TAN ENG JING EFFECT OF TIKTOK ON STUDENT LEARNING 2022

EFFECT OF TIKTOK ON STUDENT LEARNING AMONG PHYSIOTHERAPY STUDENTS

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By

TAN ENG JING

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EFFECT OF TIKTOK ON STUDENT LEARNING AMONG PHYSIOTHERAPY STUDENTS

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ABSTRACT

Background and Objective: In this modern era, the presence of social media (SM) has increased incrementally especially in the recent years. Education is also changing; social media are transforming educational environments, and online or blended learning are increasingly applied. The COVID-19 pandemic has further accelerated this trend. A new educational innovation where TikTok (a social media that is based on creating and sharing 15-60s videos) which experienced a significant breakthrough during the COVID-19 pandemic is used as a pedagogical tool and therefore, the aim of this study was to determine the effect of TikTok on student learning among physiotherapy students.

Methods: Quasi-experimental design was conducted in 60 UTAR undergraduate physiotherapy students with the pre-requisite of the course Physiotherapy in Musculoskeletal Conditions (PTMSK). 60 participants were equally divided into Control group and Experimental group in the ratio of 1:1. Pre-test was conducted before the intervention of lecture class and TikTok videos learning. Online lecture class was conducted for all participants whereas the Experimental group received extra TikTok learning videos. After one week, post-test was conducted. The primary outcome was the clinical reasoning test on the topic of Tennis Elbow. The data collected were then analyzed using Paired Sample T-test and Independent Sample T-test using IBM SPSS software statistics version 26.0.

Results: The total participants recruited were 60 students but only 58 of the data were processed. The students consist of 37.9% male and 62.1% female which have mean age of 20.91±0.601. Paired Sample T-test revealed that there were significant differences between pre-test and post-test scores among the control group ($p<0.0001$). There were significant differences between pre-test and post-test scores among the experimental group ($p<0.0001$). Independent Sample T-test analysis revealed that there was significant difference in post-test scores between the control group and experimental group ($p=0.001$).

Conclusion: In general, TikTok has a significant effect on student learning among UTAR physiotherapy students.

Keywords: Video-based Learning, TikTok, Physiotherapy Student Learning, Undergraduate Physiotherapy Students.

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APPROVAL SHEET

This Research project entitled "**EFFECT OF TIKTOK ON STUDENT LEARNING AMONG PHYSIOTHERAPY STUDENTS**" was prepared by TAN ENG JING and submitted as partial fulfilment of the requirements for the degree of Bachelor of Physiotherapy (HONOURS) at Universiti Tunku Abdul Rahman.

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PERMISSION SHEET

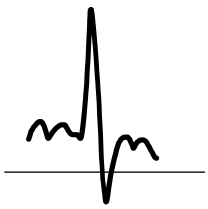
It is hereby certified that **TAN ENG JING** (ID No: **19UMB03239**) has completed this Research project entitled "EFFECT OF TIKTOK ON STUDENT LEARNING AMONG PHYSIOTHERAPY STUDENTS" under the supervision of MR AVANIANBAN CHAKKARAPANI (Supervisor) from the Department of Physiotherapy, Faculty of Medicine and Health sciences.

Yours truly,

(TAN ENG JING)

DECLARATION

I hereby declare that the Research project is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UTAR or other institutions.

Signature: 

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LIST OF ABBREVIATIONS

HE	Higher Education
PTMSK	Physiotherapy in Musculoskeletal Conditions
SM	Social Media
UTAR	Universiti Tunku Abdul Rahman
VBL	Video-based Learning

CHAPTER 1

INTRODUCTION

1.1 Chapter overview

This chapter will outline the background of the study, concluding remarks before proceeding to the importance and relevance, research objectives as well as hypotheses operational definition of terms, rationale of study, scope of study, structure of research project for the research study.

1.2 Background of Study

In this modern era, the presence of social media (SM) has increased incrementally in the recent years. SM is integrated into different components which are personal, social, and professional life and making the way different in communication among each other's. These tools create a great impact on the young's and provide new platforms for socialization.

SM is not only causing an effect on different society spheres from the economy context, sport, and communication among the society, but also the education context. Hence, higher education (HE) is changing due to SM as the university students are currently living in the era of digital where the advance of technology such as SM tend to have a continuing effect and it is important to people from all walks of life. As a result, the popularity of SM is increasing among this demographic cluster. On account of the high influence rate of SM among the students, thus there is a need to determine the potential of SM in the educational aspect and

incorporate the media as a strategy to the plans in education and generate new course materials based on the advance technologies.

In short, the HE institutions should be appreciate the opportunities that technology demonstrates and support the creation of new, more diverse, appealing, and inspirational learning environments. The ability of personalize learning and increased time, speed, and location flexibility lead to the technology successfully enhances learning and allows it more manageable.

When COVID-19 was widespread, technology and SM has increased the educational role remarkably. When people are not able to leave their homes for an extended period of time, these tools serve a platform for contact amongst people. Moreover, the HE sector were affected by these prohibitions. During the COVID-19 pandemic, HE has been compelled to switch from the physical environment of face-to-face learning to the environment of online learning. Hence, the digital tools are essential for the teachers to continue their classes. However, the teachers and students are still having the barrier in accessing to digital technologies. The COVID-19 pandemic has displayed these drawbacks as parts of students were not able to present in classes due to difficulty in accessing to computers or internet connection (Escamilla, Alguacil & Lopez-Carril, 2021).

Professional education programmes in tertiary institutions face a challenge which is to ensure the students learn in ways that allow them to practice effectively. It is relatively important to ensure that the professional skills and knowledge that are taught are useful in the practical aspect and the students are able to apply their knowledge in clinical practice (Jones, 2010). Educational usage of social media had significantly improved the student learning

experience. The social media nowadays can be easily accessed and frequently used by the students (Radin & Light, 2022).

Video-based (VBL) is now recognized as a useful learning resource in online teaching and learning process. The VBL unique features allow it to be considered as an highly effective learning alternative which able to enhance and to some extent replacing the traditional learning mode which the classroom-based and teacher-centered learning approaches. VBL is able to make the way of teaching and learning different. Videos assist the students by allowing the students to visualize how something is working and present the information and details which are difficult to be explained in words or static photos. Besides that, videos can attract the students' attention, hence the students are motivated and better learning outcomes can be ensured. Apart from that, videos encourage different type of learning styles especially for the students who are "visual learners" (Yousef, Chatti & Schroeder, 2014).

Health care academic educators should encourage and motivate the students in utilizing the advanced technology during their preparation in academic. Apart from that, health care educators are claimed that they have utilized the technologies such as video, film, slides presentations, audio recordings and web-based content in the lecture class and classroom activities (Moore & Smith, 2012). Previous studies proved that utilizing video mini lectures improves satisfaction of the participants. The educational videos motivate and drives the learner to appreciate own ship of their learning process and connect themselves with the course.

Using video as a tool in education, it is suggested to be effective when the educators consider the following elements which included the ways to cope with the video cognitive load; the way in maximizing the student engagement and interaction with the video; and they way

in promoting and encourage active learning from the video. The educators should manage and minimize the cognitive load and should look into the students' intrinsic cognitive load when designing the educational materials as the capacity of the students' memory of students is limited, and the knowledge perceived has to be processed into memory. In order to enhance the learning process by managing the cognitive load, the educational videos can use as signaling to highlight the important points and information (Brame, 2016).

Social media platforms which highly focused by the youth nowadays such as TikTok can provide a remarkable window into youth experiences, attitudes, including the perceptions of online learning (Literat, 2021). In 2016, TikTok which also known as Douyin is a social network which newly launched in China and launched internationally as TikTok in 2017. Knowledge sharing is becoming more important on the short video platform such as TikTok. According to Su (2020), the users tend to show positive attitudes on TikTok as they are able to learn a lot of beneficial skills. Videos have been highly utilized in knowledge sharing from social media to Massive Online Open Class (MOOC) platforms. There are studies claimed that the students are more interactive with the knowledge sharing videos which are less than 3 minutes on MOOC platforms whereas videos less than 5 minutes ensure the students to acquire the knowledge for the users by improving the leaners' attitude, effectiveness, and engagement. Other studies showed that the user's learning experience can be improved by utilizing video-based MOOC platforms in the teaching and learning process due to the easy access of knowledge in the comment section can make the viewers have a better understanding on the content of the videos (Qiyang & Jung, 2019).

In conclusion, it is very important to identify the effect of TikTok on student learning among physiotherapy students. Thus, this study aims to investigate the effect of TikTok on student learning among physiotherapy students.

1.3 Concluding Remarks

All in all, this study will be conducted to assess the effect of TikTok on student learning among physiotherapy students.

1.4 Research Objectives

To determine the effect of TikTok on student learning among physiotherapy students.

1.5 Hypotheses

Null hypothesis (H_0): TikTok has no significant effect on student learning among physiotherapy students.

Alternate hypothesis (H_A): TikTok has significant effect on student learning among physiotherapy students.

1.6 Operational Definition

a) TikTok refers to a short form video hosting service which hosts various short-form user videos with durations from 15 seconds to ten minutes.

b) Student learning refers to knowledge or attitudes of a learner on an educational activities.

c) Physiotherapy students are to students who are working to have doctoral degrees, to be autonomous practitioners and practitioners in determining interventions and to prevent impairments, functional limitations and disabilities related to movement, function and health (APTA, 2007).

1.7 Rationale of Study

The rationale for this study is to determine the effect of TikTok on student learning among physiotherapy students. When looking into video-based learning, there are diverse of controversies of video length which contribute to the students forming favorable or crucial attitudes towards the educational videos. According to Guo, Kim & Rubin (2014), the recorded videos that longer than six minutes were found to be significant decreased in the engagement and viewing times.

Long videos such as a 50-minutes lecture recording, or a 20-minutes YouTube video will probably distract the students easily because a long video is not only including the important points on the procedures but also contain a lot of unnecessary sentences that some students might not interested in it. In contrast, the unique features of the short videos such as TikTok are to enable the students to pause and replay the videos to increase the depth of understanding of the contents. The ability of replaying of videos also provides an alternative to enhance learning among the students. Apart from that, the students can reflect themselves and identify

and enhance the specific parts of deficiency, utilizing appropriate additional time to establish a deeper understanding of the course, and discuss and interact with the instructors.

As there is limited of the similar study has been conducted in Malaysia, there is a need to determine the effect of TikTok on student learning among the physiotherapy students so that the learning process of the students can be enhanced, and the productivity can be increased to allow more and more physiotherapists are well-verse in the practical skills which required in the future job field.

1.8 Scope of Study

The aim of this study was to investigate the effect of TikTok on student learning among physiotherapy students. The recruited participants were screened to meet the inclusion criteria in this study. Pre-test using clinical reasoning test to determine the baseline existing knowledge regarding the topic of Tennis Elbow of the participants before the implementation of intervention. Lecture class was given after the pre-test and followed by the TikTok videos learning for the experimental group. Lastly, post-test using clinical reasoning test to compare the depth of learning of the control group and experimental group. The implementation of the procedures will be conducted in the physiotherapy centre of Universiti Tunku Abdul Rahman (UTAR) Sungai Long campus, Malaysia. Permission to use the premises to conduct this study will be obtained from the Faculty of Medicine and Health Science of UTAR.

1.9 Structure of research project

In this research paper, This chapter will outline the background of the study, concluding remarks before proceeding to the importance and relevance, research objectives as well as

hypotheses operational definition of terms, rationale of study, scope of study, structure of research project for the research study. Chapter 2 follows subsequently with the literature review done on relevant themes of past studies. Chapter 3 features the methodology used in this research which discusses the research design, study setting, study population, sample size, sampling method, inclusion and exclusion criteria, instrumentation and procedure sampling design, research instrument and procedure. Chapter 4 will present the results of the data collected after descriptive and inferential analysis as well as the hypothesis testing. Chapter 5 will conclude with the discussion of the findings from the study, the limitation of the study and suggestion for future study. Chapter 6 will cover the conclusion of this study.

CHAPTER 2

LITERATURE REVIEW

2.1 The use of video-based learning

In this modern era, the advanced technology has become one of the significant parts in the teaching process as it promotes the use of e-learning basis among teachers and students toward and it led to massive changes in the process of student learning (Sablic, Mirosavljevic & Skugor, 2021). Learning videos has been applied widely in the recent years; however, the interest has been significantly increased in this era. There are many learners watch the learning videos from different platform such as YouTube on different gadgets such as desktop, phone and tablet. Hence, the students are able to access the academic content easily via the digital libraries and attend online courses from their homes (Manasrah, Masoud & Jaradat, 2021).

E-learning has progressively replaced the traditional classroom learning which is the physical learning mode as the first priority for teaching session and led the society toward a lifelong vision and on-demand learning. It is claimed that one of the trends which are currently fastest moving around the world, and it facilitates the integration of the traditional learning materials and tools into a single solution to share the educational content in an effective way (Zhang et al., 2006).

Video-based learning (VBL) implies the knowledge or skills acquired by the learners through teaching through video. The reason of videos being powerful as a medium used in e-learning is videos can convey the information in an attractively and consistently (Zhang et al., 2006). There are several key features of video such as the application of both auditory and

visual cues. The primary source is supplied by the visual aspects whereas the audio is utilized to elaborate on the information. Hence, the unique features of VBL enable the learning method to become more effective which able to enhance and partially replace the traditional learning process. The advanced technologies of smartphones and tablets with the use of social media platform such as YouTube facilitate the integration of video applications in education (Manasrah, Masoud & Jaradat, 2021).

There is extensive research has revealed that the VBL can ease the teachers and learnings during the teaching and learning process. The benefits included VBL provides flexibility in terms of time and location, cost and time savings for institutions of educational, reinforces self-directed and self-paced learning by allowing learning-centered activities, serves a collaborative learning environment by connecting each learner with the experts and peers, provides unlimited access to the electronic learning material, and promotes knowledge to be maintained or updated in a more effective way (Zhang et al., 2006).

In comparison, the traditional teaching activities are generally according to the chapters of the semester syllabus. As a result, the students are reluctant to learn and become passive in the learning process and probably led to decline in critical thinking ability. The students are unlikely to understand what they have learned from the class and hence fail to apply the knowledge in daily living. Educational videos make a remarkable change in the learning process which from traditional teacher-centered settings to learner-centered settings (Sablic, Mirosavljevic & Skugor, 2021).

One of the most challenging issues faced by the instructors in the academic field is the declined span of students' attention. Generally, the instructors have implemented various alternatives to keep the students alert and focused on the class regardless physically or in online mode. However, the methods are only effective in the physical class as most of the students have a strong impact on the visual effect delivered by the educators. The issue is showed again when the schools and universities around the world transform to the basis of E-learning after the occurrence of COVID-19 pandemic in the past 2 years (Manasrah, Masoud & Jaradat, 2021).

Using videos as a learning tool is claimed to have a positive effect on the verbal as well as spatial intelligence on students. When encountering with some challenging topic, the students can pause and replay the videos in order to increase the depth of understanding and promotes engagement in the learning materials. The ability of replaying of videos also provides an alternative to enhance learning among the students. Apart from that, the students can reflect on themselves, identify specific parts of deficiency in the topic, utilizing appropriate additional time to increase the depth of understanding of the course, and discuss and interact with the instructors. Furthermore, the students are able to reinforce the concepts as the videos are always ready and easily accessible by the students (Slemmons et al., 2018).

2.2 Comparison of the effectiveness between short videos and long videos for learning purpose

From the higher education aspect, the educational videos are important as a tool in delivering the content in the flipped, blended, and online classes. Using videos as a tool of education is claimed to be effective is enhanced when the educators consider the following

three elements: ways to manage the cognitive load of the video; how to maximize the student interaction and engagement with the video; and how to promote active learning from the video (Brame, 2016).

According to the model of memory, cognitive load theory indicates that there are three components in learning experience which included the intrinsic load, germane load, and the extraneous load. Firstly, intrinsic load is deep-rooted to the individual under study and is determined in part by the degrees of connectivity within the subject. Secondly, germane load is the level of the cognitive activity required to achieve the desired learning outcome. Lastly is the extraneous load which is the cognitive effort that does not lead the learner to achieve the desired learning outcome. Hence, the educators should minimize the extraneous cognitive load and should appreciate the intrinsic cognitive load of the student when designing the educational materials as there is limited capacity in memory, and the information perceived has to be processed by working memory to be transformed into long-term memory. In order to enhance the learning process by managing the cognitive load, the educational videos can use signaling to highlight the important points and information. For instance, a brief subtitles or captions text to explain the purpose and context for the video, short videos which have a duration of 6 minutes or less (Brame, 2016).

According to the cognitive theory of learning, this theory is based on two channels which are auditory and visual, which implies that each auditory and visual channel has a limited capacity and limited ability of processing. When a person is watching videos, the auditory and visual information are processed simultaneously, and the issue found in the continuous present of information in the video will lead to heavy load cognitive burden. If the information is

provided without controlling in speed and length of the video, the intrinsic load may rise (Guo, Kim & Rubin, 2014).

Students is lack of attention and focus on the virtual classrooms especially the recorded video lectures. 50 minutes recorded video lecture is not effective when compared to the physical in-class lecture with the same length. As a result, this issue not only create a negative effect on the students' academic performance, but also led the student to think that the course is boring and not enjoyable even with the application of advanced technologies and smart devices such as the computers and tablets (Manasrah, Masoud & Jaradat, 2021). Thus, application of short videos in student learning is important.

2.3 The use of TikTok in educational aspect

With the arrival of new modern era especially in the recent years, the influence rate of short videos is increasing in the sector of SM as short videos allow the individuals to capture the memorable moments in range of a few seconds to several minutes. In the point of fact, videos have successfully captured the attention of the society on Instagram and Facebook and currently the new SM called TikTok. TikTok, which is also known as DouYin in the Chinese market. The owner of TikTok is the technology company named ByteDance and it promotes the users to create and share short videos easily and quickly (Serrano, Papakyriakopoulos & Hegelich, 2020). Within the range of 60s, the videos are able to achieve great complexity and originality by using images, sounds, and video clips.

According to the data recorded in February 2020, TikTok have achieved the highest rate of download and install app globally with an approximate number of 113 million download. Moreover, the discovery of TikTok increased globally owing to the outbreak of COVID-19 (Su et al., 2020). This conclusion is supported as TikTok is the first SM in history that promote a remarkable growth in a quarter which was from January 2020 to April 2020 with achieved a total number of 315 million new installations on App Store and Google Play (Sensor Tower, 2020). Owing to the new appearance of TikTok in 2017, it ranked number 7 in February 2020 which based on the active users numbers (Statista, 2020).

The simple interface design led to TikTok rapid success such as the application can be easily accessed and its intuitive use (Garg & Pahuja, 2020). Moreover, because of the myriad of video editing tools, it allows the users to create and share their own visual content. Apart from that, there are diverse variety of music types can be found in TikTok which allows the users to apply any original song or an audio clip during the videos editing. In spite of that, the main upside of TikTok over other SM applications is that the TikTok video can be shared across different applications and allow the videos can reach to individuals who do not own a TikTok account (Hayes, Stott, Lamb & Hurst, 2020).

In 2016, TikTok which also known as Douyin is a social network launched in the Chinese market and launched internationally as TikTok in 2017. In 2018, TikTok had achieved most downloaded mobile app in United States, and it can be easily accessed by more than 150 countries around the world and has more than 800 millions of monthly users who are active in the TikTok. Of these, there are 41% users are aged between 16 and 24 which had a younger demographic compared to other social networks. In December 2018, TikTok had achieved

more than 271 million active monthly global users and reached 1 billion by September 2021. The TikTok users are able to create and share the short-looping videos which generally ranged from 15 to 3 minutes that are quick and easy to edit with different effects and sounds included from the phone gallery.

In May 2020, TikTok hosted a program called LearnOnTikTok program. It aims to facilitate and promote learning during the COVID-19 lockdowns through sharing the educational videos on TikTok. The educational videos are created and shared by the professionals from different disciplines, fields and other users to share their knowledge to the public. The videos were uploaded with a hashtag of #learnontiktok, have various topics such as from science experiments, cooking meal recipes, health tips, learning other languages. Currently, the videos uploaded with the hashtag of LearnOnTikTok have achieved a total number of 72 billion views, and there are still average of hundreds of videos are uploaded every day (Fiallos, Fiallos & Figueroa, 2021).

In this modern era, different videos can be used for teaching and learning purpose including TikTok videos which are the videos created by the users with an average duration of 60 seconds. The TikTok users are able to create interesting videos and have some interaction with each other in the comments. TikTok offers interesting and easy way to encourage everyone in creating impressive videos.

According to Nabilah et al. (2021), TikTok clubs and societies are administered in some schools in the USA and teachers are using TikTok for teaching purpose and interaction with the students. This phenomenon is strongly encouraged because most of the students already registered the TikTok account, and it is easier to utilize the tool of technology in engaging the students in the innovative learning using videos. Apart from that, TikTok also provided a useful editing tool that allow the users to create and upload near-professional outcomes. From the educational aspect, TikTok is claimed to be useful due to the students can watch the teacher-made short videos repeatedly.

