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CORRESPONDENCE ADDRESS:
Editorial Office
Foundation University Journal of Rehabilitation Sciences (FUJRS)
Foundation University College of Physical Therapy (FUCP)
Foundation University Islamabad Campus (FUIC); Defence Avenue DHA Phase-I, Islamabad Pakistan
Tel: +92-51-5788171-602; Email: fujrs@fui.edu.pk

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EDITORIAL

Importance of health policy and systems research for strengthening rehabilitation in health systems: A call to action to accelerate progress

Walter R. Frontera[1,2], Wouter DeGroote[3], Abdul Ghaffar[4], For the Health Policy and Systems Research for Rehabilitation Group[*]

During the last few decades, the field of rehabilitation has experienced substantial development, growth, and acceptance. Rehabilitation addresses the impact of a health condition on a person's everyday life by optimizing their functioning and reducing their experience of disability. Rehabilitation expands the focus of health beyond preventative and curative care to ensure people with a health condition can remain as independent as possible and participate in education, work, and meaningful life roles.(1) A definition of rehabilitation for research purposes has been recently published.(2) Scientific and clinical research have generated a body of knowledge that strongly supports the use of many rehabilitation interventions with positive outcomes in various populations and health conditions.

We also have now a better understanding of the growing global need, demand, and recognition of rehabilitation around the world. For example, it has been estimated that 2.41 billion people in the world could benefit from rehabilitation services. This means that at least one in every three persons in the world needs rehabilitation at some point during the course of their disease or injury.(3) This figure has most likely increased because of the COVID-19 pandemic. The need for rehabilitation increased by 63% between 1990 and 2017 because of the aging population, the increasing prevalence of noncommunicable health conditions, and the shifting epidemiological profile in most countries.(3) Finally, according to the 2022 global report on health equity for persons with disabilities, approximately 1.3 billion people or 16% of the world's

Affiliations: [1] Department of Physical Medicine, Rehabilitation, and Sports Medicine School of Medicine, University of Puerto Rico, San Juan, Puerto Rico, [2]American Journal of Physical Medicine and Rehabilitation, University of Puerto Rico, San Juan, Puerto Rico. [3]Rehabilitation Programme, World Health Organization, Geneva, Switzerland. [4]Alliance for Health Policy and Systems Research, World Health Organization, Geneva, Switzerland.
Correspondence: Walter R. Frontera, MD, PhD
Email: walter.frontera@upr.edu
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population has moderate to severe levels of disability associated with the underlying health conditions and impairments.(4) Now more than ever before, it is crucial that rehabilitation is available and accessible to populations globally according to their needs. The important contribution of rehabilitation to the functioning, including social and occupational participation and well-being of populations worldwide, can no longer be denied or delayed. Rehabilitation is critical for the attainment of the United Nations Sustainable Development Goal 3, *Ensure healthy lives and promote well-being for all at all ages.*(5)

Notwithstanding the foregoing arguments, there continues to be a high unmet need for rehabilitation globally, with some low- and middle-income countries reporting unmet needs up to 50% of those who could benefit from rehabilitation. Rehabilitation services are not accessible to many people around the world.(6) Many of those in need do not have access because of the failure, at least partially, to effectively plan for rehabilitation services. Many nations and health systems have not implemented policy measures that recognize rehabilitation as an essential component of universal health coverage.(7,8) Health policy, planning, and decision making for rehabilitation often require more local evidence to adequately plan, finance, implement,and monitor quality rehabilitation services including infrastructure and workforce to make services accessible to those in need.(9)

The field of health policy and systems research (HPSR) seeks to understand and improve how societies organize themselves in achieving collective health goals and how different actors interact in the policy and implementation processes to contribute to policy outcomes.(10,11) By nature, it is interdisciplinary, a blend of medicine and health sciences, economics, sociology, anthropology, political science, law sciences, public health, and epidemiology that together draw a comprehensive picture of how health systems respond and adapt to health policies, and how health policies can shape—and be shaped by—health systems and the broader determinants of health. The importance of HPSR for rehabilitation has been recently highlighted with robust data that needs to be considered and used by health policy and systems community and leadership.(12) Health policy and systems research for rehabilitation generates the evidence needed by policy makers to make appropriate decisions and to develop action plans to enhance the capacity of the health system to serve the population in need of rehabilitation services. For example, the evidence generated by HPSR helps (1) establish priorities for rehabilitation service delivery, (2) evaluate outcomes of various rehabilitation interventions in relation to the levels of care in the health system, (3) identify specific benefits to society justifying those decisions, and (4) strengthen health systems to increase access, quality, and provision of health services for rehabilitation.(13) Supported by the recent resolution on 'Strengthening rehabilitation in health systems' that has been endorsed by the World Health Assembly for the first time in the history of the World Health Organization, (14) it is time to leverage HPSR to support societal health goals as they apply to rehabilitation.

In 2022, the World Health Organization Rehabilitation Program established the World Rehabilitation Alliance (WRA) (15) to strengthen networks and partnerships that advocate for the integration of rehabilitation into health systems. The WRA is a World Health Organization–hosted global network of stakeholders whose mission and mandate are to support the implementation of the Rehabilitation 2030 Initiative (16) through advocacy activities. The WRA focuses on promoting rehabilitation as an essential health service that is integral to Universal Health Coverage and to the realization of the United Nations Sustainable Development Goal 3. The work of the WRA is divided into the following five workstreams: workforce, primary care, emergencies, external relations, and research. The research workstream is dedicated to the generation and routine use of HPSR evidence for planning and integrating rehabilitation into health systems. The specific objectives of this workstream are to advocate for (1) the demand and utilization of HPSR evidence for rehabilitation, (2) the widespread generation of high-quality HPSR evidence for rehabilitation, and (3) the publication, dissemination, and implementation of HPSR evidence for rehabilitation.

In this context, the coauthors of this editorial on behalf of their respective academic journals express their full support for the WRA mission in general and for the specific objectives of the research workstream. In concrete terms, we commit that our journals, as much as possible, will implement one or more of the following actions: (1) invite researchers in the field of HPSR for rehabilitation to submit their manuscripts to our Journals for peer review and possible publication, (2) create a special journal section, series, or designation dedicated to HPSR for rehabilitation, (3) appoint editorial board members with expertise in HPSR for rehabilitation, and (4) disseminate research articles among funding agencies and policymakers. These actions by our academic journals will help the WRA

achieve its goal of strengthening rehabilitation services for all.

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This editorial is being published almost simultaneously in all journals listed to reach as many readers as possible.

Acta Fisiatrica; Advances in Rehabilitation Science and Practice; American Journal of Physical Medicine and Rehabilitation; Annals of Geriatric Medicine and Research; Archives of Physical Medicine and Rehabilitation; Australian Occupational Therapy Journal; Brain and Spine; Chiropractic and Manual Therapies; Die Rehabilitation; European Journal of Physical and Rehabilitation Medicine; European Rehabilitation Journal; Foundation University Journal of Rehabilitation Sciences; Frontiers in Rehabilitation Sciences; Journal of Manipulative and Physiological Therapeutics; Journal of Occupational Rehabilitation; Journal of Pakistan Medical Association; Journal of Prosthetics and Orthotics; Journal of Rehabilitation Medicine; Journal of Speech, Language, and Hearing Research; Medicina Riabilitativa; Neuropsychological Rehabilitation; Neurorehabilitation and Neural Repair; Portuguese Journal of Physical and Rehabilitation Medicine; Rehabilitación; Revista Colombiana de Medicina Físicay Rehabilitación; Revista Mexicana de Medicina Física y Rehabilitación; Revue Santé Publique; South African Journal of Physiotherapy; The Journal of the International Society of Physical and Rehabilitation Medicine; Turkish Journal of Physical Medicine and Rehabilitation.

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RESEARCH ARTICLE

Effects of 6 weeks of step aerobics training on pulmonary functions among female students with sedentary lifestyle

Syeda Rida Fatima[1], Muhammad Iqbal Tariq[1], Saira Waqqar[1], Mehwish Waseem[1], Iram Manzoor[2], Abeer Fatima[1]

ABSTRACT

Background: Sedentary lifestyle is among the leading cause of cardiovascular and respiratory diseases over the globe. Aerobic conditioning is among the beneficial intervention to improve pulmonary function and manage the complications caused by sedentary life style.