Some teachers have created their own videos to illustrate the intricate concepts in the syllabus or share the specific task instructions in the class. This process is beneficial to the students as they do not require to be distracted in trying to catch every word in their notes. Instead, they are not restricted from repeatedly accessing the most relevant points in a video version. Utilizing TikTok as a teaching and learning tool can tackle the issues that the students may face (Nabilah et al., 2021).

METHODS

3.1 Chapter overview

This chapter will outline the research methodology and highlight the research design, study setting, study population, sample size, sampling method, inclusion and exclusion criteria, research instrumentation, procedure and lastly ethical approval in detail.

3.2 Research design

The research design for this study was Quasi-experimental study to study the effect of TikTok on student learning among physiotherapy students. Quasi-experimental study

In this study, both control group and experimental group were formed. The participants of focus were UTAR physiotherapy students who were taken the course of Physiotherapy in Musculoskeletal Conditions and the sampling method was convenience sampling. The initial contacts of the investigators were approached first and are encouraged their relevant friends to participate in this study.

The participants were allocated into two groups which were the control group and the experimental group without random assignment of participants with the ratio of 1:1. In control group, the participants were only provided lecture class learning whereas in the treatment group, the participants were provided lecture class and additional TikTok videos for learning purpose to determine the effect of TikTok on student learning among physiotherapy students.

3.3 Study Setting

This study was conducted at Sungai Long campus of Universiti Tunku Abdul Rahman (UTAR).

3.4 Study Population

The population for this study was undergraduate physiotherapy students in Sungai Long campus of Universiti Tunku Abdul Rahman (UTAR) who have completed the subject of Physiotherapy in Musculoskeletal Conditions (PTMSK).

3.5 Sample Size

The sample size is determined by using G*Power 3.1.9.4 analysis. The test family is set as T tests and Means: Difference between two independent means (two groups) experiment is set at the statistical test. The effect of size is small which is set at 0.8. Number of groups is 2 giving a sample size of 84 participants. Additional 10% was added up to accommodate for possible dropout rate using the formula of (N1 = n/(1-d), thus the total sample size is 92. There are two groups, and the ratio was 1:1. Thus each group will be consisted of 32 participants.

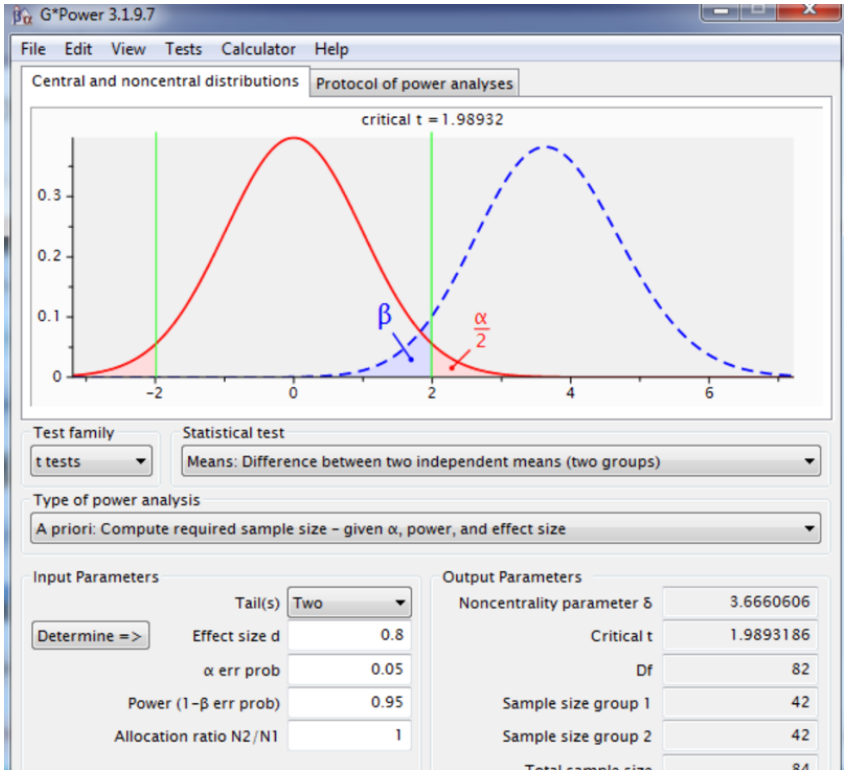

Figure 1. G*Power 3.1.9.4 analysis for this study

Due to time constraints and lack of students' interest in participating in this study, the researcher was only able to obtain 60 participants for this study. 60 participants were divided equally into two groups (Control group and Experimental group) with the ratio 1:1. Each group consist of 30 participants.

3.6 Sampling Method

The sampling method of this study was purposive sampling technique which was one of the non-probability samplings. According to purposive sampling method, the participants were recruited based on researchers' own judgement to participate in this study. The subjects were chosen by choice but not by chance through the judgement made by the researcher based on own knowledge about the population.

In this study, undergraduate physiotherapy students in Sungai Long campus of Universiti Tunku Abdul Rahman were recruited.

3.7 Inclusion Criteria

1. Undergraduate physiotherapy students in Sungai Long campus of Universiti Tunku Abdul Rahman (UTAR) who have completed the subject of Physiotherapy in Musculoskeletal Conditions (PTMSK)
2. Participants who are willing to participate in this study

3.8 Exclusion Criteria

1. Undergraduate physiotherapy students in Sungai Long campus of Universiti Tunku Abdul Rahman (UTAR) who have not taken the subject of Physiotherapy in Musculoskeletal Conditions (PTMSK)

3.9 Instrumentation

A self-reported participants recruitment form containing three sections was used in this study. Section A provided the Personal Data Protection Statement and obtained the informed consent from the participants. The participants required to provide an electronical signature and the date. Section B consisted of 7 questions to obtain the demographic data of the participant including name, age, gender, ethnicity, contact number, student ID, and year and

trimester of study. Section C was used to determine the eligibility of participants to participate in this study to determine the pre-requisite course for PTMSK and TikTok users.

Lecture class was held online on the platform of Microsoft Teams. The lecture class was organized by the lecturer from Faculty of Medicine and Health Sciences, Department of Physiotherapy, Universiti Tunku Abdul Rahman, Malaysia, Mr. Avanianban Chakkarapani. The duration of the online lecture class was one hour. The topic of the lecture class was the condition of Tennis Elbow.

TikTok videos were created by the researcher and uploaded on the platform of TikTok. A total of 7 TikTok short videos with the average duration of 40 seconds were posted on TikTok. The content of TikTok videos included introduction of Tennis Elbow, provocative tests for tennis elbow (Cozen's test, Mill's test, Chair test and Maudsley test), and physiotherapy management for tennis elbow (therapeutic eccentric exercise, strengthening exercise, stretching exercise, ball squeeze, finger web exercise).

Clinical reasoning tests were used in the pre-test and post-test. It was used to determine the baseline existing knowledge on the topic of tennis elbow during pre-test and used as an outcome measure of the impact of TikTok learning during post-test to compare the depth of learning between the participants who attended lecture class only and participants who participate in both the lecture class and TikTok learning. The clinical reasoning tests papers were prepared by the lecturer from Faculty of Medicine and Health Sciences, Department of Physiotherapy, Universiti Tunku Abdul Rahman, Malaysia, Mr. Avanianban Chakkarapani and the researcher was blinded in preparing the exam papers to avoid any bias. Different case

reports regarding the condition of tennis elbow were provided in the pre and post-test clinical reasoning tests. There are 15 questions with a total mark of 50.

3.10 Procedure

After the ethical approval from UTAR Scientific and Ethical Review Committee (SERC) was obtained, the researcher started to recruit participants for this study. 60 participants were successfully recruited to participate in this study. Participants were screened for the pre-requisite of the course Physiotherapy of Musculoskeletal Conditions (PTMSK) and all participants were found to be eligible to participate in this study. They were divided into two groups which were the control group and experimental group equally in the ratio of 1:1. Each group consisted of 30 subjects. For the control group, the subjects will be attending a lecture class only whereas the experimental group will be attending a lecture class with an additional TikTok videos learning.

A briefing on the purpose of this research study was given to the participants during the participants recruitment. The demographic data of the participants was collected using an online Google Form. The participants who met the inclusion criteria of this study, an informed consent was asked and obtained. Besides that, the participants were notified about the possible risks and benefits of this study. The Personal Data Protection Notice was explained to each participants about their personal data will not be disclosed and all information was under protection at all time.

The topic of Tennis Elbow as the learning topic in this study was decided from the participants during period of participants recruitment. A pre-test exam was held before any intervention of lecture class and TikTok videos learning in order to determine the baseline existing knowledge on the topic of Tennis Elbow. The exam was held physically at the classroom of KA block of Universiti Tunku Abdul Rahman (UTAR). A clinical reasoning test which provided a case report of Tennis Elbow and consisted of 15 questions with total marks of 50 was distributed to each participants. The duration of the exam was one hour and the participants were allowed to leave once their submission of the exam papers were done.

Next, a lecture class which were given by the lecturer from Faculty of Medicine and Health Sciences, Department of Physiotherapy, Universiti Tunku Abdul Rahman, Malaysia, Mr. Avanianban Chakkarapani to the participants was held online on the platform of Microsoft Teams. The duration of the online lecture class was one hour. The topic of the lecture class was the condition of Tennis Elbow.

On the same day of lecture class given to the participants, a total of 7 TikTok short videos with the average duration of 40 seconds were posted on TikTok and a which created by the researcher at their free time. The content of TikTok videos included introduction of Tennis Elbow, provocative tests for tennis elbow (Cozen's test, Mill's test, Chair test and Maudsley test), and physiotherapy management for tennis elbow (therapeutic eccentric exercise, strengthening exercise, stretching exercise, ball squeeze, finger web exercise). The participants were allowed to watch the TikTok videos repeatedly until they were fully understood the topic of Tennis Elbow.

After one week, a post-test exam was conducted physically at the classroom of KA block of Universiti Tunku Abdul Rahman (UTAR). All participants from the control group and experimental group were required to sit for the post-test exam to determine their depth of knowledge to the topic of Tennis Elbow. A clinical reasoning test which provided a case report of Tennis Elbow and consisted of 15 questions with total marks of 50 was distributed to each participants. The duration of the exam was one hour and the participants were allowed to leave once their submission of the exam papers were done.

3.11 Statistical Analysis

All the data collected in this study were recorded into Microsoft Office Excel 2019 and transferred and analysed using IBM Statistical Package for the Social Science (SPSS) version 26.0. The demographic data such as age, ethnicity, year of study, pre-requisite course for PTMSK and TikTok users were analysed using descriptive statistics to provide the frequency and percentage of each category for the variables. For the continuous variables, mean, standard deviation and mean differences were calculated as well. Dependent (Paired) Sample T-test was used to compare the difference between pre-test and post-test scores among the control group and experimental group respectively. Independent Sample T-test was used to compare the difference in post-test scores between the control group and experimental group.

3.12 Ethical Approval

This study was subjected to the ethical approval from UTAR Scientific and Ethical Review Committee (SERC). The study was started after the ethical approval letter was released from UTAR Scientific and Ethical Review Committee (SERC). The ethical approval letter was attached in Appendix A.

The informed consent form was attached in Appendix C. All participants were informed that their information and responses were kept confidential at all times and their participation in this study were completely voluntary. If the participants were likely to stop the participation in this study, they preserved the right to withdraw from the study at any time.

CHAPTER 4

RESULTS

4.1 Chapter overview

The following chapter features the findings after the data collection process for the research project. Firstly, demographic data of participants is presented. Following that, the score and grouping of the outcome measures, results of the inferential tests and lastly hypothesis testing is elaborated. The results are being presented in the sequence of the tabulation first, followed by the relevant graphs, if any, and lastly a brief description at the end of that component.

4.2 Normality Test for Demographic Data

	Kolmogorov-Smirnov[a]			**Shapiro-Wilk**		
	Statistic	**N**	**p-value**	**Statistic**	**N**	**p-value**
Age	0.333	58	< 0.0001	0.615	58	< 0.0001
Gender	0.402	58	< 0.0001	0.522	58	< 0.0001

Table 4.2.1*: Tests of Normality of Age and gender*

	Median	Skewness	Kurtosis
		Statistics (std error)	Statistics (std error)
Age	2.00	0.030 (0.314)	-0.141 (0.618)
Gender	2.00	-0.511 (0.314)	-1.803 (0.618)

Table 4.2.2: *Descriptive Statistic of Age and Gender*

4.3 Demographic Data of the Participants

Demographic data	Frequency (%)	Mean (SD)
N	58 (100.0)	
Age		20.91 (0.601)
20	13 (22.4)	
21	37 (63.8)	
22	8 (13.8)	
Gender		1.62 (0.489)
Male	22 (37.9)	
Female	36 (62.1)	
Ethnicity		
Malay	0 (0.0)	
Chinese	57 (98.3)	
Indian	1 (1.7)	
Year of Study		
Year 1	0 (0.0)	
Year 2	22 (37.9)	
Year 3	35 (60.3)	
Year 4	1 (1.7)	
Pre-requisite course for PTMSK		
Yes	58 (100.0)	
No	0 (0.0)	
TikTok users		
Yes	41 (70.7)	
No	17 (29.3)	

Note: N = total number of participants, SD= Standard Deviation

Table 4.3.1: *Distribution of the participants by age, gender, ethnicity, year of study, pre-requisite course for PTMSK, and TikTok users*

Table 4.3.1 above shows that frequency and percentage for the age, gender, ethnicity, year of study, pre-requisite course for PTMSK and TikTok users of all participants that provided their responses in the current study. The author had successfully collected 58 responses for this study through distributing the online recruitment form via WhatsApp. All responses of the participants were included. Hence, data from 58 participants was analyzed in the SPSS 26.0 version software and the current study achieved response rate of 100%.

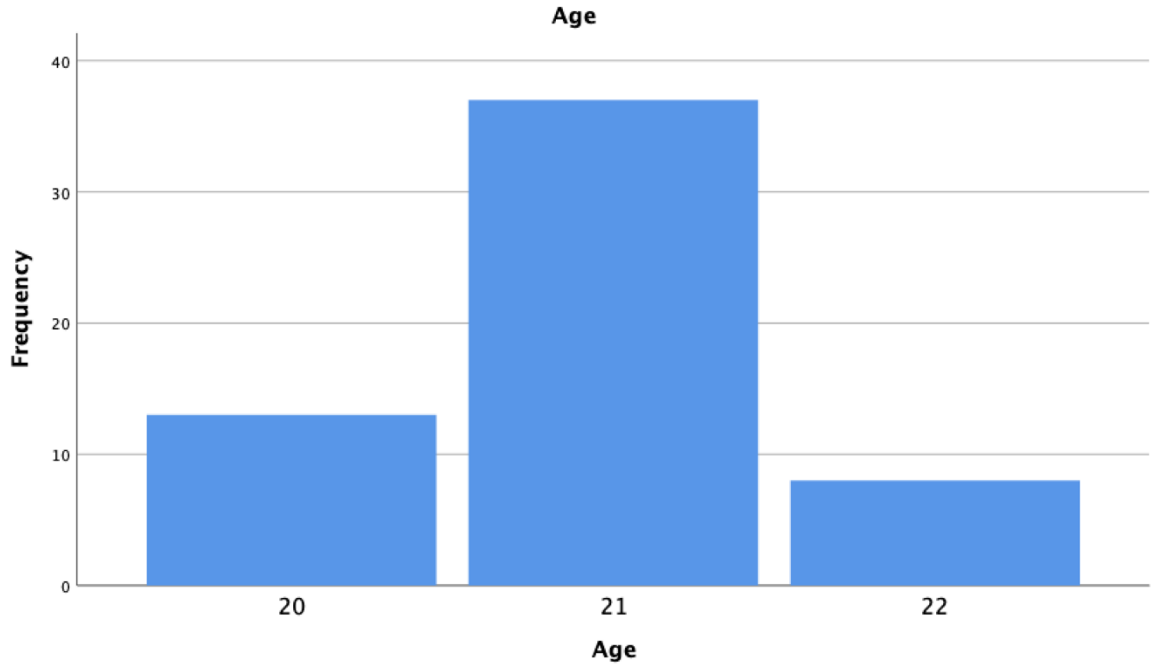

Figure 4.3.1 Bar Chart Distribution for Age of Participants

Figure 4.3.1 above illustrates the age distribution for the physiotherapy undergraduate students involved in this study. Majority of them (63.8%) were from the age of 21 with the frequency of 37 out of 58 participants. 13 participants were from the age of 20, comprising 22.4% of the total participants. Only 8 out of 58 participants were aged 22, forming 13.8% of the total participants.

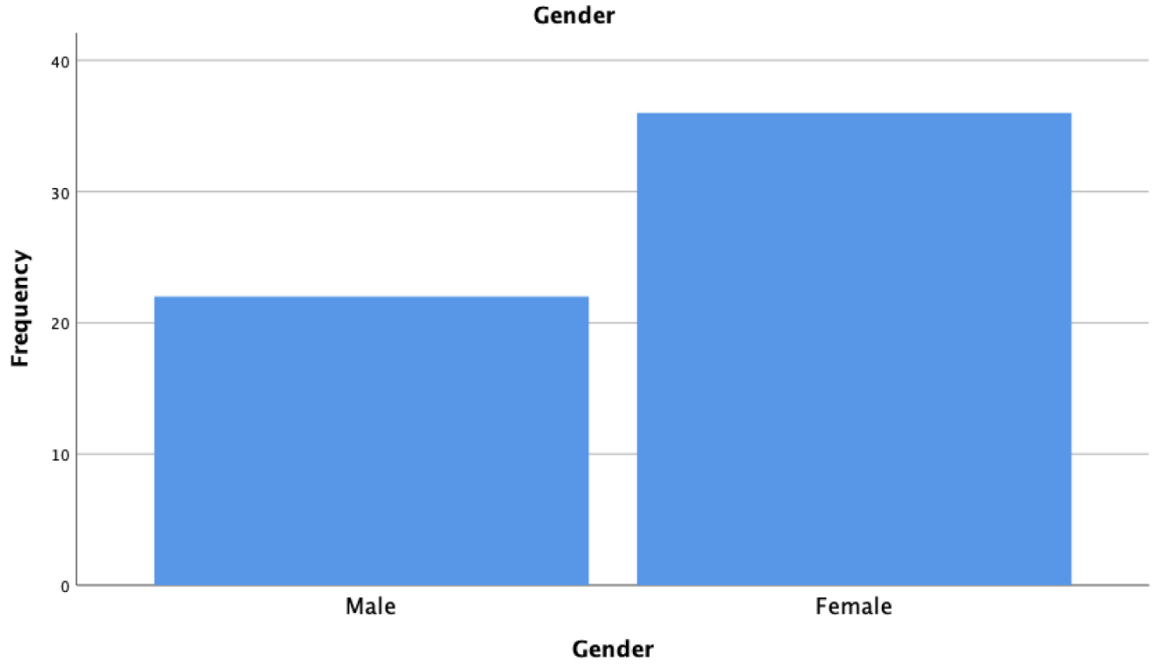

Figure 4.3.2 Bar Chart Distribution for Gender of Participants

The bar chart in Figure 4.3.2 shows the distribution for gender of participants. As illustrated by the height of the bar chart, most of the participants in this study were female which 36 out of 58 participants (62.1%) whereas 22 male participants (37.9%) had participated in this study.