Objective: To determine the effects of step aerobics training on pulmonary function among female students with Sedentary Lifestyle.

Methods: This RCT was conducted in Margalla Institute of Health Sciences from February to July 2019. Non-probability convenient sampling was employed to collect sample of 80 students, randomly allocated into groups (40 per group) by coin toss method. Group A performed step aerobics and Group B performed cycling for 6 weeks. Pulmonary function test (FVC, FEV1, PEF) and 3-minute step test was performed at baseline, after 2, 4and 6 weeks in both groups. Heart rate and oxygen saturation was monitored pre and post exercise.

Results: The mean age of Group A is 22.43±2.49 and Group B is 21.80±2.04. Results showed statistically significant difference in respiratory function between groups. Significant improvement of respiratory function was observed in group A which performed aerobics program as compared to group B. The level of significance was set on $p < 0.05$.

Conclusion: Step aerobics is considered beneficial in improvement of pulmonary functions and is a good alternative for conditioning program for female adults. Cycling also improved pulmonary function but the progress was slow as compared to step aerobics which showed quick impact in improving pulmonary function test.

Clinical Trial Number: NCT04051788

Keywords: Cycling, Pulmonary Function, Sedentary Lifestyle, Step Aerobics.

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Introduction:

A sedentary lifestyle is defined as the lifestyle of an individual living with very little or no physical activity. In daily routine, such a person spending most of his or her time in watching television, playing games on mobile, using internet, reading books, often sitting or lying down while doing these activities. It can lead to many health problems and is potentially very harmful.(1) Over the past hundred years, the manual labor jobs like (farming, manufacturing, building) have been changed into office jobs which is due to globalization and advanced technology. In 1960's physical activity jobs have decreased in number from 50 to 20%, e.g., one in two Americans have jobs which are physically demanding, while in 2011, this ratio lead to one in five.(2) In 1990 to 2016, the ratio of manual labor jobs has decreased to one third. In 2008, the United States American National Health designed a survey in which they found out that 36% of adult were inactive and 59% of adult had no participation in vigorous physical activity which could last up to 10 minutes per week.(3)

The most common effect of sedentary life style is increased BMI and Obesity. The decreased level of physical activity is the most preventable cause of death worldwide.(4) The Center for Disease Control, CDC, has some recommendations to meet the physical

Affiliations: [1]Riphah College of Rehabilitation and Allied Health Sciences, Riphah International University, Islamabad, Pakistan. [2]Department of Biosciences, University of Wah, Pakistan.
Correspondence: Muhammad Iqbal Tariq
Email: iqbal1tariq@gmail.com

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activity criteria that should be necessary for every individual for being healthy. In this criterion, an individual should spend 150 minutes in moderate and 75 minutes vigorous exercise per week. According to health professionals a person should walk 10,000 steps per day which is about 5 miles, this is said to be an ideal criteria to meet your health benefits and reduce risk factors which are caused due to the inactivity 60 to 85% of population that does not participate in physical activity around the world according to WHO. In global mortality, physical inactivity is the fourth health risk factor. Aerobic exercise and healthy diet can decrease the effects of sedentary lifestyle. If an individual exercises for 30 minutes per day, he can easily overcome the effects of sitting for rest of the day.(5-7) Researches found out that prolonged sedentary time and low level of activity has been associated with high diastolic blood pressure and high-density cholesterol level which indirectly affects the cardiovascular system of an adult and may lead to cardiac issues at a very early age.(8)

Aerobics exercise is defined as physical exertion that depends upon energy generating process. Aerobics defined as something relating to and involving what required free oxygen. During aerobic exercise, maximum use of oxygen can meet the energy demand of the body.(9-10) Activities with light to moderate intensities that adequately meet the demands of aerobic metabolism can be performed for long period of times. We have some common examples of aerobics exercise, for instance walking, swimming, jogging, running and cycling.(9) In a sedentary lifestyle, the person's heart rate beats faster and rapidly with little activity due to decreased level of cardiac endurance, which demands more amount of blood to circulate through the body due to which the heart needs to pump more than normal. A sedentary person's heart rate beats fast with a little exercise, a term named as tachycardia which is more than 100 beats per minute. This is because of weak heart and low level of cardiac endurance due to inactivity. Aerobics conditioning strengthens heart and makes it stronger to pump blood and efficiently circulate it throughout the body.(11)

Moreover, the step aerobics mechanics showed different characteristics of movements in middle age groups and older adults and developed improvement in balance and agility. Flexibility can also be achieved by the dynamic movement of step aerobics choreographies. The studies showed beneficial effects and investigations and have evaluated that step aerobics has improved the pulmonary endurance cardio respiratory fitness. Step aerobics, also known as bench aerobics and step training, is a form of aerobic exercise that involves stepping on and off a small platform. Step aerobics is one of several low-impact aerobic exercises. It is similar to climbing stairs, but performed while staying in one place. It is typically performed on medium tempo like 118 to 122 (bpm).(12) Another research was conducted on target matching foot stepping to evaluate the proprioception and function of knee osteoarthritis. It includes functional score, walking velocity and overall knee performance to determine the efficacy of knee osteoarthritis. The exercise was designed to perform in sitting position as knee arthritic patients are not able to tolerate pain in standing position.(13) Another study showed that lower limb ergometric training improves echocardiographic parameters of left ventricle in dilated cardiomyopathy (DMC) patients.(14) Another research was conducted on non-athlete females to evaluate the efficacy of eight weeks of aerobic training programs and compare their effectiveness between resistance, and interval training programs on cardio respiratory measurement in non-athlete females. Their results revealed that interval and aerobic exercise programs could improve cardiopulmonary functions and aerobic training which could be with interval training that can be used to increase VC, IC, PIF, in non-athlete females.(15)

According to the literature, traditional aerobic training programs have great effects on improved pulmonary functions in individuals with sedentary life style but the literature suggested another type of aerobic training named Step Aerobics which is different from a traditional training has less work on pulmonary function but is effective on functional score, and walking velocity.(16) As the step platform is much less expensive and more portable as it can be performed by using a bench or a step, so it would be more feasible for participants to perform anywhere. This study would help physiotherapists to choose aerobics training program which is more feasible and provides equal beneficial outcomes according to literature. So, the main aim of the study is to determine the effects of 6 weeks of step aerobics on pulmonary function on female students with sedentary lifestyles. Sedentary behaviors often correlate with compromised lung function, posing potential risks to respiratory health. By focusing on the impact of step aerobics, a recognized cardiovascular exercise within this specific group aims to discern whether this regimen could serve as an

effective strategy to enhance pulmonary function and mitigate the adverse effects of sedentary living among female students.

Methods:

Randomized control trial was conducted in Margalla Institute of Health Sciences, and the duration of study was from February to July 2019. Sample size was calculated by open epi method, it was 4 on each group through primary outcomes (FEV1).(12,17) It was too low for comparing groups while doing RCT, so a sample of 80 was selected (40/40 each group) while comparing young adults for pulmonary function test. Non probability convenient sampling was employed to collect sample of 80 students then randomly allocated into groups (40 in each group) by coin toss method. Ethical approval was taken from the ethical approval committee of Riphah International University with ref. # Riphah/RCRS/REC/00538 and then this trial was registered on clinical trial.gov (NCT04051788).

Participants were sedentary females of age 15 to 25 years (who had not performed aerobic exercise in the last 3 months). Participants having previously diagnosed with Cardio-respiratory disease or any Musculoskeletal disease that they were unable to perform aerobic exercises, or neuromuscular diseases that made them unable to maintain balance or Disc inflammatory and infectious disease were excluded from the study.