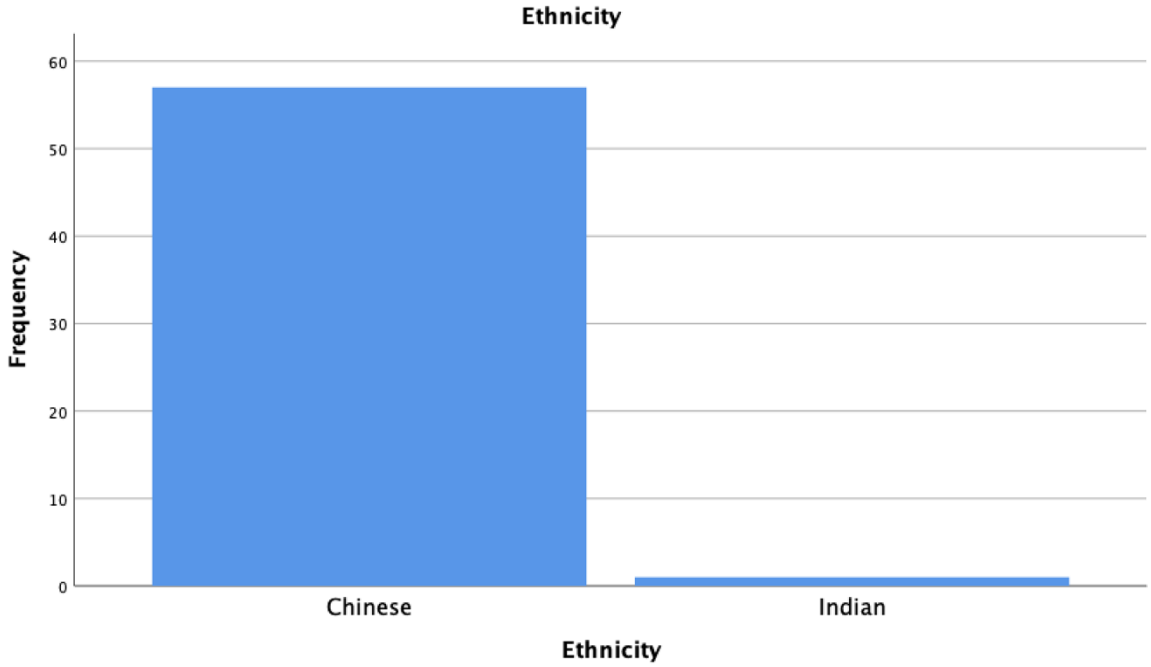

Figure 4.3.3 Bar Chart Distribution for Ethnicity of Participants

The distribution for ethnicity of participants is illustrated in Figure 4.3.3. According to the bar chart shown, most of the participants in this study were Chinese with the frequency of 57 out of 58 (98.3%). Only 1 participant involved in this study was Indian (1.7%) and no participant was from the ethnicity of Malay and others.

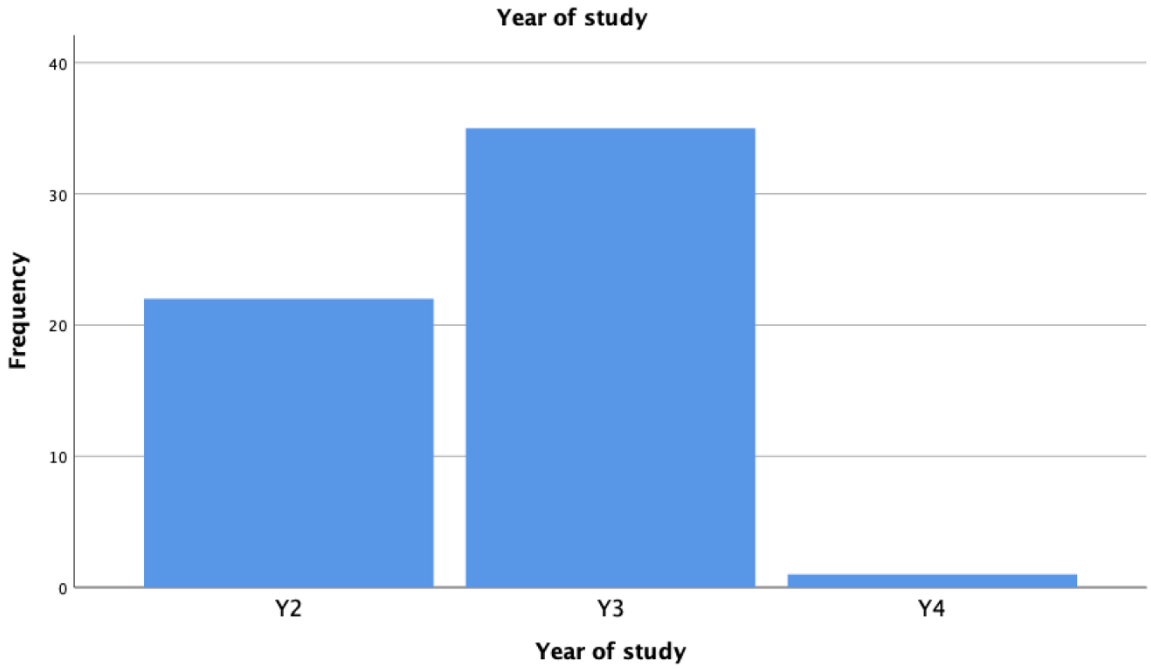

Figure 4.3.4 Bar Chart Distribution for Year of Study of Participants

Figure 4.3.4 above shows the distribution for year of study of participants. Among 58 participants, 35 (60.3%) of them were in Year 3. Year 2 students comprised 37.9% (n=22). Only 1 student from Year 4 and occupied 1.7% of the total participants.

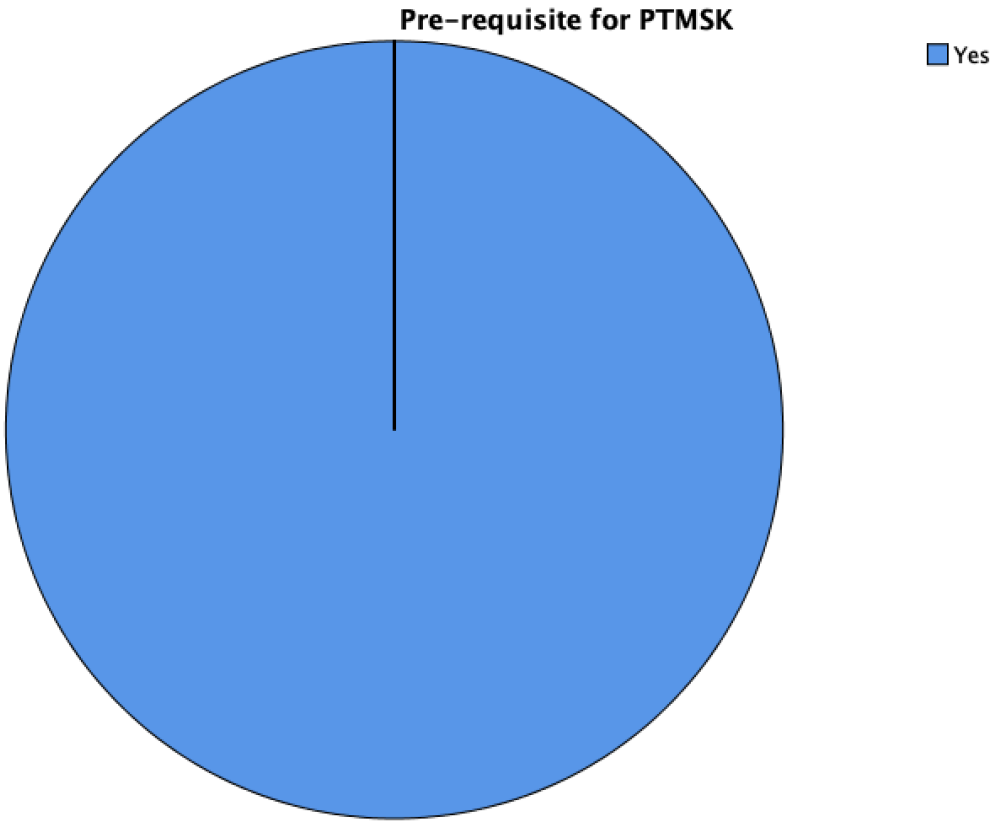

Figure 4.3.5 Pie Chart Distribution for Pre-requisite for PTMSK

The Pie Chart in Figure 4.3.5 shows the distribution for pre-requisite for PTMSK of participants. 58 (100.0%) participants had the fundamental of the subject PTMSK.

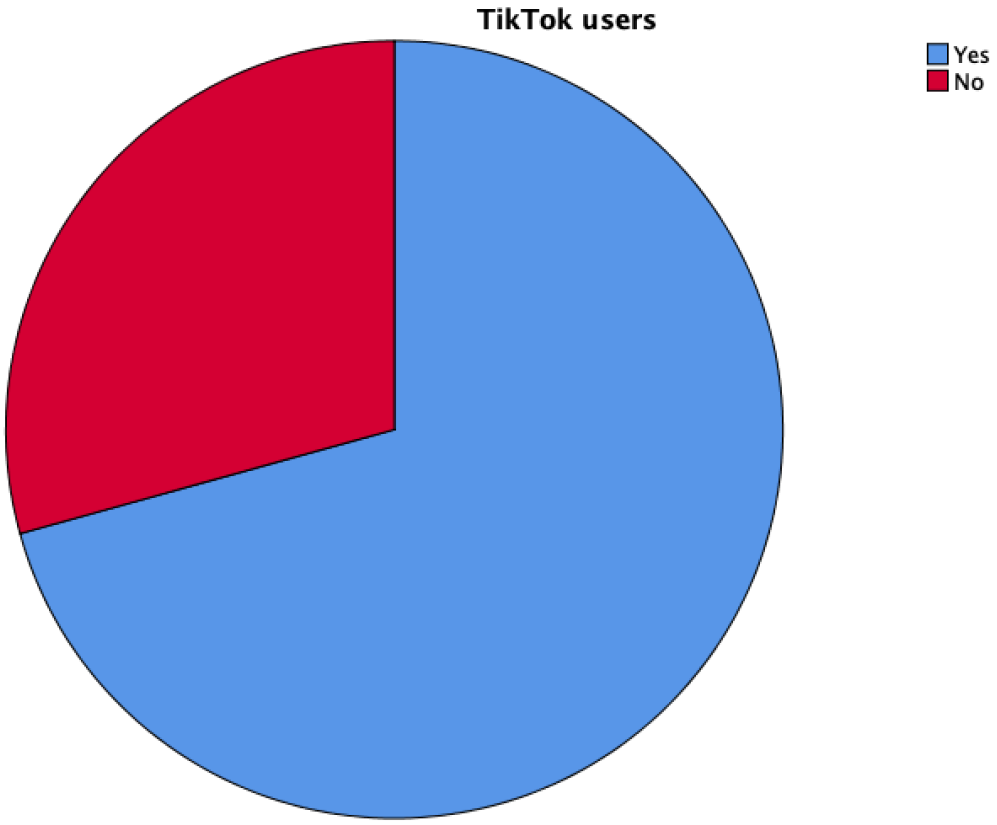

Figure 4.3.6 Pie Chart Distribution for TikTok users of participants

The Pie chart distribution for existing TikTok account of participants is shown is Figure 4.3.6. Most of the participants in this study 41 (70.7%) out of 58 participants had an existing TikTok account. 17 (29.3%) out of 58 participants had reported no existing TikTok account.

4.4 Paired Sample T-test

A Paired Sample T-test, also known as Dependent Sample T-test is used to compare the pre-test and post-test scores in one group of subjects. It aims to compare the difference of pre-test scores and post-test scores of the same group of participants.

Variables			Mean (SD)	p-value
	Pre-test	Post-test		
	Mean (SD)	Mean (SD)		
Total Scores of all participants	22.76 (5.352)	32.02 (6.348)	-9.259 (5.543)	<0.0001

Table 4.4.1: *Results of Paired Sample T-test for the Total Scores for All Participants*

Table 4.4.1 shows the results of paired sample T-test of total scores in pre-test and post-test for all participants. To test using paired sample T-test, the confidence level was set at $\alpha = 0.05$. As presented in Table 4.3.1, there was a statistically significant decrease in the pre-test scores (M= 22.76, SD= 5.352) to post-test scores (M= 32.02, SD= 6.348), t (57)= -12.722, p <.0005 (two-tailed). The mean decrease in scores was -9.259 with a 95% confidence interval ranging from -10.716 to -7.801.

From the results of the paired sample t-test, since the p value <0.05, hence null hypothesis (H_0) is rejected, it can be concluded that there is a significant difference between pre-test and post-test scores among all participants at 0.05 level of significant.

Pre-test Scores	Frequency (%)
N	58 (100.0)
12	1(1.7)
13	1(1.7)
14	1(1.7)
15	1(1.7)
16	1(1.7)
17	3 (5.2)
18	3 (5.2)
19	2 (3.4)
20	7 (12.1)
21	11 (19.0)
22	2 (3.4)
23	4 (6.9)
24	1 (1.7)
25	3 (5.2)
26	3 (5.2)
27	3 (5.2)
28	1 (1.7)
29	3 (5.2)
30	3 (5.2)
31	1 (1.7)
33	1 (1.7)
36	1 (1.7)
37	1 (1.7)

Note: N = total number of participants

Table 4.4.2: *Distribution of the Pre-test Scores for All Participants*

Table 4.4.2 shows the distribution of the pre-test scores for all participants before the intervention.

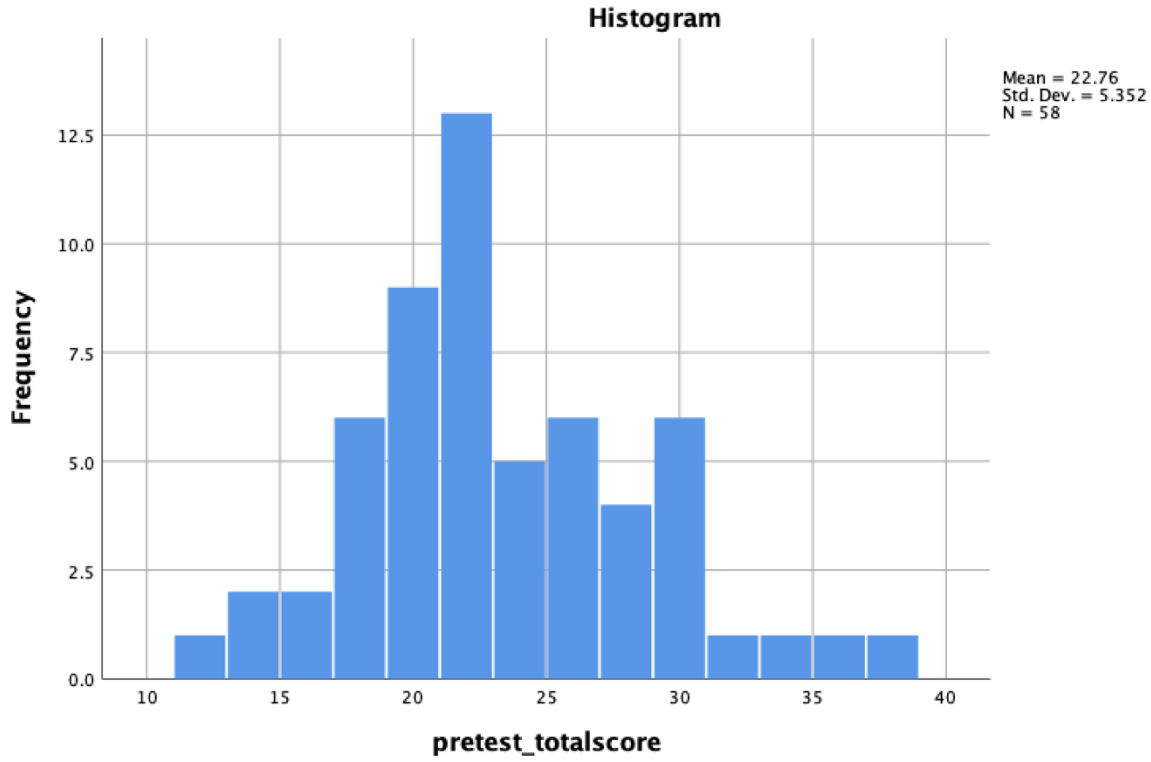

Figure 4.4.1 Histogram Distribution for the Pre-test Scores of All Participants

Figure 4.4.1 illustrates the pre-test scores of all participants before the interventions. The mean score of the pre-test is 22.76 and the standard deviation is 5.352. Most of the participants obtained the score of 21 which is the mode whereas least participants which only one participant obtained the score of 12, 13, 14, 15 and 16 respectively. The lowest pre-test score is 12 and the highest pre-test score is 37.

Post-test Scores	Frequency (%)
N	58 (100.0)
17	1(1.7)
19	1(1.7)
21	1(1.7)
23	1(1.7)
25	2 (3.4)
26	2 (3.4)
27	5 (8.6)
28	4 (6.9)
29	4 (6.9)
30	6 (10.3)
31	4 (6.9)
32	3 (5.2)
33	2 (3.4)
34	4 (6.9)
35	4 (6.9)
36	2 (3.4)
37	1 (1.7)
38	3 (5.2)
41	2 (3.4)
42	1 (1.7)
44	3 (5.2)
45	1 (1.7)
46	1 (1.7)

Note: N = total number of participants

Table 4.4.3: *Distribution of the Post-test Scores of All Participants*

Table 4.4.3 shows the distribution of the post-test scores for all participants after the intervention.

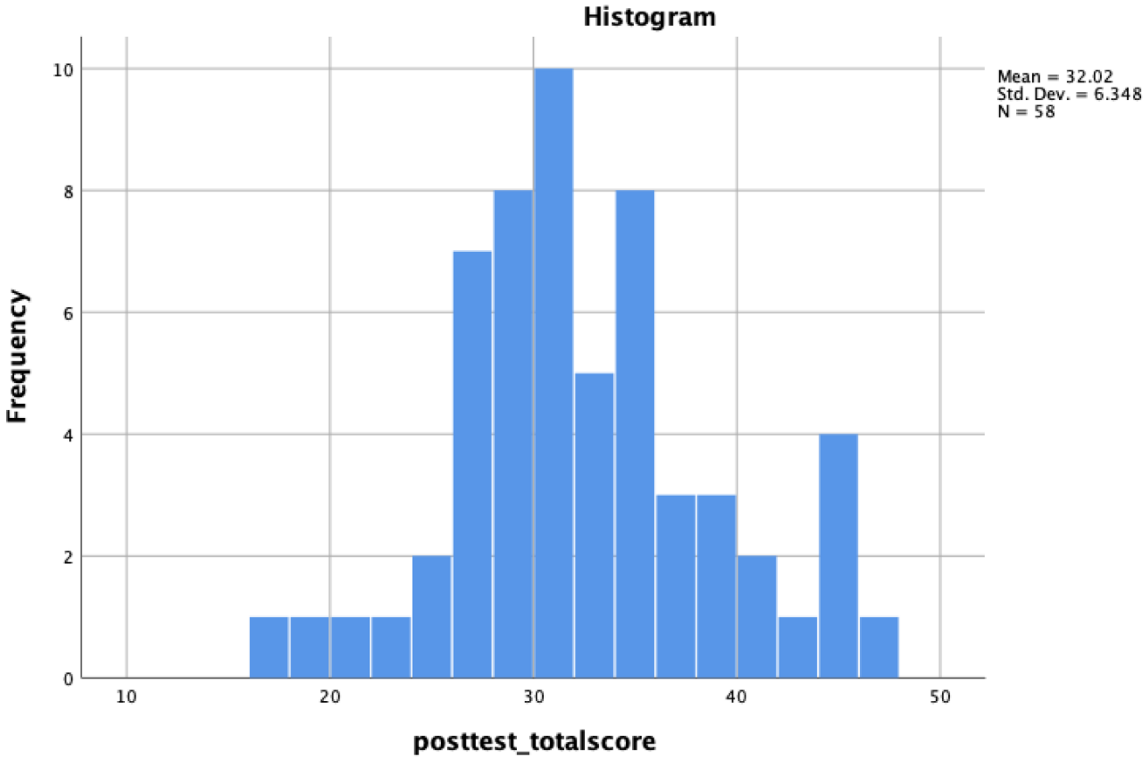

Figure 4.4.2 Histogram Distribution for the Post-test Scores of All Participants

Figure 4.4.2 illustrates the post-test scores of all participants after the interventions. The mean score of the post-test is 32.02 and the standard deviation is 6.348. Most of the participants which is 6 participants obtained the score of 30 which is the mode whereas least participants which only one participant obtained the score of 17, 19, 21 and 23 respectively. The lowest post-test score is 17 and the highest post-test score is 46.

Variables			Mean (SD)	p-value
	Pre-test	Post-test		
	Mean (SD)	Mean (SD)		
Total Scores of Control Group	22.52 (5.241)	29.28 (4.956)	-6.759 (4.453)	<0.0001

Note: SD = standard deviation

Table 4.4.4: *Results of Paired Sample T-test for the Total Scores for Control Group*

Table 4.4.4 illustrates the results of paired sample T-test of total scores for the control group. To test using paired sample T-test, the confidence level was set at $\alpha = 0.05$. As presented in Table 4.4.4, there was a statistically significant decrease in the pre-test scores (M= 22.52, SD= 5.241) to post-test scores (M= 29.28, SD= 4.956), t (28)= -8.173, p <0.0001 (two-tailed). The mean decrease in scores was -6.759 with a 95% confidence interval ranging from -8.453 to -5.065.

From the results of the paired sample t-test, since the p value <0.05, hence reject null hypothesis (H_0), it can be concluded that there is a significant difference between pre-test and post-test scores among the control group at 0.05 level of significant.