Group A performed step aerobics and Group B performed cycling for 6 weeks. Pulmonary function test forced vital capacity (FVC), forced expiratory volume in 1 second (FEV1), peak expiratory flow (PEF) through digital spirometer (Spirotron– model no.18010500003) and 3-minute step test was performed at baseline, after 2, 4 and 6 weeks in both groups. Heart rate and oxygen saturation was monitored pre and post exercise in both groups through pulse oxymeter (believia –model no: PO10) to evaluate 3-minute step test which shows how quickly the heart returns to normal for both groups. Frequency of intervention was set at 3 sessions per week up to 6 weeks for both groups. Intensity was set on 50 to 75% of HRR (Heart Rate Reserve) for both the groups. For initial 2 weeks, the group A (Step aerobics) participants did 3 minutes of light walk as warm up and then 20 minutes of stepping 120 steps per minute, and 3 minutes of deep breathing exercises post training were followed as a cool down protocol. For initial 2 weeks, group B's (Traditionally aerobic cycling) participants did light repetitions of cycling as warm up protocol and then the intensity was set at a moderate level for 20 minutes. Then deep breathing exercises were followed as cool down protocol for 3 minutes.

Data was analyzed on SPSS version 21. Descriptive analysis of variables was done and results were shown in frequency (percentages) and mean and standard deviations. Shapiro-Wilk Test was applied to check the normality of different variables which showed p value < 0.05, so non-parametric test applied. Mann Whitney U Test and Friedman test was used for between the group analyses within group analysis.

Results:

Total 80 female participants were recruited in the study with 40 participants in the group A (Step aerobics) and 40 participants in the group B (Traditionally aerobic cycling).(Figure 1). Demographic data (Homogenous) was collected to avoid confounding impact on the results in which mean and standard deviation of the age, weight and height and frequency (percentages) of the BMI among the groups was reported. (Table 1)

Comparison of Group A (Step aerobics) and Group B (Traditionally aerobic cycling) at baseline, to 6^{th} week of data on pulmonary functions (FEV1, FVC and PEF statistical test results, along with descriptive mean and standard deviations because of continuous data are reported instead of median and interquartile. While applying between group analysis, both groups showed improvement at 4^{th} week and 6^{th} week and were significant ($p<0.05$). Within group analysis for all variables, both groups showed significant improvement ($p<0.05$) except FVC in Group B was not significant ($p>0.05$). (Figure 2) (Table 2)

Results of the data for 2^{nd} week, 4^{th} week, and 6^{th} week are reported on 3 Min Step Test (Pulse Rate, Saturation and time to recover heart rate) statistical test along with descriptive mean and standard deviations for comparison of Group A (Step aerobics) and Group B (traditionally aerobic cycling) at baseline. While applying between group analysis, both groups showed improvement in mean of pulse rate and saturation variables but statistically remained inconclusive as it is significant at baseline ($p<0.05$). But for time to recover heart rate, both groups showed significant improvement at 2^{nd} and 4^{th}week ($p<0.05$). Within group analysis for all variables, both groups showed significant improvement ($p<0.05$) except time to recover heart rate ($p>0.05$). (Table 3)

Fitness level of female students among the groups at baseline, at the end of 2nd week, at the end of 4th week and at the end of 6th week showed improvement in fitness level in both groups when moving to 4th and 6th week. It was derived from 3-minute Step Test on the bases of heart rate. (Figure no 3)

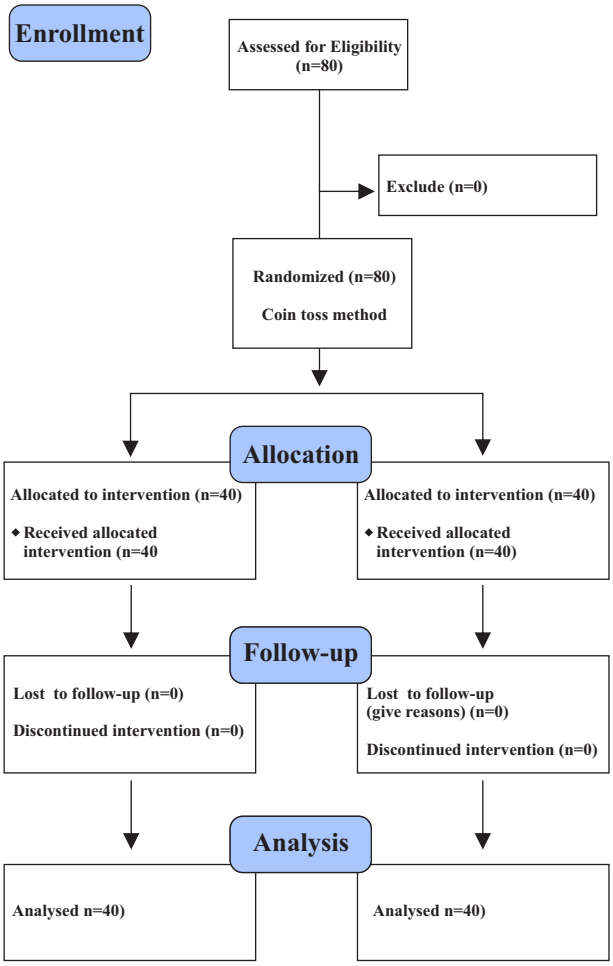


Figure 1: Consort Diagram

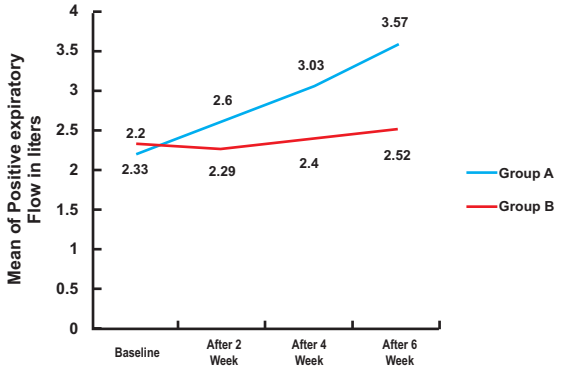
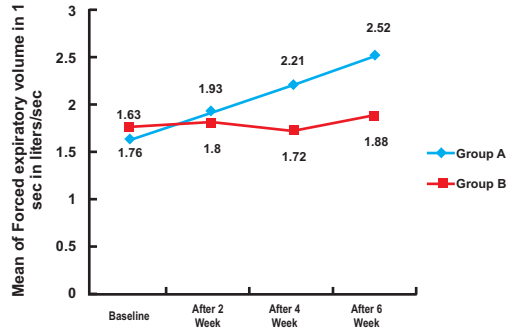


Fig 2 a)



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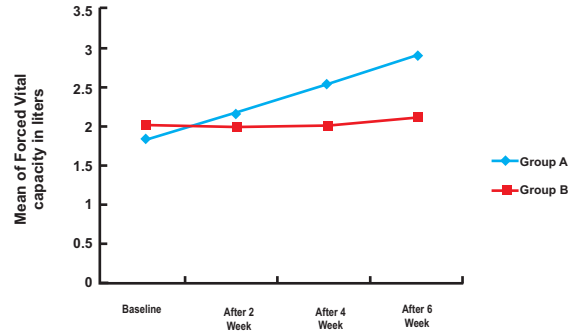

Fig 2 c)

Figure 2: Shows the Mean of PEF (fig 2a), FEV[1] (fig 2b), FVC (fig 2c) among the groups

Table 1: Comparison of Demographics (Age, weight, Height and BMI) among the Groups

Variable		Group A Mean±SD	Group B Mean±SD
Age (years)		22.43±2.49	21.80±2.04
Weight (kg)		58.93±5.94	57.13±6.75
Height (feet. Inches)		5.33±0.18	5.32±0.16
Body Mass Index (kg/meter^2)	Normal	38 (95%)*	38 (95%)*
	Overweight	2 (5%)*	2 (5%)*

SD= Standard Deviation, n= Sample, kg= kilogram, *= Frequency (percentage)

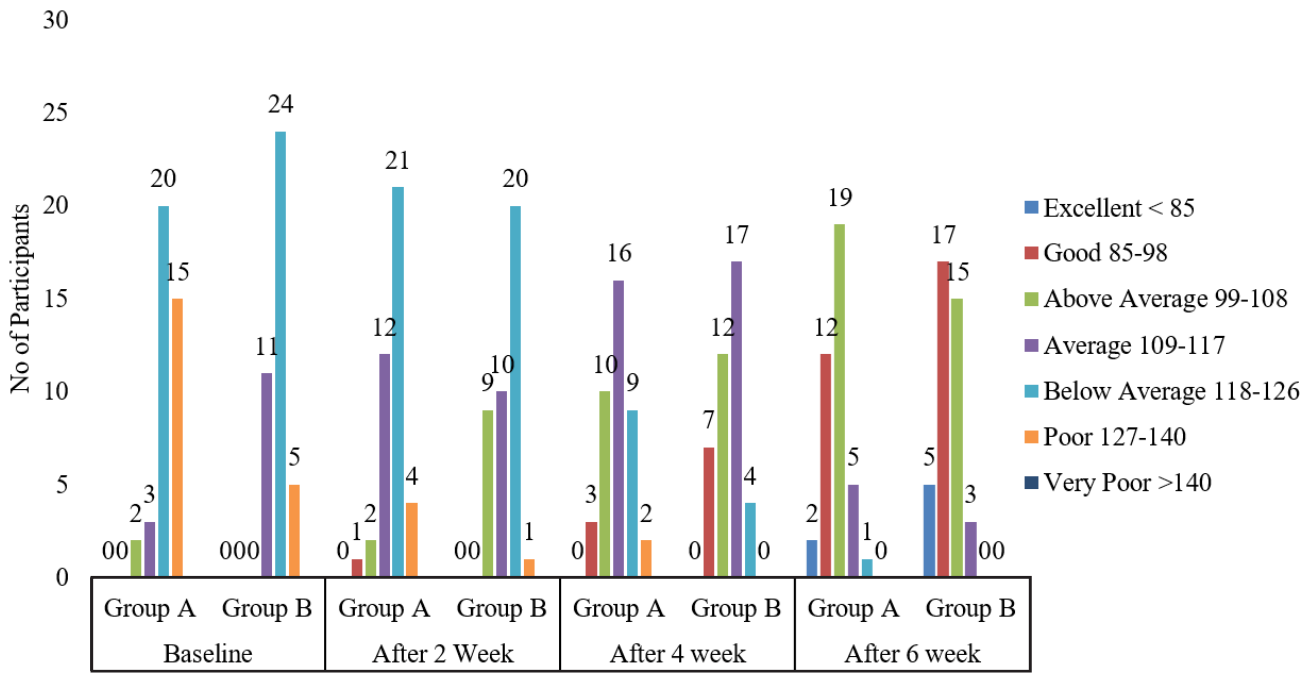

Figure 3 Shows the Frequency of fitness level of female students among the groups

Table 2: Comparison of groups for pulmonary function

Variable		Group A Mean±SD	Group B Mean±SD	Between group P value
FVC in Liters	Baseline	1.87±0.30	2.01±0.42	0.056
	After 2 week	2.17±0.39	2.01±0.36	0.400
	After 4 week	2.55±0.50	2.02±0.35	0.000*
	After 6 week	2.91±0.48	2.13±0.41	0.000*
Within group p value		0.000*	0.194	
FEV1 in liter/sec	Baseline	1.63±0.26	1.76±0.35	0.039*
	After 2 week	1.93±0.31	1.80±0.33	0.063
	After 4 week	2.20±0.36	1.72±0.34	0.000*
	After 6 week	2.52±0.43	1.88±0.43	0.000*
Within group p value		0.000*	0.047*	
PEF in liters	Baseline	2.20±0.49	2.33±0.68	0.519
	After 2 week	2.60±0.64	2.29±0.58	0.013*
	After 4 week	3.03±0.75	2.40±0.64	0.000*
	After 6 week	3.57±0.84	2.52±0.65	0.000*
Within group p value		0.000*	0.018*	

***= statistically significant 0.000=<0.001**

Table 3: Comparison of groups for 3 minute step test

Variable		Group A	Group B	Between group
3 Min Step Test		Mean±SD	Mean±SD	P value
Pulse rate in beat/min at the end of Test	Baseline	124.07±7.19	120.77±4.92	0.021*
	After 2 week	118.50±7.61	115.42±7.20	0.026*
	After 4 week	111.85±8.99	106.42±9.28	0.023*
	After 6 week	95.30±9.21	100.12±9.02	0.024*
Within group p value		0.000*	0.000*	
Saturation in % at the end of Test	Baseline	96.30±0.65	96.75±0.54	0.002*
	After 2 week	97.22±0.77	96.85±7.20	0.014*
	After 4 week	97.22±0.42	97.10±0.50	0.261
	After 6 week	97.30±0.56	97.20±0.40	0.524
Within group p value		0.000*	0.000*	
Time to recover heart rate in seconds	Baseline	214.00±2.83	210.20±2.68	0.302
	After 2 week	182.45±2.75	151.00±5.23	0.017*
	After 4 week	157.45±1.63	139.95±2.47	0.014*
	After 6 week	133.25±2.89	141.65±2.19	0.082
Within group p value		0.112	0.145	

*= statistically significant 0.000=<0.001

Discussion:

Healthy lifestyle and physical fitness have a great interrelation. The more the person is strong, not only is he more physically active but also has great impact on psychological and mental health issues. Also, it may help to reduce the mortality and morbidity rate. In our research, we evaluated the effectiveness of pulmonary functions in young female students with step aerobics program which was an experimental group. 40 students were allocated in experimental and control each which received cycling. On analysis, we got more significant results in aerobic as compared to control group. Many previous researches have been carried out with different population and objectives.

In a previous study, there were healthy young medical students, aged 17 to 20 years. The exercise plan was 16 weeks of training program. Pulmonary function test was recorded before the training program and at the end of the training pre and post reading. The paired t test ($p<0.05$) was considered significant to analyze the data. At the end of training, there were significant findings in the improvement of pulmonary function tests ($p<0.05$). The study showed significant difference between aerobic training and pulmonary function. If compared with our study we did on young female students aged 18 to 30 years, we have 4 levels of assessment, and have significant findings in improvement of pulmonary function testing after 6^{th} week of training in experimental group which received aerobic. According to Wilcoxon signed rank test and Freidman test, the p value for aerobic is ($p<0.05$) The other control group received cycling which also shows improvement but less significant as compared to the aerobic group.(17)

In one of the studies, the young females were engaged in aerobics swimming in order to increase their vital capacity and total lung capacity over the duration of one year training. They suggested that larger lung volumes may be due to the swimming training but the mechanism has been unclear in physical inactivity which may influence the effect of FEV1 and FVC,

although the relationship has been found strong between FVC and FEV1 post training.(18)

Another study was conducted on individuals who were 24 to 46, 44 to 46 and 64 to 66 years of age. They were healthy men and their hemoglobin level was more than 10gms/100ml. Pulmonary parameters were measured on spirometer which includes FVC, FEV1, FEV1/FVC%, PEF 50%, RR. The results significantly increased.(19)

A study on healthy adults was conducted to find out the effects of aerobic program on pulmonary function. 65 healthy adults participated with age range from 20 to 35 years. Spirometer was used as an outcome tool. The results showed that pulmonary function improved after the training program.(20)

Another research was conducted on elderly women to evaluate the effects of step aerobics. It is said to be the most famous and traditional program in females. It is designed as a single bench and the person has to move up and down repetitively with rhythm. The body composition showed positive effects in young and older adults. Lower body strength has been improved by the repetitive actions of stepping up and down. It can also improve upper extremity strength as the arms move in a dynamic pattern.(12)

In this study, we have some limitations of temperature as the humidity level was not the same for every student in which she performed the exercises. It's hard for them to cope up with the training program in initial 2-3 sessions.

The study suggests that the aerobics exercise plan should be designed in such a way that would be convenient for the individual to cope up with the exercise in sedentary lifestyle and the person should benefit from the program. Similar warm up and cool down protocol can be planned throughout the 6 weeks as were followed for initial 2 weeks to meet the actual intensity criteria. It is suggested to design RPM (Repetitions Per Minute) in cycling. The data suggests that longer duration and increased level of intensity is recommended to get more significant results in sedentary people. Those with physical issues and with compromised physical mobility are also recommended to do cycling or step aerobics in sitting position which may benefit in improving their pulmonary function.