Pre-test Scores of Control Group	Frequency (%)
N	29 (100.0)
12	1 (3.4)
14	1 (3.4)
16	1 (3.4)
17	1 (3.4)
18	2 (6.9)
20	1 (3.4)
21	9 (31.0)
22	1 (3.4)
23	3 (10.3)
25	2 (6.9)
26	2 (6.9)
29	1 (3.4)
30	2 (6.9)
31	1 (3.4)
36	1 (3.4)

Note: N = total number of participants

Table 4.4.5: *Distribution of the Pre-test Scores of Control Group*

Table 4.4.5 shows the distribution of the pre-test scores of the control group before the intervention.

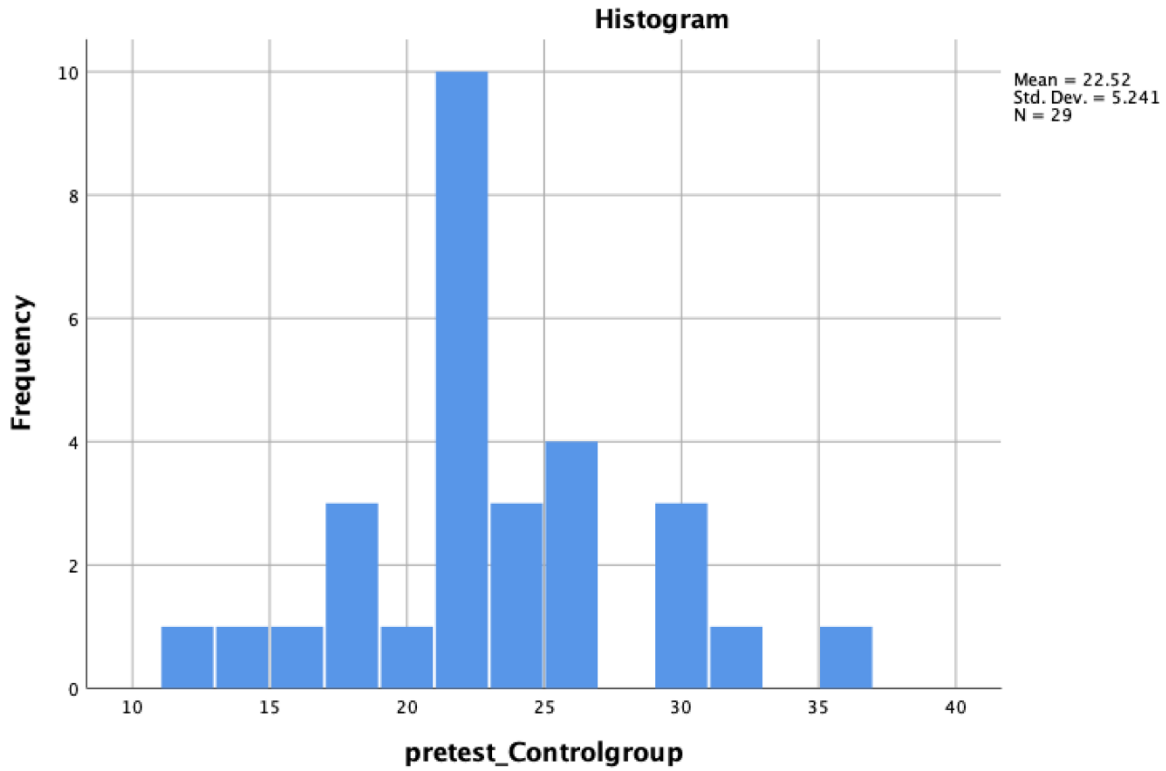

Figure 4.4.3 Histogram Distribution for the Pre-test Scores of Control Group

Figure 4.4.3 illustrates the pre-test scores of the control group before the interventions. The mean score of the pre-test is 22.52 and the standard deviation is 5.241. Most of the participants which are 9 participants obtained the score of 21 which is the mode whereas least participants which only one participant obtained the score of 12, 14, 16 and 17 respectively. The lowest pre-test score in control group is 12 and the highest pre-test score is 36.

Post-test Scores of Control Group	Frequency (%)
N	29 (100.0)
17	1 (3.4)
19	1 (3.4)
21	1 (3.4)
25	2 (6.9)
26	1 (3.4)
27	2 (6.9)
28	4 (13.8)
29	3 (10.3)
30	2 (6.9)
31	3 (10.3)
32	3 (10.3)
33	1 (3.4)
34	1 (3.4)
35	1 (3.4)
36	1 (3.4)
38	2 (6.9)

Note: N = total number of participants

Table 4.4.6: *Distribution of the Post-test Scores of Control Group*

Table 4.4.6 shows the distribution of the post-test scores of the control group after the intervention.

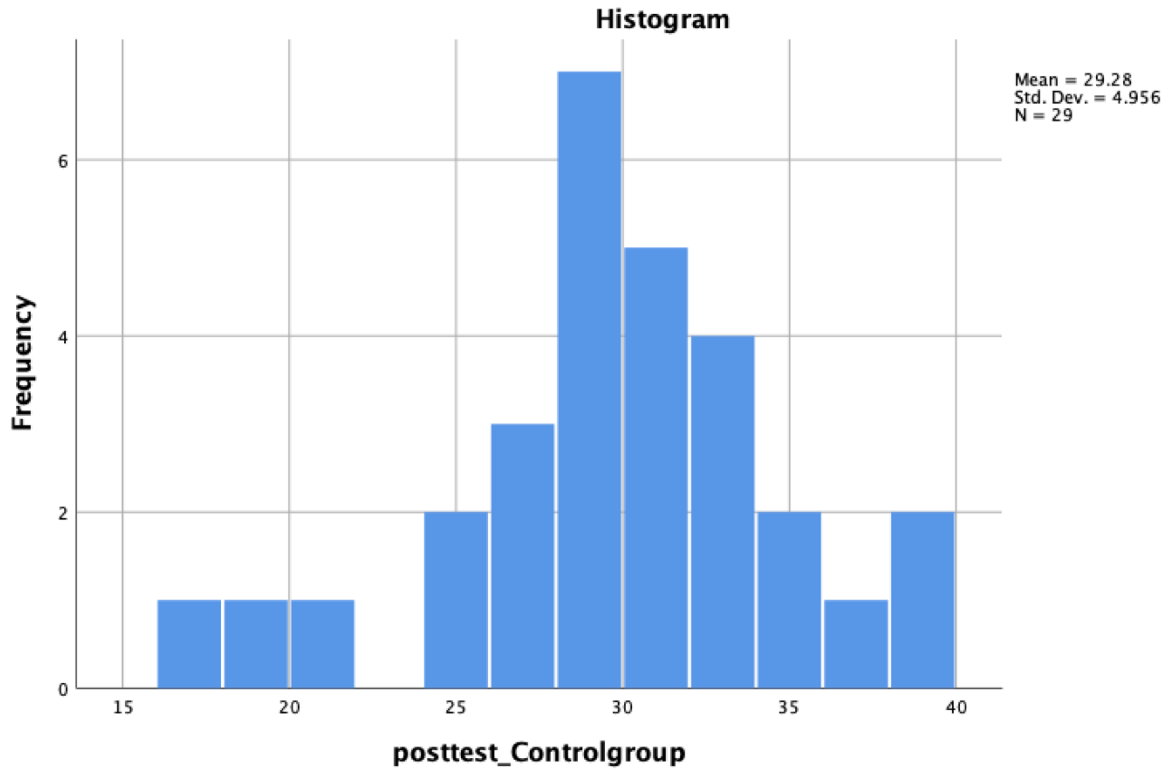

Figure 4.4.4 Histogram Distribution for the Post-test Scores of Control Group

Figure 4.4.4 illustrates the post-test scores of the control group after the interventions. The mean score of the post-test of the control group is 29.28 and the standard deviation is 4.956. Most of the participants which are 4 participants obtained the score of 28 which is the mode whereas least participants which only one participant obtained the score of 17, 19 and 21 respectively. The lowest post-test score in control group is 17 and the highest post-test score is 38.

Variables			Mean (SD)	p-value
	Pre-test	Post-test		
	Mean (SD)	Mean (SD)		
Total Scores of Experimental Group	23.00 (5.542)	34.76 (6.473)	-11.759 (5.455)	<0.0001

Table 4.4.7: *Results of Paired Sample T-test for the Total Scores of Experimental Group*

Table 4.4.7 illustrates the results of paired sample T-test of total scores for the experimental group. To test using paired sample T-test, the confidence level was set at $\alpha = 0.05$. As presented in Table 4.4.7, there was a statistically significant decrease in the pre-test scores (M= 23.00, SD= 5.542) to post-test scores (M= 34.76, SD= 6.473), t (28)= -11.607, p <0.0001 (two-tailed). The mean in total scores of experimental group was -11.759 and standard deviation is 5.455 with a 95% confidence interval ranging from -13.834 to -9.684.

From the results of the paired sample t-test, since the p value <0.05, hence null hypothesis (H_0) is rejected, it can be concluded that there is a significant difference between pre-test and post-test scores among the experimental group at 0.05 level of significant. Between the groups, there are good improvement in TikTok group as compared to Lecture only group whereas significant compared in the groups.

Pre-test Scores of Experimental Group	Frequency (%)
N	29 (100.0)
13	1 (3.4)
15	1 (3.4)
17	2 (6.9)
18	1 (3.4)
19	2 (6.9)
20	6 (20.7)
21	2 (6.9)
22	1 (3.4)
23	1 (3.4)
24	1 (3.4)
25	1 (3.4)
26	1 (3.4)
27	3 (10.3)
28	1 (3.4)
29	2 (6.9)
30	1 (3.4)
33	1 (3.4)
37	1 (3.4)

Note: N = total number of participants

Table 4.4.8: *Distribution of the Pre-test Scores of Experimental Group*

Table 4.4.8 shows the distribution of the pre-test scores of the experimental group before the intervention.

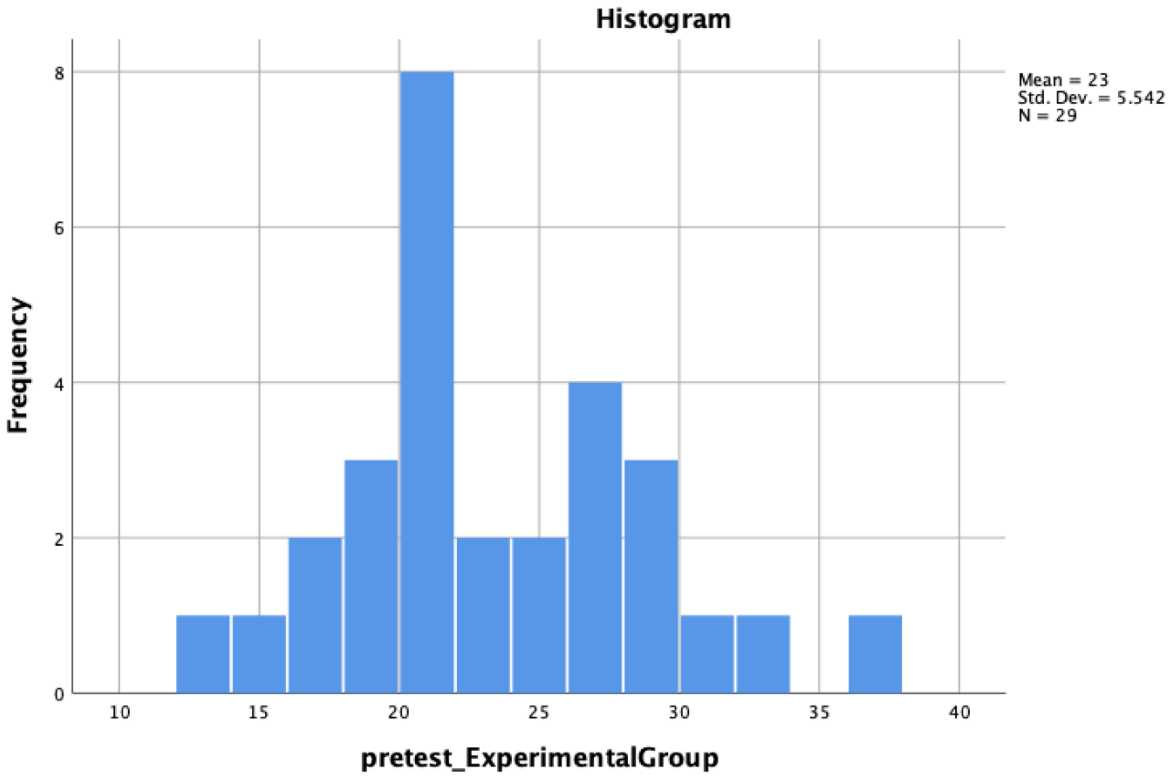

Figure 4.4.5 Histogram Distribution for the Pre-test Scores of Experimental Group

Figure 4.4.5 illustrates the pre-test scores of the experimental group before the interventions. The mean score of the pre-test of the experimental group is 23.00 and the standard deviation is 5.542. Most of the participants which are 6 participants obtained the score of 20 which is the mode whereas least participants which only one participant obtained the score of 13 and 15 respectively. The lowest post-test score in control group is 13 and the highest post-test score is 37.

Post-test Scores of Experimental Group	Frequency (%)
N	29 (100.0)
13	1 (3.4)
15	1 (3.4)
17	2 (6.9)
18	1 (3.4)
19	2 (6.9)
20	6 (20.7)
21	2 (6.9)
22	1 (3.4)
23	1 (3.4)
24	1 (3.4)
25	1 (3.4)
26	1 (3.4)
27	3 (10.3)
28	1 (3.4)
29	2 (6.9)
30	1 (3.4)
33	1 (3.4)
37	1 (3.4)

Note: N = total number of participants

Table 4.4.9: *Distribution of the Post-test Scores of Experimental Group*

Table 4.4.9 shows the distribution of the post-test scores of the experimental group after the intervention.

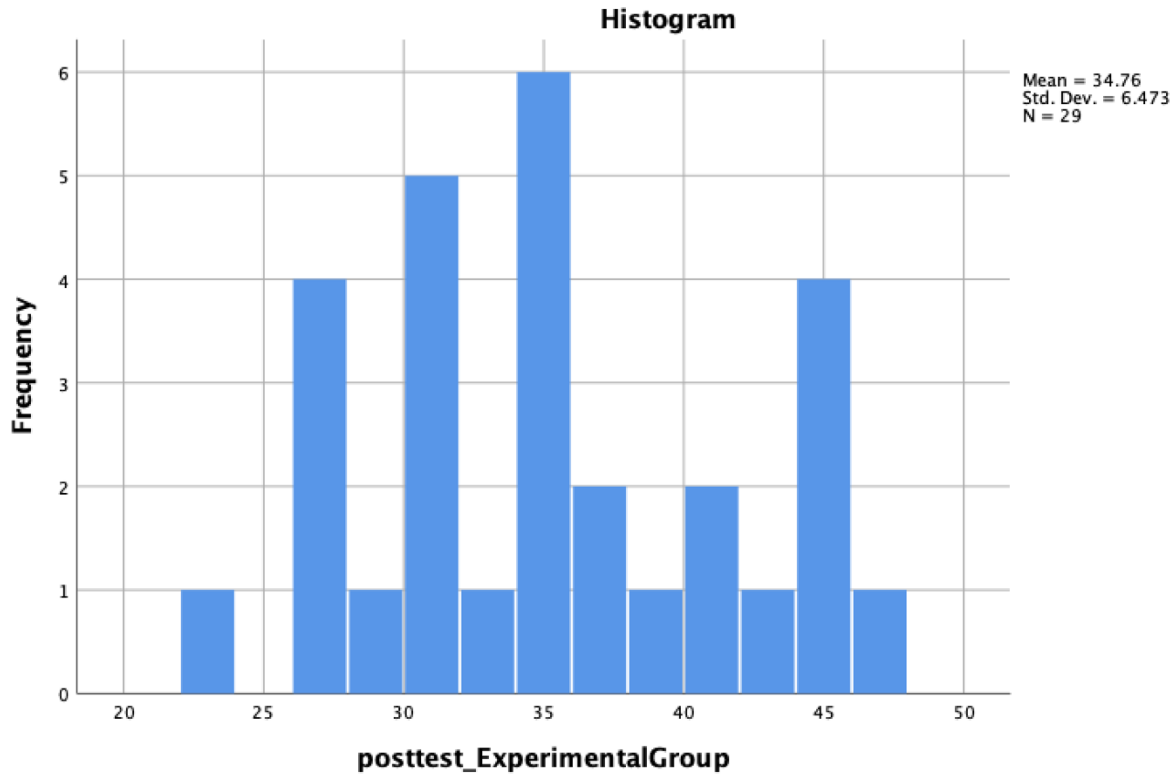

Figure 4.4.6 Histogram Distribution for the Post-test Scores of Experimental Group

Figure 4.4.6 illustrates the post-test scores of the experimental group after the interventions. The mean score of the post-test of the experimental group is 34.76 and the standard deviation is 6.473. Most of the participants which are 4 participants obtained the score of 30 which is the mode whereas least participants which only one participant obtained the score of 23 and 26 respectively. The lowest post-test score in experimental group is 23 and the highest post-test score is 46.

4.5 Independent Sample T-test

Independent Sample T-test is used when comparing the mean score of the continuous variable for two different groups of participants. In this study, Independent Sample T-test is used to compare the mean total scores of the post-test for the control group and experimental group.

For Independent Sample T-test, two variables are needed which are the categorical as independent variable and continuous as dependent variable. Independent Sample T-test indicates whether there is a significant difference in the mean scores for the two groups. In the terms of statistical, the probability that the two sets of scores from the same population is tested.

Variables			**Diff**	***t***	**Sig**
	Control group	**Experimental group**			
	Mean (SD)	**Mean (SD)**			
Pre-test Scores	22.52 (5.241)	23.00 (5.542)	-0.483	-0.341	0.735

Table 4.5.1: *Results of Independent Sample T-test for Pre-test scores between Control Group and Experimental Group*

Table 4.5.1 shows the results of Independent Sample T-test of pre-test scores between control group and experimental group. Independent Sample T-test was conducted to compare the pre-test scores for the control group and experimental group. As illustrated in the Table 4.5.1, there was significant difference in the pre-test scores for control group (M = 22.52, SD = 5.241) and experimental group (M = 23.00, SD = 5.542); t (56) = -0.341, p-value = 0.735

(>0.05), two-tailed. The magnitude of the differences in the means (mean difference = -0.483, 95% CI: -3.320 to 2.355).

In the Levene's Test for equality of variances, the significant p value is 0.457 (>0.05), hence, failed to reject null hypothesis and equal variances assumed.

When referring to the p-value of t-test for equality of means under equal variances assumed, p = 0.735 which is greater than the alpha value set at 0.05. Thus, null hypothesis is failed to reject. From the results shown, it can be concluded that there is no significant difference in pre-test scores between control group and experimental group at 0.05 level of significant.

Variables			Diff	*t*	Sig
	Control group	**Experimental group**			
	Mean (SD)	**Mean (SD)**			
Post-test Scores	29.28 (4.956)	34.76 (6.473)	-5.483	-3.622	0.001

Table 4.5.2: *Results of Independent Sample T-test for Post-test Scores between Control group and Experimental group*

Table 4.5.2 shows the results of Independent Sample T-test of post-test scores between control group and experimental group. Independent Sample T-test was conducted to compare the post-test scores for the control group and experimental group. As illustrated in the Table 4.5.2, there was significant difference in the post-test scores for control group (M = 29.28, SD = 4.956) and experimental group (M = 34.76, SD = 6.473); t (52.432) = -3.622, p-value = 0.001 (<0.05), two-tailed. The magnitude of the differences in the means (mean difference = -5.483, 95% CI: -8.520 to -2.445).

In the Levene's Test for equality of variances, the significant p value is 0.001 (<0.05), hence, reject null hypothesis and equal variances not assumed.

When referring to the p-value of t-test for equality of means under equal variances not assumed, p = 0.001 which is smaller than the alpha value of 0.05. Thus, null hypothesis is rejected. From the results shown, it can be concluded that there is significant difference in post-test scores between control group and experimental group at 0.05 level of significant.

4.6 Hypothesis Testing

Null Hypothesis, H0: TikTok has no significant effect on student learning among UTAR physiotherapy students.

Alternate Hypothesis, HA: TikTok has significant effect on student learning among UTAR physiotherapy students.

Firstly, the paired sample t-test conducted reveals a statistically significant difference (<0.0001) in the mean score of pre-test and post-test of both control and experimental group. Therefore, the null hypothesis is rejected in favour of the alternate hypothesis which there is a significant difference between pre-test and post-test scores among all participants.

Secondly, the paired sample t-test conducted reveals a statistically significant difference (<0.0001) in the mean score of pre-test and post-test of the control group. Therefore, the null hypothesis is rejected in favour of the alternate hypothesis which there is a significant difference between pre-test and post-test scores among the control group.

Thirdly, the paired sample t-test conducted reveals a statistically significant difference (<0.0001) in the mean score of post-test between the control group and experimental group. Therefore, the null hypothesis is rejected in favour of the alternate hypothesis which there is a significant difference of post-test scores between the control group and experimental group.

Lastly, independent sample t-test conducted reveals a statistically significant difference (0.001) in the mean score of post-test between the control group and experimental group. Therefore, the null hypothesis is rejected in favour of the alternate hypothesis which there is a significant difference of post-test scores between the control group and experimental group.

Thus, it can be concluded that TikTok has a significant effect on student learning among physiotherapy students.

DISCUSSION

5.1 Chapter overview

This chapter will outline the discussion on the significant findings from the results sections in accordance with the research objectives, which will follow with the limitation of study, recommendations for future research and lastly the conclusion of the research project.

5.2 Discussion

In this study, the researcher aimed to determine the effect of TikTok on student learning among physiotherapy students. The control group was only given the one hour online lecture class learning on the topic of Tennis Elbow whereas the experimental group was given online lecture class with 7 TikTok videos for learning purpose. The use of lecture class in both control group and experimental group is to convey the knowledge of Tennis Elbow to the participants and it simulated the normal traditional learning method in the classroom. For the TikTok videos, it concluded the important points in the lecture class, and it was used as an additional learning material after the lecture class for the experimental group.

Prior to the intervention of lecture class and TikTok videos learning, a pre-test to determine the baseline knowledge on the topic of Tennis Elbow was conducted. A clinical reasoning test paper consisted of 15 questions with total marks of 50 was prepared to all participants. After the intervention of lecture class and TikTok videos learning were provided to both control and experimental group, a post-test to determine and compare the depth of learning among the groups. In terms of pre-test, all participants obtained a mean score of 22.76 with the standard deviation of 5.352 whereas in terms of post-test, all participants obtained a

mean score of 32.02 with the standard deviation of 6.348. The mean decrease in scores was -9.259. The results of this study shows there is a statistically significant difference between the pre-test and post-test scores among all participants. This results concluded that both control group and experimental group showed a significant improvement in the post-test scores after the intervention of control group and experimental group. It shows that all participants were not familiarize in the topic of Tennis Elbow prior to the intervention and after the knowledge shared to the participants, it showed a significant improvement in the post-test.

In terms of the pre-test of the control group who only received lecture class, the participants of control group obtained a mean scores of 22.52 out of 50 which was half of the total marks with the standard deviation of 5.241 whereas in post-test, the participants of control group obtained a mean scores of 29.28 out of 50 with the standard deviation of 4.956. The mean decrease in scores was -6.759. The results of this study shows there is a statistically significant difference between the pre-test and post-test scores among the control group. This results concluded that the control group showed a significant improvement in the post-test scores after the lecture class.

In terms of the pre-test of the experimental group who received lecture class with TikTok videos learning, the participants of experimental group obtained a mean scores of 23.00 out of 50 which was half of the total marks with the standard deviation of 5.542 whereas in post-test, the participants of control group obtained a mean scores of 34.76 out of 50 with the standard deviation of 6.473. The mean decrease in scores was -11.759. The results of this study shows there is a statistically significant difference between the pre-test and post-test scores

among the experimental group. This results concluded that the experimental group showed a significant improvement in the post-test scores after the lecture class.

When performing the Independent Sample T-test to compare the pre-test scores between control group and experimental group, the results showed that there is no significant difference of pre-test scores between the control group and experimental group. When comparing the post-test scores between control group and experimental group using Independent Sample T-test, the results showed that there is significant difference of post-test scores between the control group and experimental group. The pre-test results showed that the baseline knowledge of both control and experimental group is almost the same which was all participants had a poor knowledge to the topic of Tennis Elbow but the mean post-test scores of experimental group is higher than the control group. It indicates that TikTok has a significant effect on student learning among physiotherapy students.

The conclusion of TikTok has a significant effect on physiotherapy student learning is possibly due to TikTok is an useful tool educational and motivational tool in the teaching and learning process as it is a medium of audio and visual that being used to convey messages so it can facilitate the learners to study. Media used in the learning process is mainly interpreted as graphic, photographic, or electronic tools to process and rearrange the information in terms of verbal and visual. TikTok as one of the learning medias can make the presentation of messages and information to be easier and thus the learning outcomes are facilitated and improved. TikTok videos are able to enhance simulations as the students are allowed to watch themselves and evaluate their performance. Besides that, with the help of TikTok videos, the students feel more realistic. One of the benefits of TikTok videos is it facilitates the transfer of

materials that are associated with the lesson teach in the classroom, the students can understand and catch the content of the videos clearly and precisely (Afidah, Sari & Hanifah, 2021).

Apart from that, other study suggested that videos are effective in studying body language and the students can learn based on the action in the videos. The students are able to gain confidence through repetition as learners prefer repeat the stories again and again and this is similar to the concept of TikTok videos. By repeating watching the videos, the students can learn by absorption and imitation. Besides that, TikTok videos can draw attention of the students (attention) and to being more active compared in the physical class (affection), support the students in sharing their feelings (cognitive) and assist the students who have less acquirement in the physical class (compensatory) (Afidah, Sari & Hanifah, 2021).

5.3 Limitation of the study

It is acknowledged that this study is not exempt from limitations. First, the sample size (n=60) is small. Second, the short study period is one of the limiting factors in this study. Third, the lecture class which held online is considered as a limitation as well. Conducting the lecture class in physical mode can ensure all participants are focused on the class. Fourth, only one topic from Physiotherapy in Musculoskeletal Conditions (PTMSK) which was the Tennis Elbow is chosen.

The major pitfall confronted by researchers when doing quasi-experimental studies is that randomization sampling method was not applied. Apart from that, there is a challenge in reality for quasi-experimental studies that may appear in a circumstance in which one group of participants were introduced an intervention while the other group was not provided any intervention, and this will cause emotionally imbalance. It is utmost imperative that researchers should be appreciate the biases that might arise in quasi-experimental studies that can contribute to a loss of internal validity, especially selection bias in which the intervention group may differ from the baseline group. There are several types of selection bias that might arise in quasi-experimental studies which included maturation bias, regression to the mean, historical bias, instrumentation bias, and the Hawthorne effect.

Last but not least, reporting bias can be arise in quasi-experimental studies which the researchers only present the positive findings in quasi-experimental studies and do not publish the null or negative findings.

5.4 Recommendation for Future Research

For the recommendations for future research, researchers should increase the sample size in order to obtain more accurate and precise results. Second, researchers should extend the study period so that the period of participants recruitment is longer and thus more participants can be recruited. Besides, the post-test can be held two weeks after the intervention of lecture and TikTok to test the memories retention in the participants in order to obtain more accurate results on the effect of TikTok on student learning among physiotherapy students.

Apart from that, it is suggested that the lecture class should be held in physical mode to ensure all participants attend the class with full attention. Next, diverse topic from the field physiotherapy is suggested to be involved in this study to obtain more accurate data to determine the effect of TikTok on student learning among physiotherapy students. For instance, the topic of Cervical Spondylosis and Osteoarthritis together with Tennis Elbow can be added to this study as the study topic of student learning in the lecture class and TikTok videos learning.

As mentioned previously, the quasi-experimental which is not involving randomization can produce bias in researchers in grouping the participants into control group and experimental group. In order to avoid bias, randomized control trial which involved randomization is suggested.

CHAPTER 6

CONCLUSION

This study had addressed the research objective which is to determine the effect of TikTok on student learning among UTAR physiotherapy students. The study results demonstrated that the mean scores of the post-test of experimental group is higher than the control group. It can be concluded that TikTok has a significant effect on student learning among UTAR undergraduate physiotherapy students.

As the TikTok has a significant effect on student learning among UTAR undergraduate physiotherapy students, the future physiotherapy teaching and learning process can include TikTok videos learning as one of the learning materials in order to improve the students' performance.

To generalize the findings of this study, the future study could include more physiotherapy topics other than Tennis Elbow as the learning topic in this study. The number of TikTok videos shared to the participants could be more to increase the students' depth of learning.

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APPENDIX A – ETHICAL APPROVAL FORM

UNIVERSITI TUNKU ABDUL RAHMAN
Wholly Owned by UTAR Education Foundation (Company No. 578227-M)

Re: U/SERC/232/2021

18 October 2021

Mr Muhammad Noh Zulfikri bin Mohd Jamali
Head, Department of Physiotherapy
Faculty of Medicine and Health Sciences
Universiti Tunku Abdul Rahman
Jalan Sungai Long
Bandar Sungai Long
43000 Kajang, Selangor

Dear Mr Muhammad Noh,

Ethical Approval For Research Project/Protocol

We refer to your application for ethical approval for your students' research project from Bachelor of Physiotherapy (Hons) programme enrolled in course UMFD3026. We are pleased to inform you that the application has been approved under Expedited Review.

The details of the research projects are as follows:

No	Research Title	Student's Name	Supervisor's Name	Approval Validity
1.	Relationship Between Mental Health Knowledge and Attitudes Towards People with Mental Illness among Health Sciences Students in UTAR	Erin Wong Jin Qian	Ms Siti Hazirah binti Samsuri	18 October 2021 – 17 October 2022
2.	Prevalence of Urinary Incontinence and Its Associated Risk Factors among Nulligravid Medical and Health Sciences Students in Malaysia	Kwek Oi Yen		
3.	Determinants of Physical Activity and Mental Health During Covid-19 Movement Restriction Order among University Students	Ng Shang Kuan	Mr Imtiyaz Ali Mir	
4.	Impact of Aerobic Exercise on Blood Pressure Among Hypertensive Adults: A Systematic Review	Yong Yuen Ching		
5.	Prevalence of Exercise Addiction and Its Correlation with Body Image Dissatisfaction and Eating Disorders Among Physiotherapy Students During COVID-19 Pandemic	Tan Sweet Lee	Ms Kiruthika S	
6.	Prevalence of Tension-type Headache and Its Correlation with Sleep Quality Among Physiotherapy and Nursing Students from Higher Education Institutions in Klang Valley, Malaysia, During the COVID-19 Pandemic	Moses Wong Pak Zhui		
7.	Awareness And Perception Of Telemedicine Among Selangor Population During The Covid-19 Pandemic	Foong Yi Xin	Dr Ilayaraja Alagia Thiruvevenkadam	
8.	A Comparison of Awareness and Knowledge of Students in Health Care Education Program with Non-health Care Education Program Towards Diabetes Mellitus	Voon Sin Yee		
9.	Awareness of Parents' Responsibilities in Childhood Obesity Among Population in Sungai Buloh, Selangor	Teresa a/p Abraham		

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Website: www.utar.edu.my

APPENDIX A – ETHICAL APPROVAL FORM (CONT.)

No	Research Title	Student's Name	Supervisor's Name	Approval Validity
10.	Knowledge and Attitudes Towards Sleep Medicine and Role of Physiotherapist Among Undergraduate Healthcare Students: A Cross-sectional Study	Lim Ziyi	Mr Tarun Amalnerkar	18 October 2021 – 17 October 2022
11.	Association Between Sleeping Position Preference and Quality of Sleep Among Parkinson's Disease Patients	Wong Zhi Qing		
12.	Knowledge, Perception, And Attitude Towards Patients With Parkinson's Disease Among Academic Staff In UTAR	Siew Yuet Xin		
13.	A Survey on Learning and Development of Professionalism Among Undergraduate Physiotherapy Students	Grace Ling Si En	Mr Deepak Thazhakkattu Vasu	
14.	Attitude Towards Persons with Disabilities Among Undergraduate Health Care Students in UTAR: A Cross-Sectional Study	Wendy Ngui Yew Hui		
15.	Measuring Self-Directed Learning Readiness (SDLR) Among Undergraduates in Universiti Tunku Abdul Rahman: A Cross-Sectional Study	Wong Kai Xuan		
16.	Association Between Physical Fitness Level and Psychological Health Among Dodgeball Players	Timothy Pang Ren Ming	Ms Kamala a/p Krishnan	
17.	Knowledge and Awareness of Physiotherapy Rehabilitation for Covid-19 Patients Among Clinical Physiotherapy Students	Chan Wei Kei	Ms Premala a/p Krishnan	
18.	Assessment of Knowledge, Perception of Telemedicine and Telerehabilitation and Community Acceptance on Patient Data Sharing During Covid-19 Situation	Chua Bee Qing	Ms Premala a/p Krishnan Co-supervisor: Ms Kamala a/p Krishnan	
19.	Empathy Level Among Undergraduate Healthcare Students in UTAR: A Cross Sectional Study	Wong Shee Jie	Pn Nadia Safirah binti Rusli	
20.	Literacy and Practice of Laptop Ergonomics Among Undergraduates Students of Universiti Tunku Abdul Rahman During Covid-19 Pandemic	Yap Kar Men		
21.	Attitude, Perception, Psychological Status and Coping Strategies Among UTAR Undergraduate Training Students During Covid-19 Pandemic	Goo Fang Qi		
22.	Association Between Fitness Applications Usage and Physical Activity Levels Among University Students During Covid-19 Pandemic	Carissa Choong Chui Yung	Mr Sathish Kumar Sadagobane	
23.	Assessment of Quality of Life and Awareness of Risk Factors Lead to Quality of Life Changes During Covid-19 Pandemic Among Undergraduate Students In Malaysia	Tan Zi Xuan		
24.	The Perceived Stress Level and Coping Strategies Among University Students Engaged in Remote Learning During Lockdown	Ting You Jian	Mr Avanianban Chakkarapani	
25.	Awareness, Knowledge and Attitude Towards Basic First Aid Among Medical and Health Science Students in UTAR	Khor Ji Lean		
26.	Perceptions of Blended Learning Approach Among Physiotherapy Students: A Cross Sectional Study	Tan Zhen Xin	Ms Meneka Naidu Mohnaraju	
27.	Prevalence of Low Back Pain and It's Association With Physical Activity Level Among UTAR Students During Covid-19 Pandemic MCO.	Chin Hao Yang		
28.	The Level of Anxiety, Knowledge and Attitude Toward Covid-19 Pandemic Among UTAR Students	Te Wan Yi		
29.	Awareness of Chronic Obstructive Pulmonary Disease in Penang, Malaysia	Tan May Jynn	Ms Mahadevi Barathi	
30.	Comparison of Levels of Physical Activity During the Pandemic Lock Down Period and Non-Pandemic Period	Jade Lim Gek Cheng		

No	Research Title	Student's Name	Supervisor's Name	Approval Validity
31.	Association of Neck and Shoulder Pain Following Laptop Use Among University Students During Covid-19 Pandemic	Khoo Wei Ern Emylia	Ms Swapneela Jacob	18 October 2021 – 17 October 2022
32.	Relationship Between Mental Health Wellbeing and Sleep Quality Among UTAR Students During Pandemic Covid-19 Lockdown Period: A Cross Sectional Study	Muhamad Haiqal Bin Zailan		
33.	Perception and Awareness of Animal Physiotherapy Among Physiotherapy Students in Malaysia: A Cross Sectional Study	Cheong Ci Yun		
34.	Prevalence and Associated Factors of Eating Disorders Among University Students During Covid-19 Home Confinement	Goh Xin Rue	Mr Nizar Abdul Majeed Kutty Co-Supervisor: Ms Aparna Sudhan (Co-operative Institute of Health Sciences, Thalassery, India)	
35.	Perception of Undergraduate Medical and Health Sciences Students Towards Computer-Based Test: A Cross-sectional Study	Choong Jia En	Mr Nizar Abdul Majeed Kutty	
36.	Association Between Body Mass Index with Self-Esteem and Social Appearance Anxiety Among University Students: A Cross Sectional Study	Aaron Shawn Aloysius		
37.	Knowledge and Practice of Diabetic Foot Care Among Adults with Diabetes in Kuching, Sarawak	Cindy Chai Hui Chyi	Mr Martin Ebenezer Chellappan	
38.	Association Between Sleep Variation and Perceived Stress with Premenstrual Symptoms Among Undergraduate Students During COVID-19	Choong Su Yan		
39.	Palliative Care Awareness and Knowledge Among Final Year Medicine & Health Sciences Students: A Cross-Sectional Study	Tan Wei Wern	En Muhammad Noh Zulfikri bin Mohd Jamali	
40.	Association Between Postural Habits with Neck Pain, Back Pain and Sleep Quality Among Undergraduate Students from Universiti Tunku Abdul Rahman (UTAR) During COVID-19 Pandemic: A Cross Sectional Study	Teh Wen Chee		
41.	The Association of Microbreaks, Sleep Quality and Physical Activity on the Prevalence of Musculoskeletal Pain Among Health Science Students During Movement Control Order. A Cross-sectional Study	Tee Jian Heng		

The conduct of this research is subject to the following:

(1) The participants' informed consent be obtained prior to the commencement of the research;

(2) Confidentiality of participants' personal data must be maintained; and

(3) Compliance with procedures set out in related policies of UTAR such as the UTAR Research Ethics and Code of Conduct, Code of Practice for Research Involving Humans and other related policies/guidelines.

(4) Written consent be obtained from the institution(s)/company(ies) in which the physical or/and online survey will be carried out, prior to the commencement of the research.

APPENDIX B – INFORMED CONSENT FORM

EFFECT OF TIKTOK ON STUDENT LEARNING AMONG PHYSIOTHERAPY STUDENTS

You are invited to participate in a research study that is being conducted as part of the requirement to complete the above-mentioned course.

Please read this information sheet and contact me to ask any questions that you may have before agreeing to participate in this study.

Purpose of the Research Study

The purpose of this research is to determine the effect of TikTok on student learning among physiotherapy students. If you are a physiotherapy undergraduate student from UTAR Sungai long campus, you are invited to participate in this study.

Procedures

If you agree to be in this study, you will be asked to complete this questionnaire. This questionnaire will consist of 2 parts. Part I will be the demographic data of the participants while Part II will be a questionnaire to evaluate the eligibility to participate in this study.

Length of Participation

The questionnaire will take around 5 minutes to complete. Once the inclusion criteria is met, this study requires 3 weeks of participation.

Benefits and Risk

There are no known risks to participants and no direct benefits in participating in this study. However, the results generated from this study will help the healthcare educator to formulate a more effective teaching mode for the physiotherapy students to ensure a more effective teaching and learning environment.

Confidentiality

All information collected about you will be kept strictly confidential. Any information about you which leaves the research unit will be anonymous (all identifying information removed). Hence, no information that will make it possible to identify you, will be included

about you which leaves the research unit will be anonymous (all identifying information removed). Hence, no information that will make it possible to identify you, will be included in any reports to the University or in any publications. Research records will be stored securely and only approved researchers will have access to the records.

Voluntary Nature of the Study

Participation in this study is voluntary. If you withdraw or decline participation, you will not be penalized or lose benefits or services unrelated to the study. If you decide to participate, you may decline to answer any question and may choose to withdraw at any time.

Contacts and Questions

If you have any questions, clarifications, concerns or complaints, about the research, the researcher conducting this study can be contacted at 016-5911702 or engjing@1utar.my.

engjing1234@gmail.com (not shared) Switch account

* Required

Email *

Please register using your UTAR email (e.g. engjing@1utar.my)

Your answer

Are you willing to participate in this study? *

- ○ Yes
- ○ No

APPENDIX C – PERSONAL DATA PROTECTION NOTICE

Personal Data Protection Statement

Please be informed that in accordance with Personal Data Protection Act 2010 ("PDPA") which came into force on 15 November 2013, Universiti Tunku Abdul Rahman ("UTAR") is hereby bound to make notice and require consent in relation to collection, recording, storage, usage and retention of personal information.

Notice:

The purposes for which your personal data may be used are inclusive but not limited to: For assessment of any application to UTAR for processing any benefits and services. For communication purposes. For advertorial and news. For general administration and record purposes. For enhancing the value of education. For educational and related purposes consequential to UTAR. For the purpose of our corporate governanceFor consideration as a guarantor for UTAR staff/ student applying for his/her scholarship/study loan. Your personal data may be transferred and/or disclosed to third party and/or UTAR collaborative partners including but not limited to the respective and appointed outsourcing agents for purpose of fulfilling our obligations to you in respect of the purposes and all such other purposes that are related to the purposes and also in providing integrated services, maintaining and storing records. Your data may be shared when required by laws and when disclosure is necessary to comply with applicable laws.

Any personal information retained by UTAR shall be destroyed and/or deleted in accordance with our retention policy applicable for us in the event such information is no longer required.

UTAR is committed in ensuring the confidentiality, protection, security and accuracy of your personal information made available to us and it has been our ongoing strict policy to ensure that your personal information is accurate, complete, not misleading and updated. UTAR would also ensure that your personal data shall not be used for political and commercial purpose.

APPENDIX C – PERSONAL DATA PROTECTION NOTICE (CONT.)