Conclusion:

This study reveals that step aerobics is considered to be beneficial in the improvement of pulmonary functions and could be a good alternative for conditioning program for female adults. Cycling also improved pulmonary function but the progress was slow and steady as compared to step aerobics which showed quick impact in the improvement of pulmonary function test.

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Authors Contribution:
Fatima SR: Data collection, data analysis, and drafting of manuscript
Tariq MI: Conception, data analysis, data interpretation, critical review and final approval
Waqqar S: Data acquisition, data analysis, and drafting of manuscript
Waseem M: Data acquisition, data analysis, and drafting of manuscript
Manzoor I: Data acquisition, data analysis, and drafting of manuscript
Fatima A: Data acquisition, data analysis, and drafting of manuscript

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RESEARCH ARTICLE

Effects of dry needling on pain, range of motion and function in patients with upper cross syndrome

Komal Uroj[1], Syed Shakeel Ur Rehman[1], Muhammad Sanaullah[2]

ABSTRACT

Background: In upper cross syndrome, upper trapezius, levator scapulae, sub occipital, sternocleidomastoid, pectoralis major and minor become tight. Whereas, the phasic muscle including lower and middle trapezius, deep neck flexor and serratus anterior muscle weaken.

Objectives: To determine the effects of dry needling on pain, range of motion and function in upper cross syndrome.

Methods: This randomized clinical trial was conducted at Sheikh Zaid Hospital Rahim yar khan. Ethical approval REC/RCRS/20/1049 was obtained from Riphah International University Lahore. Group A was treated with dry needling along with conventional therapy and group B was treated with conventional therapy and 34 subjects were allocated in both groups. The duration of study was of 2 weeks with 1 session per week. The pre and post intervention scores were taken for Visual analogue scale, Neck disability index and neck range of motion. The data was analyzed using SPSS 25.

Results: There was no significant difference ($p<0.05$) between groups based on demographic data at baseline. The BMI in group A was 24.38(1.14) and in group B 23.19(2.59). The mean difference of VAS in group A was 2.89(1.68) with CI[1.98,3.76] ($p<0.05$) and in group B was 2.87(1.03) with CI [2.33,3.42] ($p<0.05$). The mean difference for NDI in group A was 21.25(10.85) with CI [15.46,27.03] ($p<0.05$) and in Group B was 14.68(8.42) with CI [10.20,19.17] ($p<0.05$). In VAS and NDI between group analysis did not show significant result ($p>0.05$).

Conclusion: Dry needling along with conventional therapy only improves range of motion but in term of pain and functionality, dry needling and conventional therapy are equally effective.

Clinical Trial Number: NCT04674904

Keywords: dry needling, muscle spasm, muscle stretching, muscle weakness.

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Introduction:

In upper cross syndrome, the tonic muscle becomes tight and phasic muscle becomes weak. The tight group of muscle includes upper trapezius, levator scapulae, sub occipital, sternocleidomastoid, and pectoralis major and minor. The weak group of muscle includes lower and middle trapezius, deep neck flexor and serratus anterior muscle. The muscle imbalance is caused by sedentary lifestyle. This imbalance in muscle groups causes pain, movement restriction and triggers points and muscle imbalance.(1-5) This condition leads to forward head posture, rounded upper back and elevated shoulders.

The physical therapy treatment approach for upper cross syndrome includes joint mobilization, strain counter strain, proprioceptive neuromuscular facilitation, soft tissue release technique, strengthening, and active isolated stretching. The kinesiotaping, hot packs and TENS are the modalities used in treatment.(6-10)

The practice of dry needling (DN) is the use of thin needle without any injectable to treat soft tissue conditions.(11) Dry needling technique is used in physiotherapy for musculoskeletal conditions and upper motor neuron disease to treat myofascial pain and spasticity.(12-14) Majority of studies find the relation between dry needling and muscle extensibility, neural sensitization, circulation which effects ROM, pain and

Affiliations: [1]Riphah International University, Lahore. [2]Superior University, Lahore.
Correspondence: Muhammad Sanaullah
Email: drmuhammadsanaullah@gmail.com
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quality of life.(15-19)

The data is available about implication of dry needling for trigger points and muscle spasm treatment. Unlimited data available on dry needling effect with conventional therapy for muscle spasm and trigger points in upper cross syndrome. The current study aims to examine the effect of DN in upper cross syndrome on ROM, pain and functional status.

Methods:

This study was a randomized controlled trial carried out at Sheikh Zaid Hospital Rahim Yar Khan. The duration of the study was from March 2020 to January 2021 after the approval of ethical committee with reference no: REC/RCRS/20/1049. Study was clinically registered by Clinical Trials, gov ID: NCT04674904. Sample size was 34 calculated by using online epi tools assuming power (0.8), margin of error (5%) and confidence interval (95%), the means (5.3,4.7) of VAS were used.(20)

The diagnosed patients of upper cross syndrome referred from orthopedics and neurology specialist of Sheikh Zaid Hospital Rahim Yar Khan for physiotherapy, patients with stiffness and gradual pain in neck and shoulder region, patients aged between 30-50 years and with complains of pain resulting from postural dysfunction or insidious onset were included.(21) Any individual with needle phobia, or is unable to give consent or is mentally retarded, patients with systemic soft tissue and bony disease, tumor, fracture, metabolic disease, rheumatoid arthritis, osteoporosis, with resting BP greater than 140/90 mmHg, or prolonged history of steroid use, atrophy of neck muscles or cervical Neuropathy, were excluded from this study.(22)

Patients were recruited into the study through convenience sampling and were randomly assigned into two groups by lottery method. Safety identity numbers were assigned, and assessors were blinded. Group A was treated with dry needling along with conventional therapy. Group B was treated only with conventional therapy. Conventional therapy includes hot pack, stretching and Transcutaneous Electrical Nerve Stimulation (TENS). (Figure1)

The tight muscle groups in upper cross syndrome include upper trapezius, Levator Scapulae, Sternocleidomastoid. MTrP and tight band were palpated by expert therapist according to criteria determined by Simons et al.(23) The dry needling consists of acupuncture needle of 0.30 mm and 50 mm length was applied. The needle was moved up and down 3 to 5 times and then removed.(24) Hot pack was applied for 20 min, TENS was applied for 10 min with 100 Hz frequency and pulse duration was 0.05 to 0.07. Stretching was maintained for 30 seconds with 15 seconds rest between each stretch(4-5 repetitions).(6)

The participants completed pre and post treatment scoring by performing neck goniometry for flexion, extension and right-side bending. The universal goniometer is a reliable tool for neck's range of motion (ICC=0.85;[0.90-0.99]).(25) NDI consists of 10 sections of a self-reporting questionnaire. 0 means no disability and 50 means complete disability. Neck Disability Index (NDI) shows excellent reliability (ICC=0.88;[0.63-0.95]).(26) The visual analog scale (VAS) is 10-cm scale 0 for no pain and 10 for extreme pain and had excellent reliability(ICC=0.81;[0.79-0.85]).(27) The treatment duration was 2 weeks with 1 session/week.

Data was analysed by using SPSS 25. The data was not normally distributed when checked by Shapiro Wilk Test. The data was analyzed using Wilcoxon's Test. For between group comparisons, Mann-Whitney U Test was used. The effect size of Mann-Whitney Test was calculated using formula $z/\sqrt{n}$.

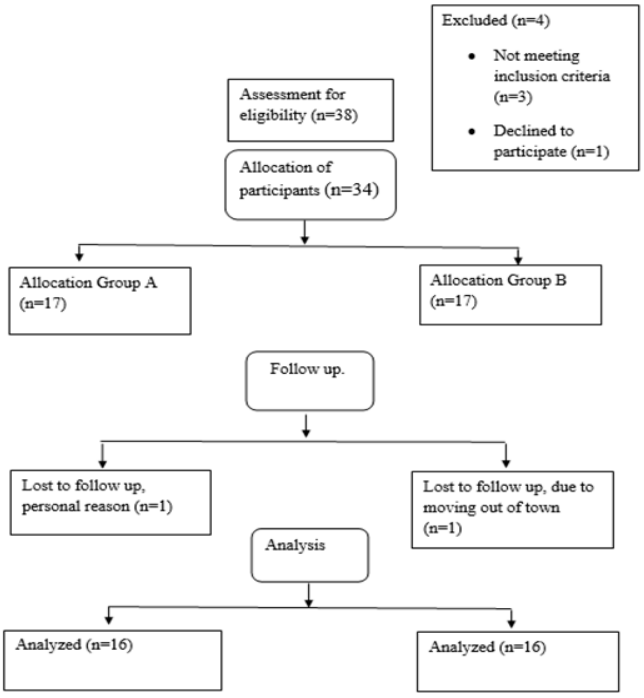

Figure 1: Consort diagram

Table 1: Results of demographic data.