Acknowledgement of Notice *

- ◯ I have been notified by you and that I hereby understood, consented and agreed per UTAR above notice.
- ◯ I disagree, my personal data will not be processed

Electronical Signature (eg: electronically s/d engjing) *

Your answer

Date *

MM DD YYYY

/ /

APPENDIX D – QUESTIONNAIRE FORM (DEMOGRAPHICS)

Demographic Data

Name *

Your answer

Age *

Your answer

Gender *

- ◯ Male
- ◯ Female
- ◯ Other:

Ethnicity *

- ◯ Malay
- ◯ Chinese
- ◯ Indian
- ◯ Other:

APPENDIX D – QUESTIONNAIRE FORM (DEMOGRAPHICS) (CONT.)

Student ID *
eg: 19UMB00000

Your answer

Year & Trimester *
eg: Y3S1

Your answer

Have you taken the subject Physiotherapy in Musculoskeletal Conditions (PTMSK)? *

- ◯ Yes
- ◯ No

Have you signed up a TikTok account? *

- ◯ Yes
- ◯ No

APPENDIX E – CLINICAL REASONING TEST PAPER IN PRE-TEST

Type of Examination	: Clinical Reasoning Test
Date:	Time:

Details to be filled in by the student

Name & signature	UTAR ID	Intake	Year	Trimester

INSTRUCTIONS TO CANDIDATES

1.	This clinical reasoning test consists of 18 questions based on 1 case report.
2.	Candidates are reminded that Consultation, Discussion and Sharing of Answers with others are **STRICTLY PROHIBITED** in this test.
3.	After reviewing the case report, insert responses within the table given below the question.
4.	Answer all the questions.
5.	When answering the questions, assume the patient only has the conditions listed.
6.	Do not add additional pathologies not specified in the case.

APPENDIX E – CLINICAL REASONING TEST PAPER IN PRE-TEST (CONT.)

CASE REPORT I

A 47-year-old right-hand-dominant male comes to you complaining of elbow and neck pain. He is here for further evaluation of right elbow pain. He states that he has been dealing with the pain for approximately 5 months in duration, and it seemed to progressively gotten worse over that time period. He states that the pain is mainly localized to the outside of his elbow. He is unable to identify a specific traumatic episode leading to the pain. He is a mechanic at a local car garage and does state that he does extensive manual labor with his hands. He has tried taking analgesics, which have provided minimal to moderate relief of symptoms. Additionally, he has tried icing his elbow, which has provided minimal benefit as well. He states the pain radiates down the posterior aspect of his forearm without associated numbness or tingling. He has not noticed a decrease in his grip strength. He has not had this previously evaluated with a physician.

PHYSICAL EXAM: Examination of the right elbow does not demonstrate any acute deformity, asymmetry, or ecchymosis. He has tenderness to palpation along the lateral epicondyle. He has full range of motion with elbow flexion, extension, pronation, and supination. Full range of motion with wrist extension, flexion, radial and ulnar deviation. He demonstrates 5/5 strength testing with pronation, supination, elbow flexion and extension, as well as with wrist flexion and extension. However he does have elicitation of pain most notable with supination and wrist extension. Valgus and varus stress testing is negative. Neuro vascularity is intact distal in the medial, radial, and ulnar nerve distributions.

APPENDIX E – CLINICAL REASONING TEST PAPER IN PRE-TEST (CONT.)

ANSWER ALL QUESTIONS

Q1. What is the **MOST** likely diagnosis in this case? (2 marks)

Q2. How do you justify your diagnosis? (6 marks)

Q3. Relate the possible mechanism for this patient's pathology? (3 marks)

Q4. Write **ANY TWO (2)** causes for this problem? (2 marks)

APPENDIX E – CLINICAL REASONING TEST PAPER IN PRE-TEST (CONT.)

Q5. What are the signs and symptoms of this patient's problem? (4 marks)

Q6. Does this patient experiences reduced grip strength? If **YES**, describe on the grip strength. (2 marks)

Q7. Describe the provocative tests useful in making the diagnosis? (6 marks)

APPENDIX E – CLINICAL REASONING TEST PAPER IN PRE-TEST (CONT.)

Q8. Which is the **MOST** common differential diagnosis?

(2 marks)

Q9. What are the signs and symptoms of radial tunnel syndrome? (2 marks)

Q10. What is the other differential diagnosis? (6 marks)

Q11. Are braces used to treat this patient? (1 mark)

This question paper consists of 14 questions on 6 printed pages

Q12. List the goals to treat patient's problem? (3 marks)

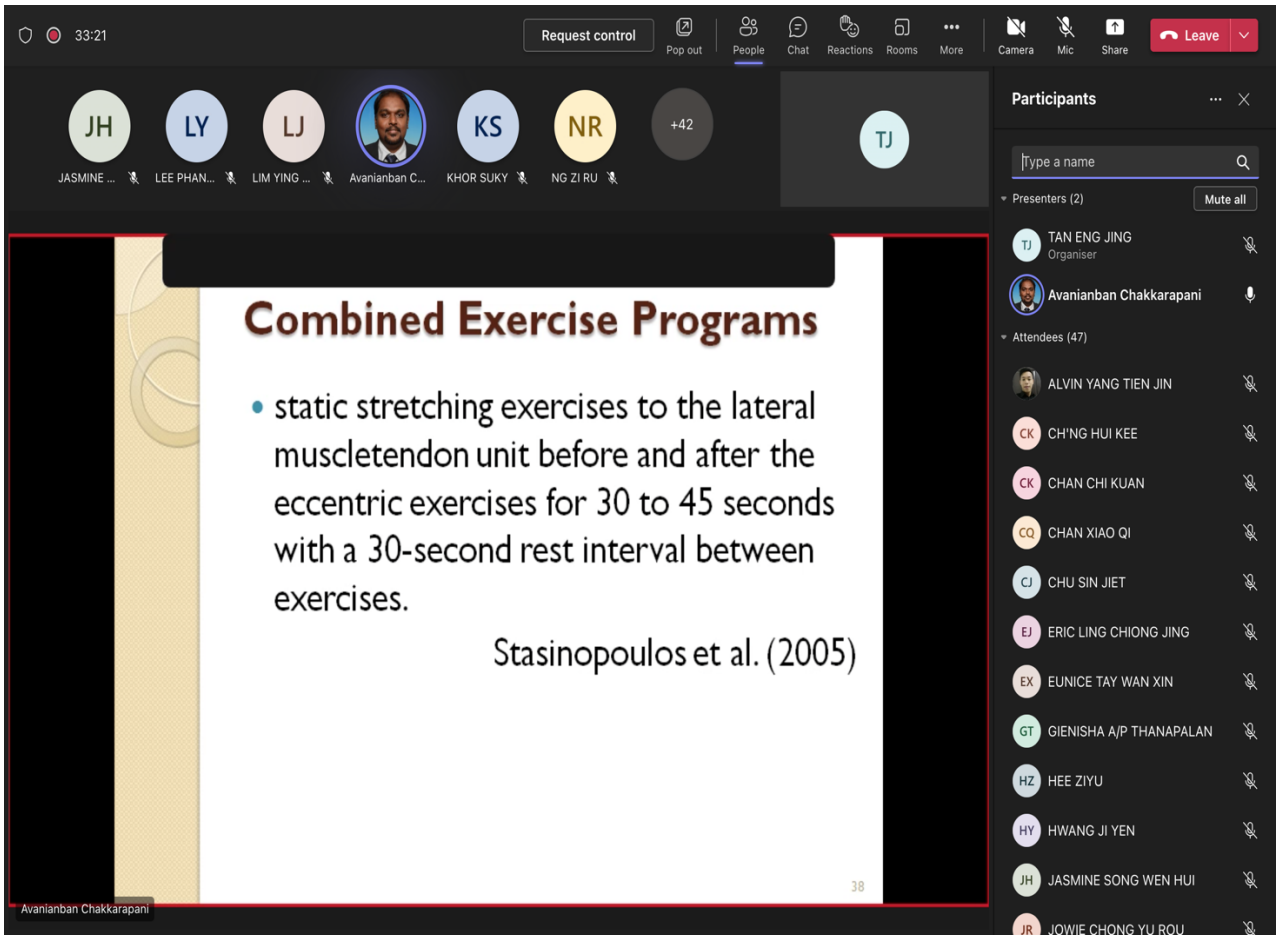
Q13. List the line of management to treat patient's problem? (7 marks)

Q14. List the functional goals for this patient. (2 marks)

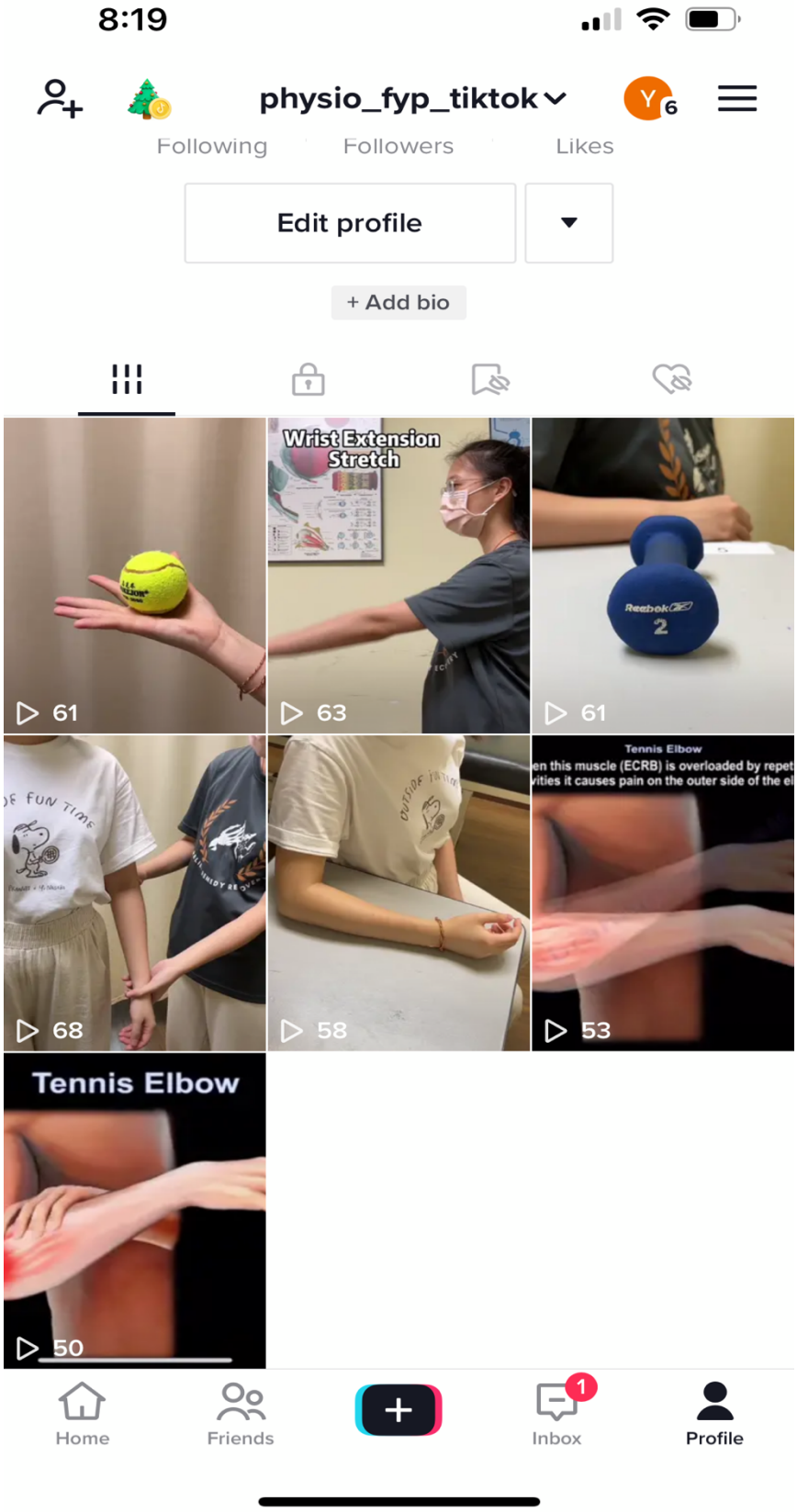
Q15. What will be the prognosis for this patient? (2 marks)

[Total: 50 marks]

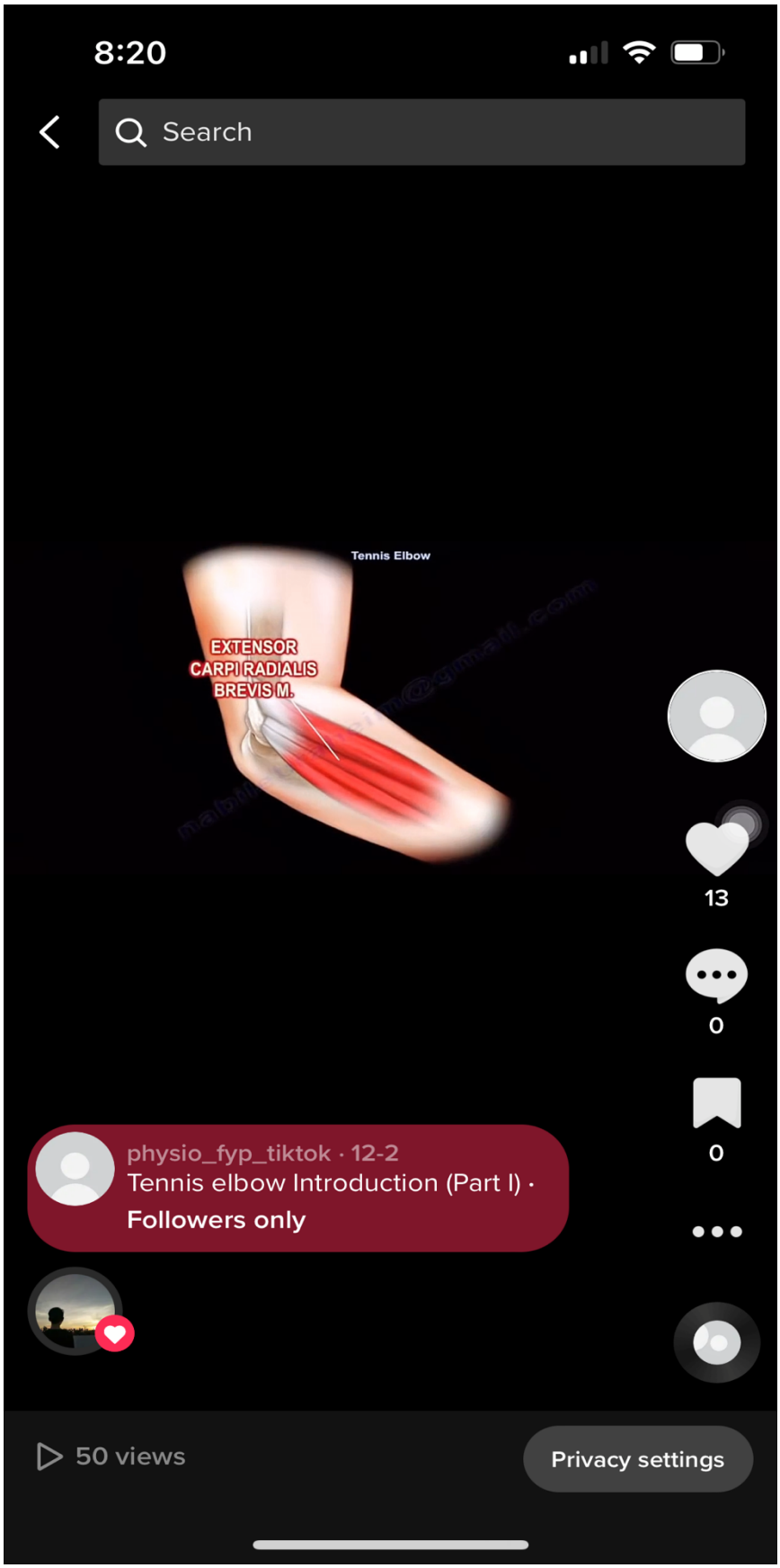
APPENDIX F – ONLINE LECTURE CLASS ON MICROSOFT TEAMS



APPENDIX G – TIKTOK PROFILE



APPENDIX H – TIKTOK VIDEOS



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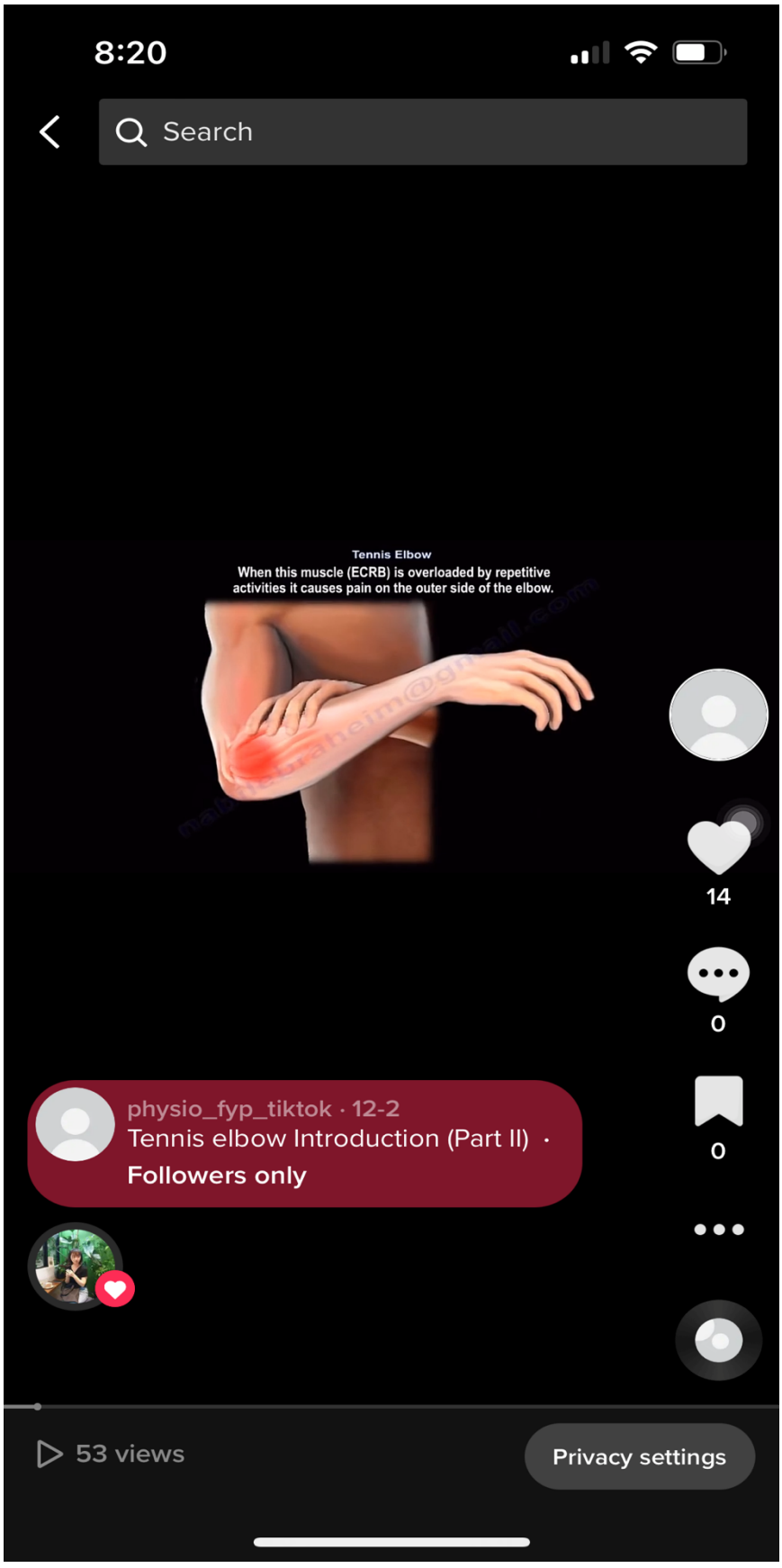

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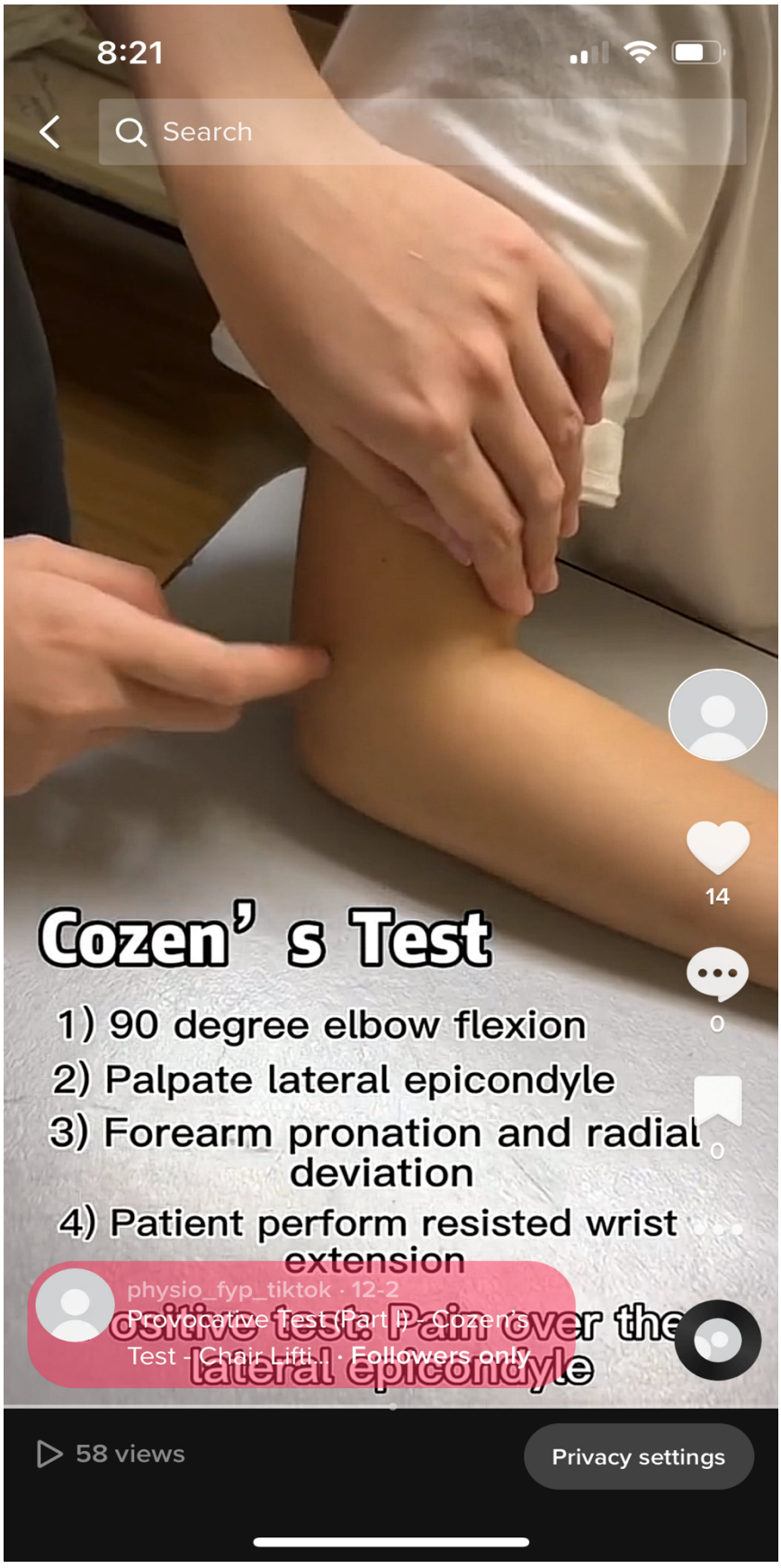

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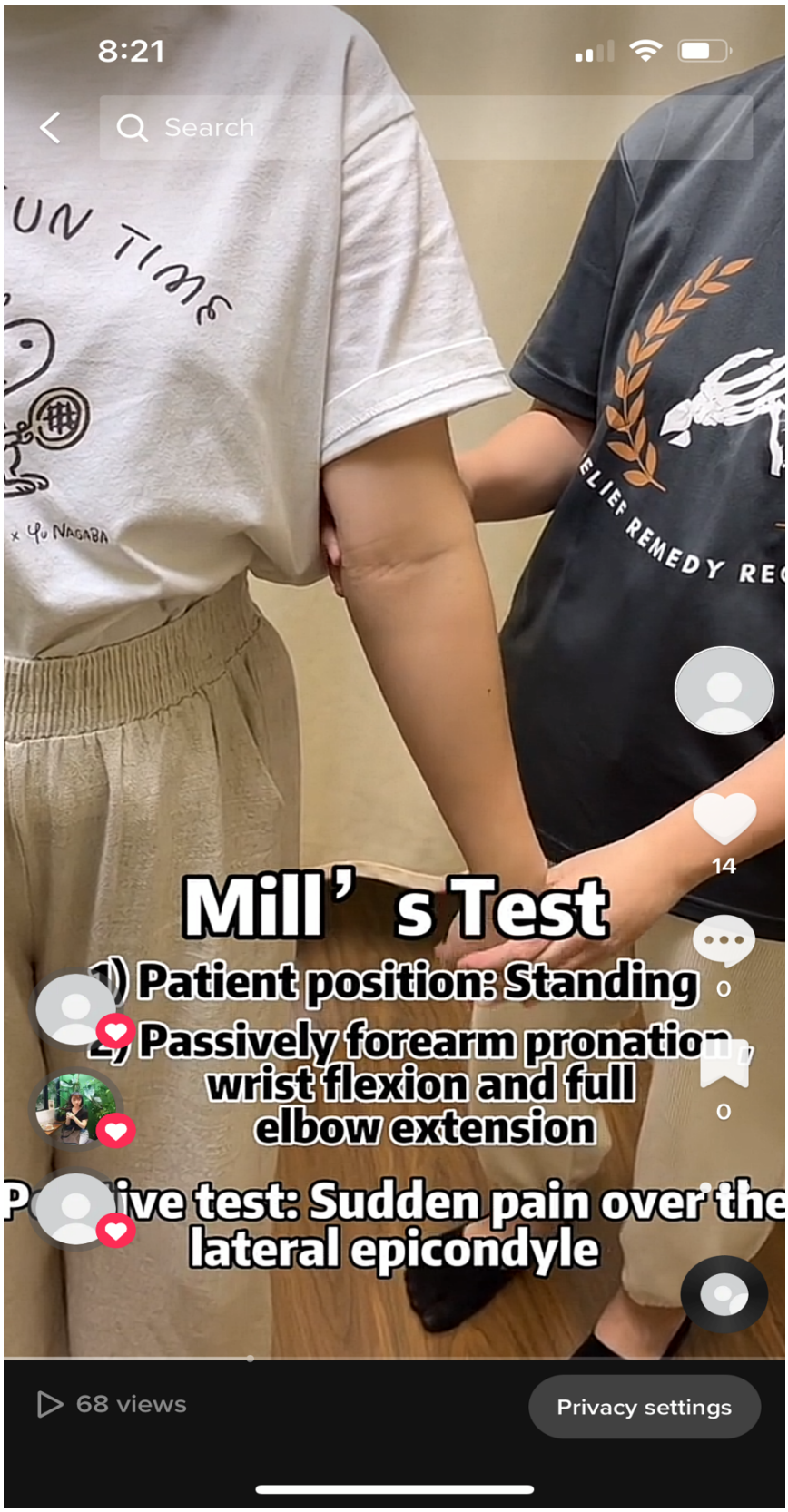

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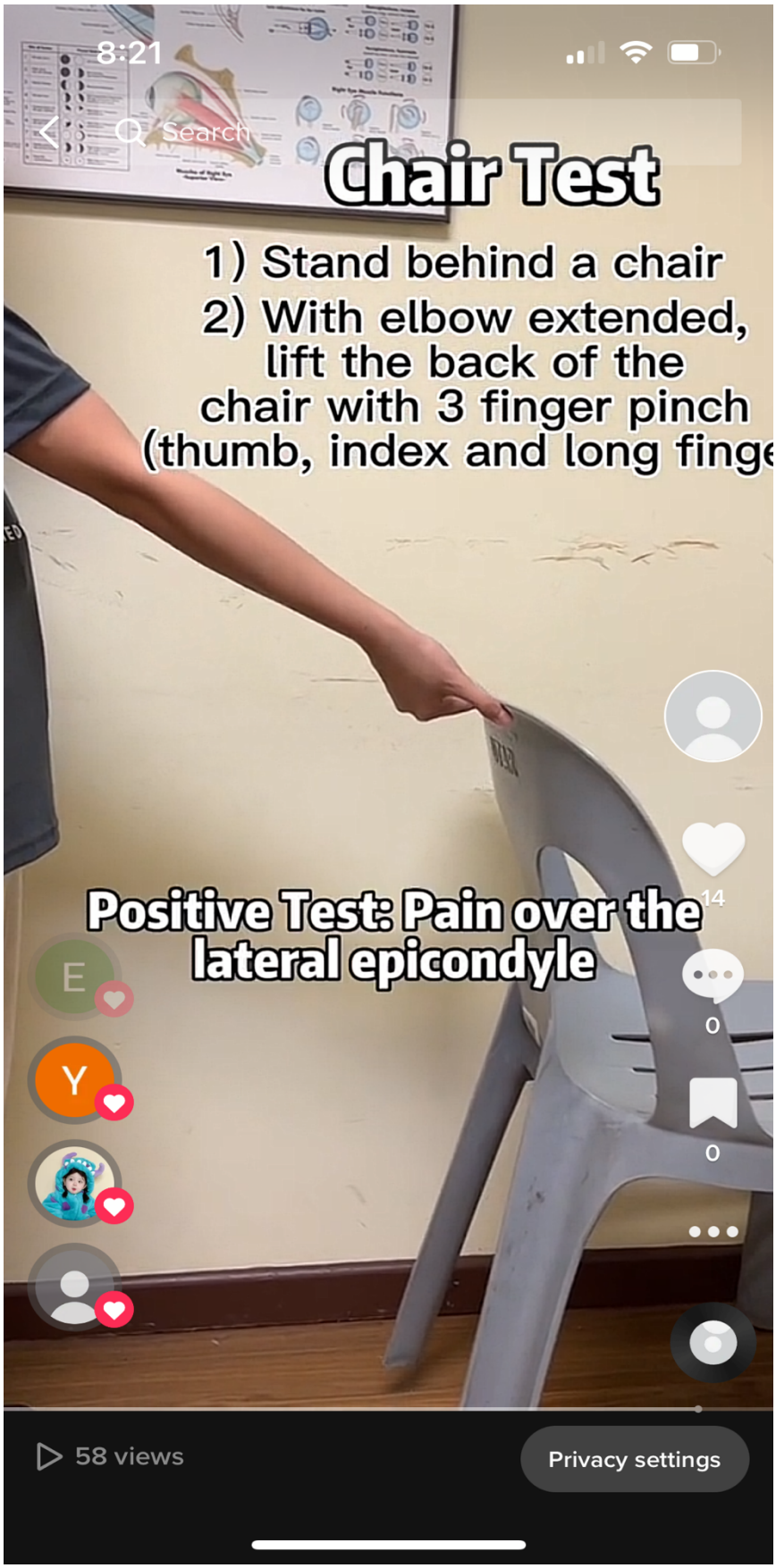

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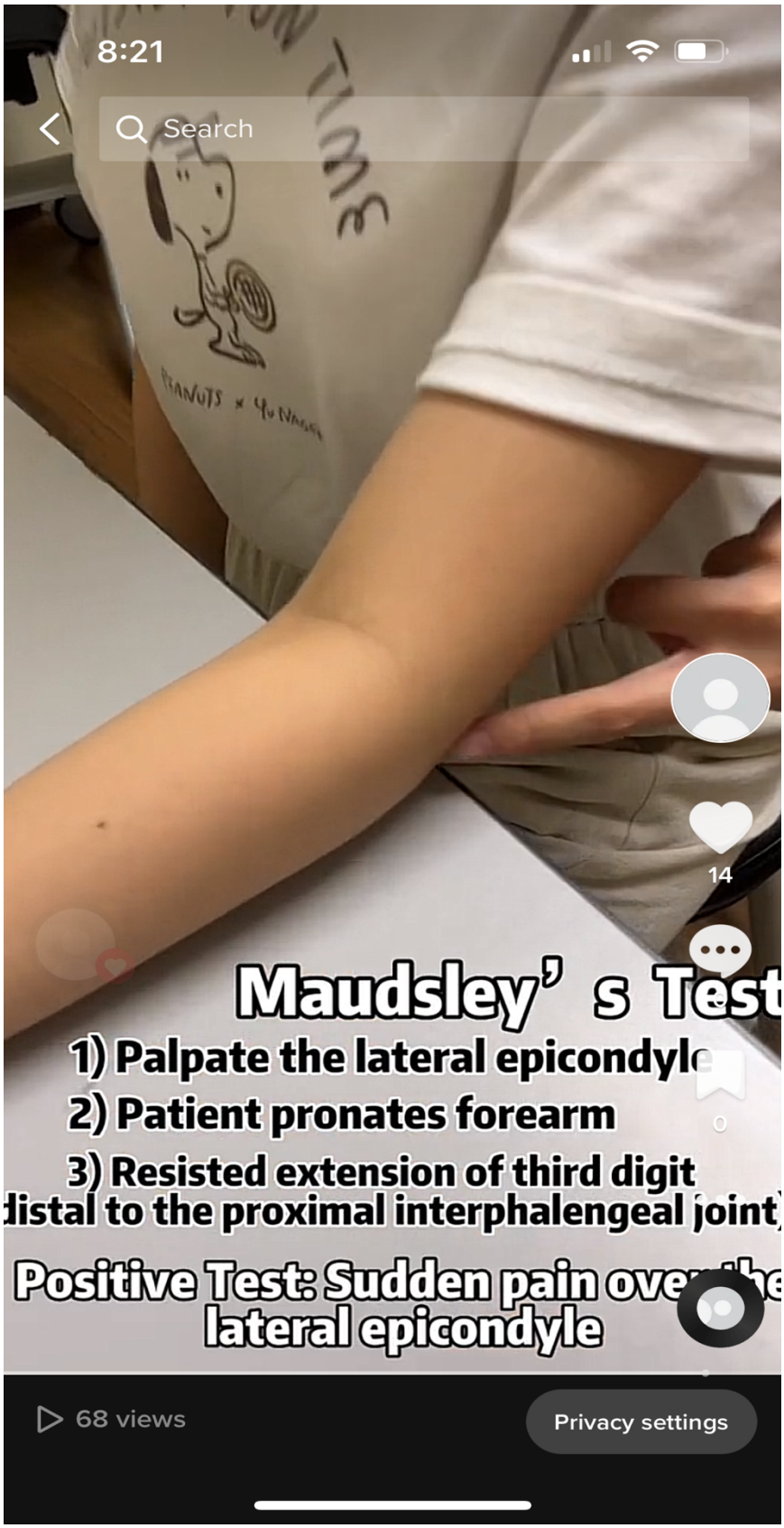

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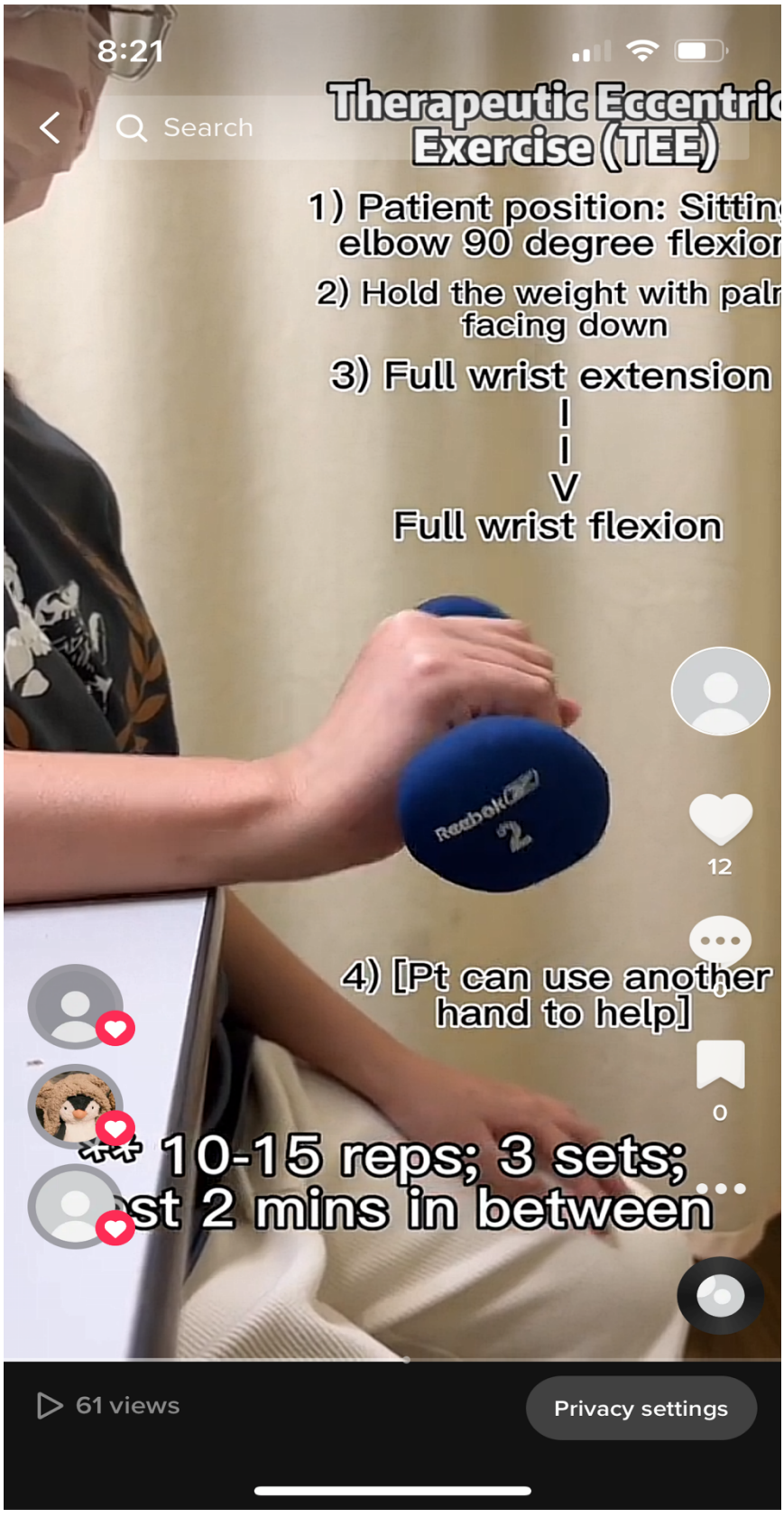

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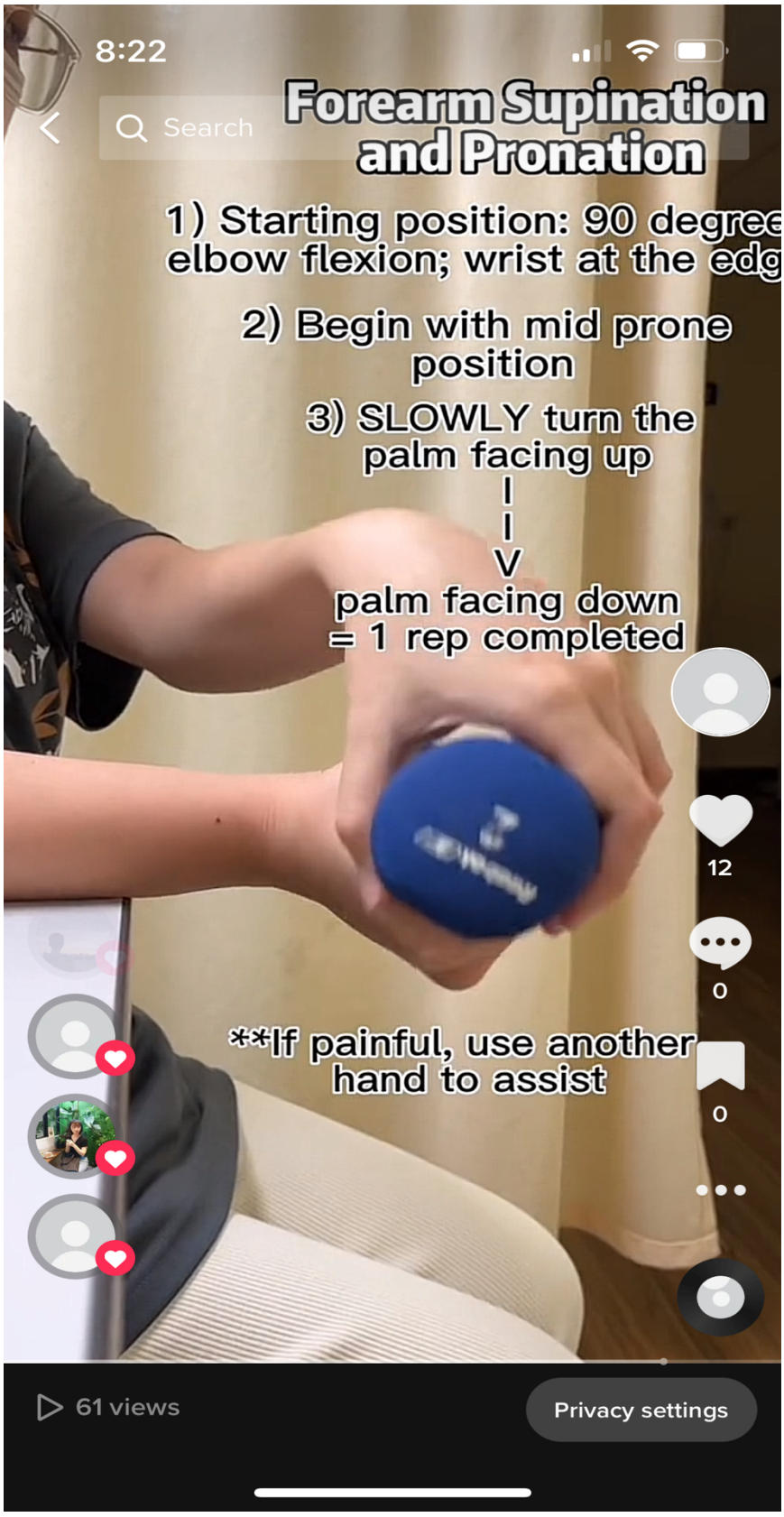