Variable		Group A Mean±SD	Group B Mean±SD	p-value
Age		35.38±6.52	31.63±6.52	0.114
Height		167.81±2.71	174.25±3.70	0.00
Weight		69.63±5.15	69.63±6.96	1.00
BMI		24.38±1.14	23.19±2.59	0.104
Work time		7.25±2.01	6.88±2.63	0.654
Sitting time		4.25±3.00	5.56±3.41	0.256
Computer use		3.13±2.74	6.57±3.16	0.041
Gender	Male	7(43.8%)*	8(50%)*	0.733
	Female	9(56.3%)*	8(50%)*	

*= Frequency (percentage)

Table 2: Between and within group analysis.

		Pre-test x̄± SD	Pre-test Median Q1-Q3	Post-test x̄± SD	Post-test Median Q1-Q3	Within Group p-value	Between Group p-value	r
VAS	**Group A**	4.44±1.09	4.5 3.25-5.0	1.56±0.73	1.0 1.0-2.0	<0.01	0.77	0.05
	Group B	4.44±0.73	5.0 4.0-5.0	1.56±0.51	2.0 1.0-2.0	<0.001		
	M.D	0.00		0.00				
NDI	**Group A**	49.503±14.13	53.0 37.0-60.0	28.25±12.43	27.0 18.5-37.5	<0.01	0.72	0.12
	Group B	42.06±13.25	44.0 34.25-46.75	27.37±13.38	26.0 18.0-31.50	<0.01		
	M.D	7.44		0.87				
Flexion	**Group A**	41.38±10.97	37.5 34.25-45.75	47.50±12.57	43.50 40-50	<0.01	<0.01	0.69
	Group B	64.06±6.61	66 60.50-68.75	70.50±6.79	73.50 69.25-75	<0.01		
	M.D	22.69		23.00				
Extension	**Group A**	53.88±5.80	52.25 52-55	60.63±6.66	60 55-64.75	<0.01	<0.01	0.51
	Group B	60.50±6.39	60 59-63.5	67.00±6.37	68 63.5-69.75	<0.01		
	M.D	6.62		6.37				
Rotation right	**Group A**	67.19±10.95	73 57.75-76.75	76.00±10.64	80 70-85	<0.01		0.19
	Group B	72.38±11.78	75.50 69.50-77.75	78.63±13.01	84.50 74-85	<0.01	0.268	
	M.D	5.19		2.62				
Rotation left	**Group A**	67.50±10.72	73.50 57.75-76.75	75.56±10.44	79 67.75-84.75	<0.01	0.191	0.23
	Group B	72.56±11.57	75.50 69.75-77.75	78.63±12.98	84 74-85	<0.01		
	M.D	5.06		3.06				
Side bending right	**Group A**	29.38±6.16	28.50 25-35	34.19±7.47	33.50 27.75-40	<0.01	0.01	0.42
	Group B	38.19±7.37	37 36-37.75	42.31±7.53	40 40-42	<0.01		
	M.D	8.81		8.13				
Side bending left	**Group A**	29.66±6.29	29 25-35	34.00±7.18	33.50 29-40	<0.01	0.01	0.45
	Group B	38.38±7.58	37 36-38	42.31±7.55	40 40-42	<0.01		
	M.D	8.94		8.31				

x̄: mean, S.D: standard deviation, M.D: mean difference, r: effect size, VAS: visual analogue scale, NDI: Neck Disability Index

Results:

A total of 34 patient were included in the study. Each group had 17 patients and there were 2 dropouts, one from each group, so a total of 32 patients were analysed. Gender distribution between in group A, females 9 (56.3%) and males 7 (43.8%) and in group B both were equal in number. The participants in both groups were of adult age with normal BMI. The working time of participants in group A (7.25) was greater than group B (6.88). The duration of sitting and computer use was greater in group B (5.56, 6.57) than group A (4.25, 3.13). (Table 1)

In table 2, the pain was measured by VAS and functional disability was measured by NDI and there were significant results ($p<0.01$) in both group A and B. However, there were insignificant results ($p>0.05$) while comparing both groups. For all ROM's, there were significant results ($p<0.01$) in both groups, while group A had more significant results than group B in flexion, extension and side bending ($p<0.01$).

Discussion:

The following parameters NDI, VAS and goniometer were included to measure the levels of neck disability, pain and range of motion. Both groups had significant improvement in NDI, VAS and ROM. Dry needling along with conventional therapy had better effects in improving flexion($p<0.01$), extension($p<0.01$) side bending right and left($p<0.01$) but did not have better effect than conventional therapy in improving pain($p>0.05$) disability ($p>0.05$), rotation right and left($p>0.05$).

MTrP causes pain, decrease range of motion and dysfunction of muscle fibers and motor end plate dysfunction; dry needling is observed to be effective for these dysfunctions. Dry needling improves micro circulation, decrease sensitization both central and peripheral and MTrP vicious cycle break down.(28) DN may play an important role in treating active MTrPs via inhibition of sympathetic nervous activity and reduction of NMJ hyperactivity.(29-31)

Stretching lengthens the muscle and improves ROM but studies showed that stretching increases sensitization in MTrP. A study mentioned that stretching in only beneficial after desensitizing the MTrP (31). Graff-Radford mentioned that TENS desensitizes the MTrP. TENS along with stretching can improve muscle length.(32, 33) Hot pack increases location circulation.(34) Thus, in the current study, both groups' treatments improve blood circulation, sensitization and pain.

In the current study, DN was applied with conventional therapy and there was a significant improvement ($p<0.05$) in pain (M.D:2.88±0.36), NDI (M.D:21.25±1.73), flexion (M.D6.12:±1.53), extension (M.D:6.75±0.86), rotation right (M.D:8.81±0.31), rotation left (M.D:8.06±0.28), side bending right (M.D:4.81±1.31), side bending left (M.D:4.34±0.89) The stretching was applied along with TENS and hot pack in group B and there was significant improvement($p<0.05$) in pain (M.D:2.88±0.22), NDI (M,D:14.59±0.13), flexion(M.D:6.44±0.18), extension(M.D:6.5 ±0.02), rotation right(M.D:6.25 ±1.23), rotation left (M.D:6.07 ±1.41), side bending right (M.D: 4.12±0.16), side bending left (M.D:3.93 ±0.03).

In a previous study, static stretching applied on trapezius, levator scapulae and pectoralis along with infrared, TENS and cervical mobilization in upper cross syndrome and duration was 3 weeks with 2 sessions per week. There was significant improvement in pain (M.D2±0.0), NDI(M.D2.05±0.35), flexion(M.D5±1.25), extension(M.D4.25±0.5), rotation right(M.D5±3.50), rotation left(M.D2.7±0.59), side bending right(M.D5.35±0.46) and side bending left(M.D3.6±0.07).(35) In the current study there was more improvement in NDI and ROM than in the previous study because hot pack and TENS were applied for long duration and sternocleidomastoid was also treated.

Another study applied static stretching along with home exercises in upper cross syndrome for 16 sessions and 3 sessions per week. There was significant improvement in pain (M.D3.42±0.2), NDI (M.D9.81±0.4), flexion(M.D12.5±0.28), extension (M.D11.92±0.78), rotation right (M.D10.97±2.01), rotation left (M.D10.96±1.26), side bending right (M.D8.39±2.12), side bending left (M.D8.08±2.1).(36) In the current study, there was less improvement as compared to the previous study. In the previous study, the number of sessions were greater than in the current study and also a home plan of self-stretching was given in previous study.

Another study applies stretching of pectoralis along with hot pack and strengthening of trapezius and neck flexors and rhomboids for upper cross syndrome. The duration of study was 8 weeks with 3 sessions per week. There was significant improvement in pain

(M.D2±0.0)) and NDI (M.D16.25±0.0).(37) The results of this study are similar to current study.

A study determines the effect of DN on sternocleidomastoid muscle MTrP in neck pain. There was no significant effects on pain (M.D0.2±1.99) but there was significant effect on NDI (M.D5.1±7.82), flexion (M.D3.1±10.60), extension (M.D3.4±8.07), rotation right (M.D3.7±10.60), rotation left (M.D0.3±9.79). The effect side for VAS was 0.005, for NDI was 0.209, for flexion was 0.265, for extension was 0.572, for rotation right was 0.505, for rotation left was 0.302.(38) This was a single session study, and no conventional therapy was added. The results mean difference and effect size of this study are less than current study because in current study three muscles were targeted and conventional therapy was also used. Also, the number of sessions of current study were greater than previous study.

Another study determines the effect of DN on levator scapulae in neck rotation. This was a single session study and instead of right and left this study focused more on ipsilateral and contralateral rotation according to DN applied for particular side muscle. The result showed significant improvement in ipsilateral rotation (M.D2.71±1.26) and non-significant for contralateral rotation (M.D0.99±0.61).(39) There was greater improvement of rotation in current study as compared to the previous one. Because in current study, a group of muscles were included, and convention therapy was also used.

Another study determines the effect of DN on trapezius muscle in neck pain. The treatment was for 3 weeks with 2 interventions per week. One group was treated by DN along with stretching and other group was treated with stretching only. The median for pain in DN group changed from 5.8 to 0 and for stretching group from 5 to 3. The DN group had significant effects on neck flexion-extension, side bending and rotation. In stretching group, only rotation significantly improved as compared to other movements.(40) Another study compares DN and stretching with stretching alone in trigger point and concluded that DN along with stretching had same effect as applying stretching alone to minimize pain.(41) The outcomes are similar to current study.

Another study determines the effect of dry needling on mechanical neck pain where the target muscle was upper trapezius. There was significant improvement in pain (M.D=5.3±0.4), flexion (M.D=6.1±0.4), extension (M.D=7.5±3.1), rotation right(M.D=6.5±3.5) left (M.D=4.7±3), side bending right (M.D=6.2±0.74) left(M.D=6.8±0.3).(42) In current study target muscles were SCM, pectoralis major, minor and upper trapezius. The improvement in pain was greater in previous study but there was similar increase in range of motion in both studies. In previous study DN effect was assessed on mechanical neck pain but in the current study, upper cross syndrome was included.

The pathophysiological effects of both groups' interventions were almost similar so stretching along with TENS and hot pack have similar effects on pain and disability as DN along with stretching, hot pack and TENS. Stretching increases the neural sensitization and TENS inhibits these phenomena. Stretching alone is not effective so hot pack and TENS prior to stretching give significant results. There are significant outcomes when interventions are applied to a group of muscle instead to single muscle, because upper cross syndrome involves group of muscles.

There are some limitations of current study. The follow up was not done as DN effect remains for a long term so follow up can be included in next studies. Home exercises were not included. The third group was not added in which sham DN with conventional therapy can be applied.

Conclusion:

The conventional therapy and dry needling had equal effects on pain in term of VAS, functional disability in term of NDI. In range of motion, dry needling had better effects on flexion, extension and side bending than conventional physical therapy.

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Authors Contribution:
Uroj K: Methodology, Formal analysis, Investigation, Writing-original, Funding Acquisition
Rehman SS: Conceptualization, Validation, Resources, Supervision, Project Administration
Sanaullah M: Software, Data Curation, Draft, Writing-review and editing, Visualization

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RESEARCH ARTICLE

Frequency of urinary incontinence in post-partum multiparous women

Sharjeel Tasneem[1], Danish Latif[1], Hafiza Warda Shaheen[2], Muneeba Saeed[2], Abdullah Javaid[3], Alisha Munir[3]

ABSTRACT

Background: Urinary incontinence (UI) is a widespread condition of uncontrollable urine leakage that has been strongly linked to natural delivery problem impacting one's wellbeing and quality of life.

Objective: The objective of study was to determine frequency of urinary incontinence in postpartum multiparous women in Karachi.

Methods: A descriptive cross-sectional study by using non-probability convenient sampling technique was conducted at different hospitals of Karachi in a duration of seven months, June 2020 to December 2020. A total of 267 women aged between 18 to 40 years, undergoing postpartum period after normal deliveries in last one year were included in the study. Ethical permission was taken from the Institutional review board of Hayat Institute of Rehabilitation Medicine. A consent form in their native language was taken before recruiting into the study. They were asked to fill the questionnaire Bristol Female Lower Urinary Tract Symptoms (BFLUTS). Data entry and analysis was done through SPSS version 26 and descriptive analysis was done. Data was presented in frequency and percentages, however, demographic information was presented in mean and standard deviation.

Results: A total of 267 women were recruited, the mean ±SD of age in years was 30.6 ±5.087 while all women were housewives. Females experienced symptoms like urgency 13.48%, bladder pain occasionally at 80.15%, and frequent visits to the toilet to urinate 41.2%. The current study discloses that 61.16% experienced urinary incontinence.

Conclusion: This study concludes that urinary incontinence is moderately found in postpartum multiparous women.

Keywords: Multiparous, Post-Partum,Pregnancy, Urinary Incontinence, Vaginal delivery.

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Introduction:

Urinary Incontinence (UI) is defined by the International Continence Society (ICS) as an involuntary loss of urine and it has notable psychological consequences.(1) Urine leakage can be acknowledged by its prevalence, severity, intensifying factor, and consequences on society.(2) Mixed UI is followed with urgency as well as activity, sneezing, or coughing.(3) Variety of factors such as pelvic floor muscle disorders, postmenopausal hypo-estrogens, pregnancies, vaginal births, trauma of pelvic floor muscles, pelvic surgeries, chronic constipation, obesity, being an athlete and diabetes mellitus are associated with urinary incontinence.(4) UI is a consequential problem associated with physical, psychological and social burden.(5) As a result, a big part of the population gets frustrated and is not actively involved in activities.(6) Urine leakage is a remarkably common condition having great influence on quality of life.(7-9) A couple of studies show that urinary incontinence has a strong association with vaginal birth.(10) According to epidemiological research, the prevalence of Stress Urinary Incontinence (SUI) during pregnancy rises with increase in gestational age, ranging from 18.6% to 67%.(11,12) While SUI in women after delivery is 56% and the condition progressively declines within 6 months.(13-15) Prevalence of SUI is high in comparison to urge and mixed incontinence with incidence increasing in the 5th decade of life.(16)

Parity is a risk element for urinary incontinence in adolescent women whereas C-section marginally

Affiliations: [1]Bahria University Health Sciences, Karachi, Pakistan [2]Pakistan Society for Rehabilitation of Differently Abled Hospital, Lahore, Pakistan [3]Hayat Institute of Rehabilitation Medicine, Karachi, Pakistan

Correspondence: Sharjeel Tasneem

Email: sharjeelch2010@hotmail.com

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increases the danger of urine leakage compared to the nulliparous state, natural delivery in addition will increase the chance significantly.(17,18) Several researches have looked at delivery parameters as possible factors for urinary incontinence. Contradictory outcomes have been reported for breech delivery, epidural analgesia, forceps and vacuum delivery. Furthermore, there is variability concerning the interdependence between urinary incontinence and trauma to the pelvis, such as episiotomy and sphincter tear. Finally, contradictory outcomes are reported related to neonatal parameters, for instance, high birth weight and head circumference.(19,20) According to conventional statistics, women above the age of 18 and 40 were 10% and 33% respectively. Even though being a common problem, it may not be reported and may result in long delays between their occurrence and seeking help.(21) It has been observed that only 20% of women seek help for condition they are facing. The main reasons are lack of knowledge and embarrassment.(22) A study shows a prevalence of 28.64% of participants reported moderate urinary incontinence. In countries like Pakistan data on prevalence of post-partum UI in females is limited and needs to be addressed.(23) Another study revealed that inability to urinate is a common condition in many people, especially the elderly, which reduces the quality of life so that 10 to 20 percent of all women and 77% of women living in nursing homes have an inability to urinate.(24) Urinary incontinence affects the life quality of women. But no recent studies have been done to find the recent proportion of urine incontinence among women within 12 months after child birth. The objective of this study was to investigate the frequency and its impact on quality of life of women after delivery.