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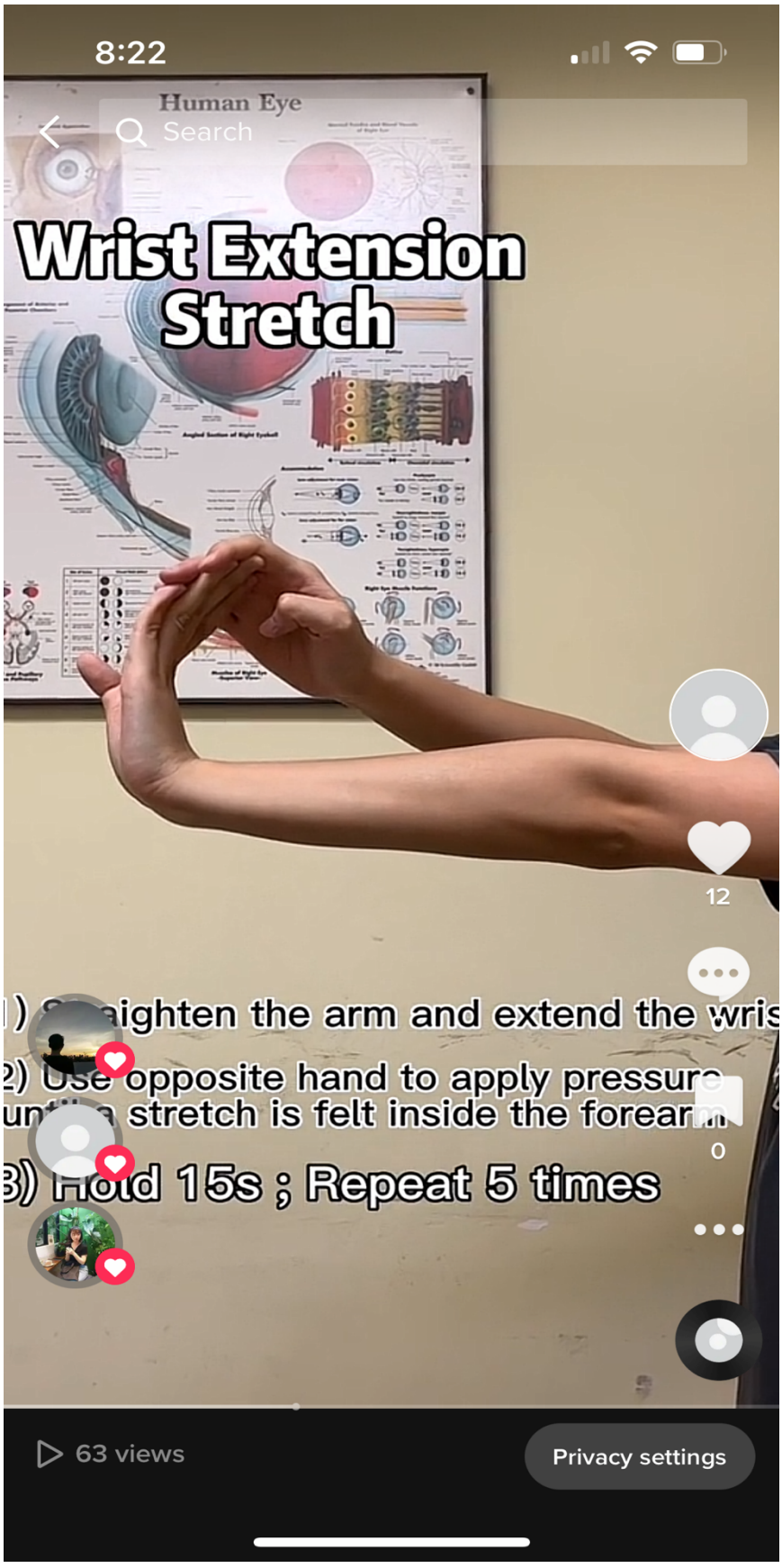

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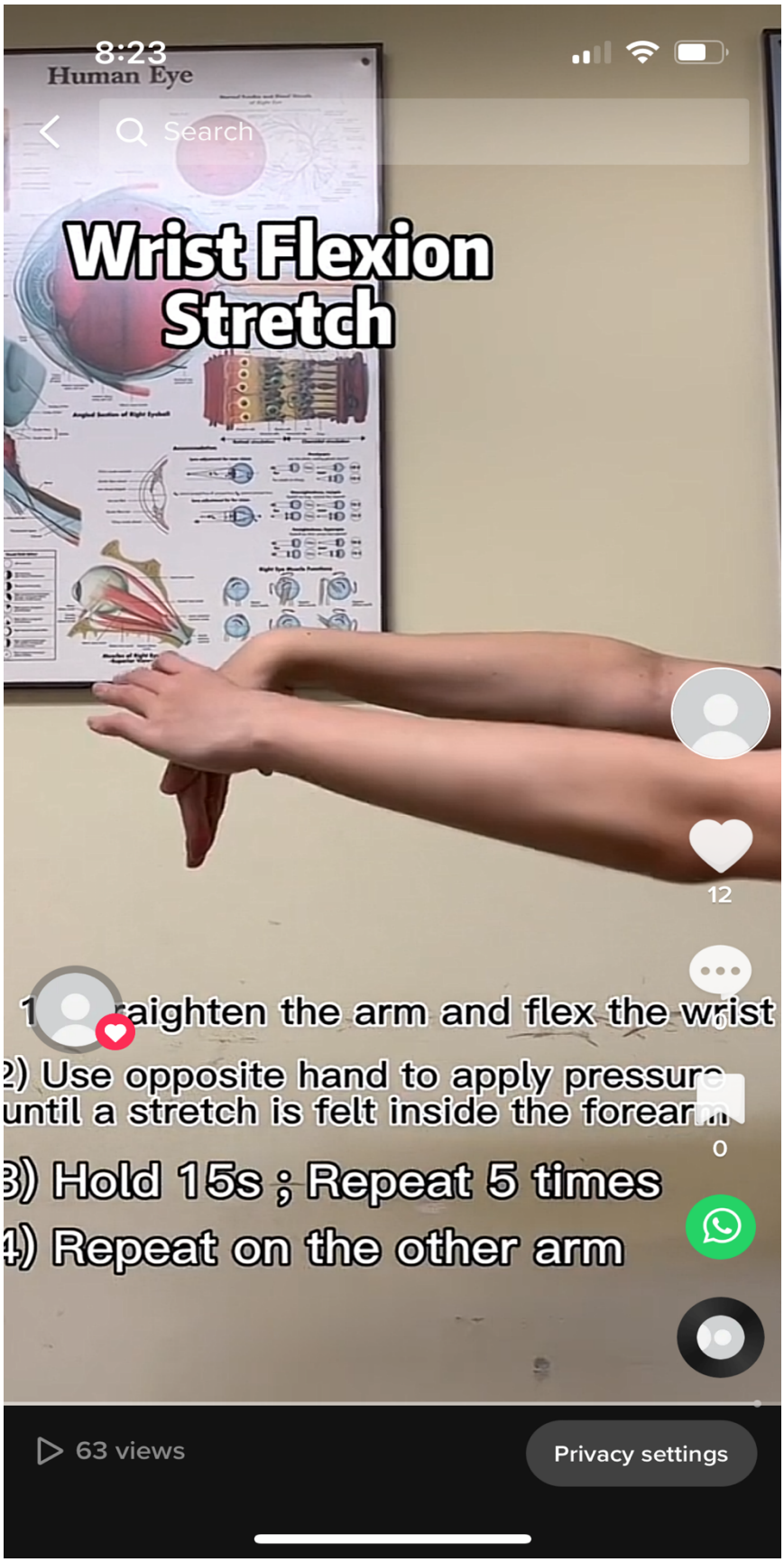

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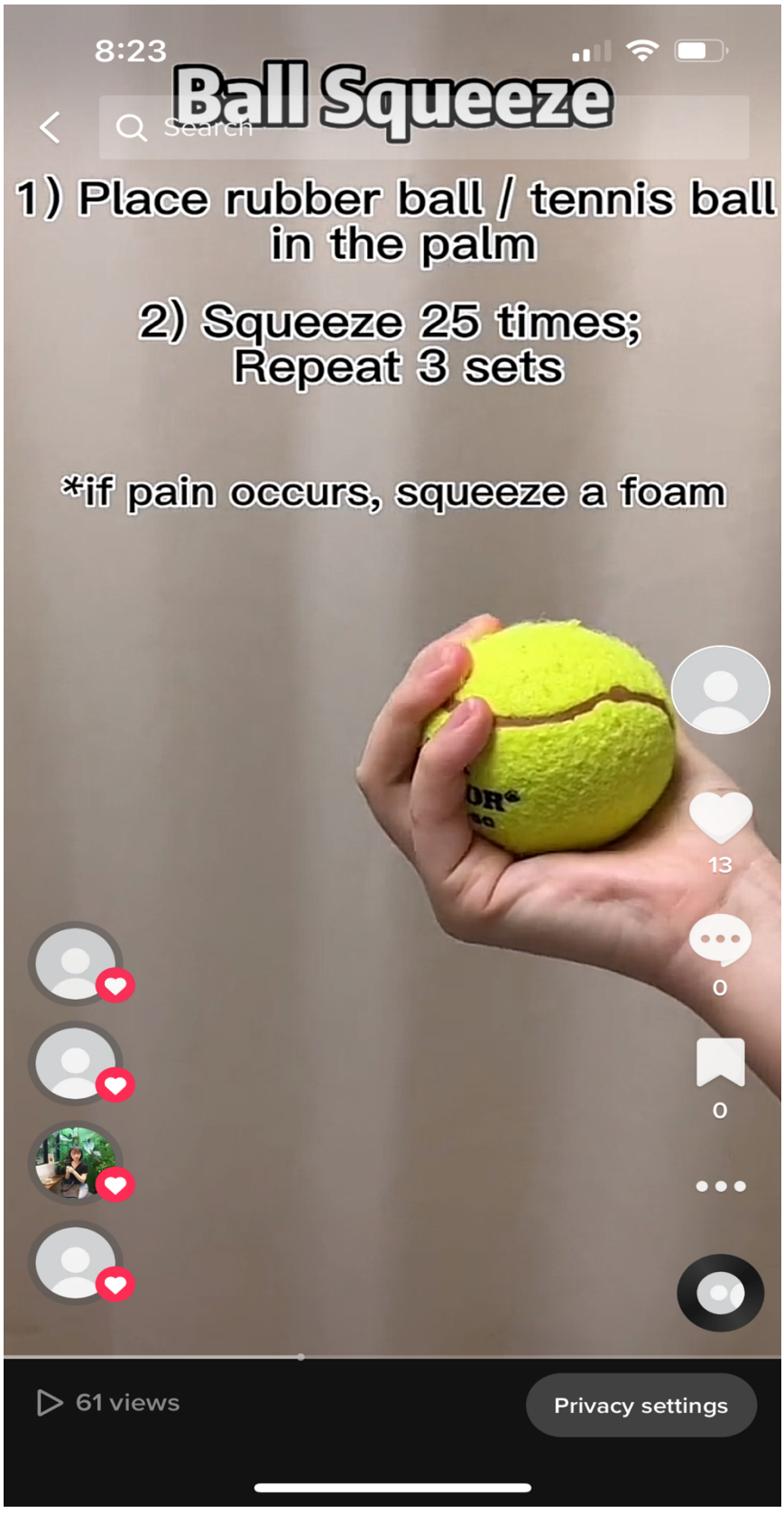
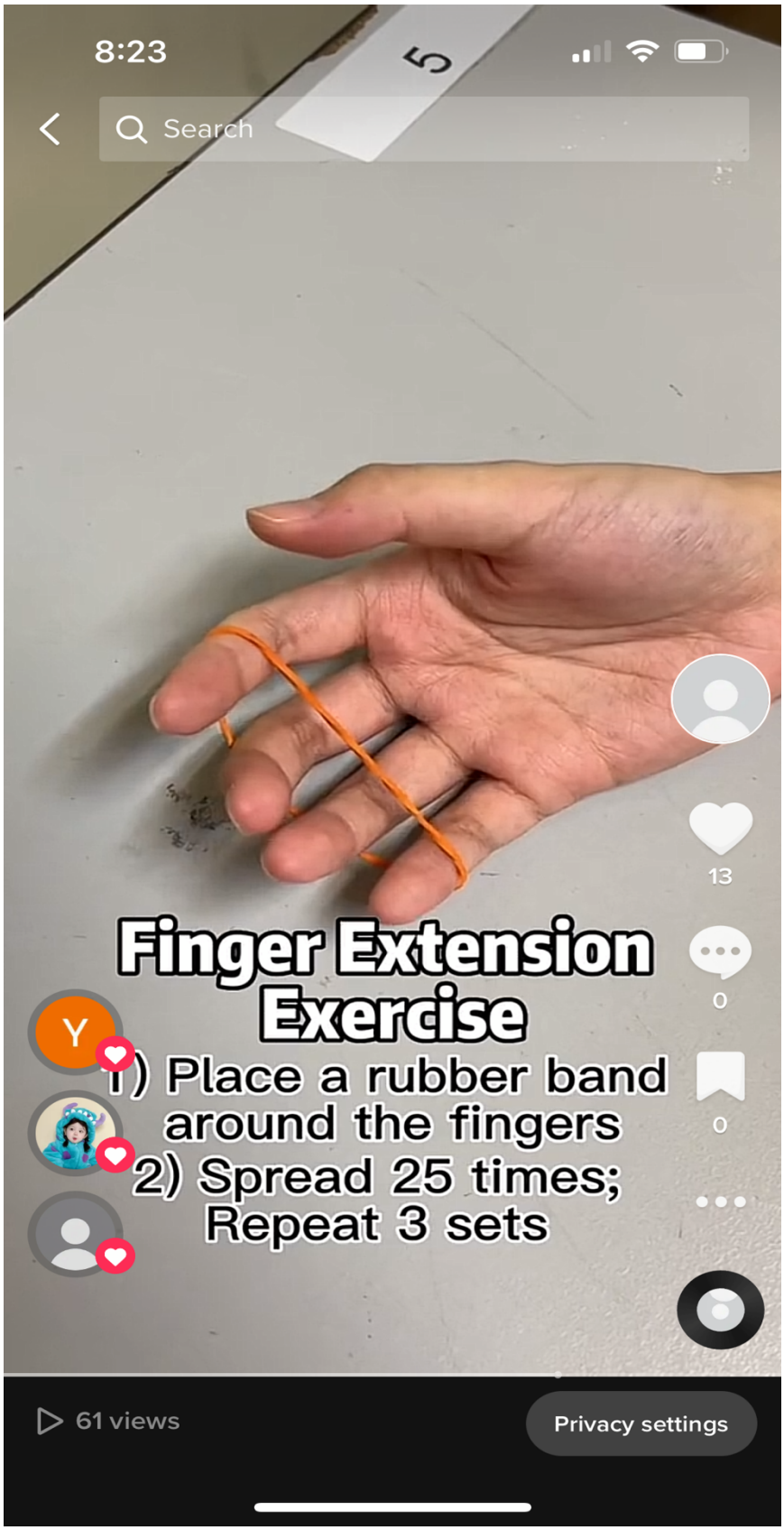


APPENDIX H – TIKTOK VIDEOS (CONT.)



APPENDIX I– CLINICAL REASONING TEST PAPER IN POST-TEST

Type of Examination	: Clinical Reasoning Test
Date:	Time:

Details to be filled in by the student

Name & signature	UTAR ID	Intake	Year	Trimester

INSTRUCTIONS TO CANDIDATES

1.	This clinical reasoning test consists of 18 questions based on 1 case report.
2.	Candidates are reminded that Consultation, Discussion and Sharing of Answers with others are **STRICTLY PROHIBITED** in this test.
3.	After reviewing the case report, insert responses within the table given below the question.
4.	Answer all the questions.
5.	When answering the questions, assume the patient only has the conditions listed.
6.	Do not add additional pathologies not specified in the case.

APPENDIX I– CLINICAL REASONING TEST PAPER IN POST-TEST (CONT.)

CASE REPORT I

A 51-year-old male, right hand dominant recreational tennis player suffered from right elbow pain that had lasted three months. The pain, which had progressively worsened in the previous two weeks was characterized as stiff, achy, and sometimes throbbing and was rated as an 8/10 in intensity on a numeric pain rating (zero being no pain and 10 being the worst pain ever). The patient was no longer able to play tennis. The pain began insidiously after playing in a weekend tournament. Initially he sought out physiotherapy care, which included therapeutic ultrasound, ice and an elbow strap. The patient attended eight or nine sessions over one month without improvement to his condition, and he was referred to an orthopedic surgeon for a corticosteroid injection. The injection relieved his symptoms for approximately one month, in which he continued to play tennis with the elbow strap. In the last month his symptoms returned, and in the last two weeks his pain was described to be the worst it had ever been. The pain was noted to be at its worst in the morning, and was aggravated by extending the wrist to brush his teeth, open doors, and carry groceries. Ice and Advil were reported to be minimally relieving. The patient discarded his elbow strap considering it to be of no benefit. No numbness, tingling or weakness was noted in the hand. The patient denied previous trauma to his right elbow, but did recall a similar pain in his left elbow a few years earlier that resolved on its own with rest.

Upon inspection, there was no ecchymosis and the lateral epicondyle and common extensor origin did not appear to be inflamed (no redness or swelling) when compared to the opposite side. All active ranges of motion of the elbow joints were full, while flexion and extension in the right wrist were limited due to pain. Passive range of motion, was also limited by patient discomfort particularly at the end range of right wrist flexion, and was able to reproduce the patient's chief complaint at the right elbow. Resisted wrist extension and grip strength were

very painful and the patient declined to provide much effort as this reproduced a sharp pain at the lateral epicondyle. Motion palpation of the radial head proved unremarkable and was not pain provoking. The common extensor origin was tender to direct palpation, as was the extensor carpi radialis brevis, which was noted to be leathery and lumpy. Orthopedically, Cozen's test was positive. While Mill's test, was inconclusive in that it was uncomfortable but did not produce pain at the lateral epicondyle.

ANSWER ALL QUESTIONS

Q1. What is the **MOST** likely diagnosis in this case? (2 marks)

Q2. How do you justify your diagnosis? (6 marks)

Q3. Relate the possible mechanism for this patient's pathology? (3 marks)

APPENDIX I– CLINICAL REASONING TEST PAPER IN POST-TEST (CONT.)

Q4. Write **ANY TWO (2)** causes for this problem? (2 marks)

Q5. What are the signs and symptoms of this patient's problem? (4 marks)

Q6. Does this patient experiences reduced grip strength? If **YES**, describe on the grip strength. (2 marks)

APPENDIX I– CLINICAL REASONING TEST PAPER IN POST-TEST (CONT.)

5

Q7. Describe the Cozen's test and Mill's test useful in making the diagnosis? (6 marks)

Q8. Which is the **MOST** common differential diagnosis? (2 marks)

Q9. What are the signs and symptoms of radial tunnel syndrome? (2 marks)

APPENDIX I– CLINICAL REASONING TEST PAPER IN POST-TEST (CONT.)

Q10. What is the other differential diagnosis? (6 marks)

Q11. Are braces used to treat this patient? (1 mark)

Q12. List the goals to treat patient's problem? (3 marks)

Q13. List the line of management to treat patient's problem? (7 marks)

APPENDIX I– CLINICAL REASONING TEST PAPER IN POST-TEST (CONT.)

Q14. List the functional goals for this patient. (2 marks)

Q15. What will be the prognosis for this patient? (2 marks)

[Total: 50 marks]

APPENDIX J– TURNITIN REPORT

Turnitin Originality Report

Effect of TikTok on student learning by Tan Eng Jing

From Kinesiology (Assignment)

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APPENDIX J– TURNITIN REPORT (CONT.)

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Aljameel, Sumayh Saud. "Development of an Arabic conversational intelligent tutoring system for education of children with autism spectrum disorder", 2018

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