Methods:

A descriptive cross-sectional study with non-probability, convenient sampling technique was conducted with a sample size of 267 women, calculated by open epi tool with confidence interval of 95% and 05% margin of error. An informed consent was taken from all the willing participants. Data was collected from Gynecology wards of Dar ul Sehat and Liaquat National Hospital in duration of seven months from June 2020 to December 2020 including female aged between 18 to 40 years who had delivered their newborns and agreed to participate in this study within 12 months of post-partum including vaginal delivery, vaginal assisted delivery and multiparous women. While females with C-section delivery, primiparous and nulliparousity were excluded. They were asked to fill out a Bristol female lower urinary tract symptoms (BFLUTS) questionnaire that is a valid tool for urinary incontinence (Cronbach Alpha= 0.78).(25) The questionnaire used in this study is designed to assess the wide range of symptoms, including incontinence impact on quality of life. The questionnaire assesses three domains, including incontinence, voiding, and filling with additional sub-scale for sexual function and quality of life. These domains were identified to assess symptoms: incontinence (5 items); voiding (3 items); and filling (4 items); sexual function (2 items) and quality of life (5 items). All scales have simple additive scores.

Ethical permission was taken from the institutional review board of Hayat Institute of Rehabilitation Sciences (Ref. No HIRM/DPT/REC/101). Permission was taken from the clinical setting prior to getting information from the participants and consent was taken according to the guidelines of Helsinki from every patient. All the data was entered and analyzed by using (SPSS) version 26. The demographic information was presented by mean and standard deviation and domain-wise analysis was also presented in the form of mean and standard deviation.

Results:

A total of 267 female participants were recruited in the study. The age of the participants ranged from 18 to 40 years with Mean± SD of 30.68±5.087 and the highest number of participants were at the age of 29 with 10.49%, while the lowest number of participants were of the age of 20 with 0.4%. All women in the current population were housewives and fulfilled the inclusion criteria.

The Mean± SD of filing severity was 5.78±3.012 and of voiding severity was 3.42±3.082. The mean± SD of leaking severity was 5.62±4.56, the mean± SD of sexual functional severity was 1.35±1.56 and of quality of life severity was 5.10±3.83. (Table 1)

In Section BFLUTS-sex most of the participants, i.e. 236 participants (88.4%) reported that they are active sexually, their sex life is not at all spoiled by urinary symptoms, and do not leak urine during intercourse, respectively. 143 participants (53.56%) does not leak urine during the sexual activity and 13 participants (4.87%) had leaked urine a lot during the sexual intercourse. 108 participants (40.45%) of the participants had a little problem to perform their daily tasks due to the urinary symptoms. Only 17 participants

Table 1: Showing all domains with frequencies and percentages of items

	Questions		Frequency (percentages)
Incontinence	No. of times to urinate on average	2 times	110 (41.2%)
		4 or more times	12 (4.5%)
	Rush toilet to urinate	Never	109 (40.8%)
		All the time	3 (1.1%)
	Pain in the bladder	Occasionally	98(36.7%)
		All of the time	10(3.7%)
	No. of times pass the urine during the day	Every 3 hours	103(38.6%)
		Hourly	30(11.2%)
Voiding	Delay before the start of urinate	Never	109(40.8%)
		All of the time	7(2.6%)
	Strain in urinating	Never	113(42.3%)
		All of the time	7(2.6%)
	Stop and start urinating	Never	110(41.2%)
		All of the time	10(3.7%)
Filling	Leakage before they get to the toilet	Never	129(48.3%)
		All of the time	3(1.1%)
	How often leakage occurs	Never	128(47.9%)
		Several times per day	25(9.4%)
	Leakage when they are physically active	Occasionally	115(43.1%)
		All of the time	5(1.9%)
	Leakage for no obvious reason	Never	120(44.9%)
		All of the time	7(2.6%)
	Leakage during sleep	Never	143(53.6%)
		Most of the time	12(4.5%)
Sexual function	Sex life spoiled by their urinary symptom	Not at all	141(52.8%)
		A lot	14(5.2%)
	Leakage of urine during sexual intercourse	Not at all	143(53.6%)
		A lot	13(4.9%)
Quality of life	Need to change clothing	Never	115(43.1%)
		All of the time	6(2.2%)
	Cutting down fluids	Occasionally	90(33.7%)
		All of the time	6(2.2%)
	Affected daily tasks	A little	108(40.4%)
		A lot	17(6.4%)
	Avoiding places	Occasionally	104(39%)
		All of the time	5(1.9%)
	Symptoms interfering with their routine life	Not at all	111(41.6%)
		A lot	11(4.1%)

Table 2: Showing frequencies and percentages of important parameters

Parameters	Frequency	Percentages
Urinates two times during the night.	110	41.20%
Urinates on average 1 time	65	24.34%
Urinates 3 times on average	60	22.47%
Sometimes rushed to the toilet	79	29.59%
Most of the times rushed to the toilet for urination	33	12.36%
Pain in their bladder	10	3.75%
Experiences pain all the time	7	2.62%
Experiences pain sometime	53	20%
Never experienced leakage of urine.	128	47.94%
Experienced it once or less per week	42	15.73%
2-3 times per week	25	9.36%
Experienced leakage once	37	13.86%
More than once in a while	35	13.11%
Never experienced leakage of urine during sleep	143	53.56%
Experienced it most of the time	12	4.49%

(6.37%) had responded that they have a lot of problems in performing their daily tasks due to the urinary symptom. 104 participants (38.95%) occasionally avoided the places and only 5 participants (1.87%)had responded positively that they avoided such situations all the time. 110 participants (41.57%) did not have such complains at all. 103 participants (38.58%) had stated that there was a little inference in their life. 42 participants (15.73%) have somewhat agreed to the question whereas 11 participants (4.12%) have complained a lot about it. (Table 2)

Discussion:

The findings of the study revealed that most of the female participants (61.16%) experienced symptom like Nocturia and get up to two to four times during night to urinate, 13.48% of the participants experienced urgency to urinate almost all the time, 80.15% of females experienced pain in bladder occasionally, sometimes, most of the time or all the time, and around 41.2% of women went to toilet to urinate in every one to two hour. Similar study was conducted by Zoha Gilani and her colleagues to find out the urinary incontinence prevalence in Post-Partum Females in Hayatabad, Peshawar in which majority of women (84.4%) experienced Nocturia and it is the most reported symptom, 43.9% of females experience urgency, 48.3% experience bladder pain and about 54.7% female participants frequently void.(23)

In the present study, about 52.06% of women reported that they experienced leakage of urine one to four times a week within first year of post-partum whereas in MacArthur and colleges' study, 13 months to 9 years after their most recent delivery, 11% female experienced incontinence symptoms.(26)

Another study disclosed that women who gave natural birth had a higher prevalence of urinary incontinence over the first year postpartum.(27) The findings of similar studies showed that stress incontinence symptoms were found in one out of five women within first year. Various studies have revealed that there is an association between urinary incontinence and multi-parity.(17,28) In the study conducted by S. Mørkved and K. Bø , the number of multiparous women with urinary incontinence was 36%.(29) .A study was carried out by Erica Schytt and his colleagues on the topic “Symptoms of stress incontinence 1 year after childbirth: prevalence and predictors in a national Swedish sample”. This study disclosed that increased pressure on the pelvic floor muscles due to obesity, constipation or any other reason in women who delivered a baby via SVD, increased the risk of stress urinary incontinence.(30) Wilson and colleagues study revealed that regular antenatal PME could reduce the risk of postpartum urinary incontinence by 50%, and similar figures have been reported for postpartum exercises in the study conducted by Glazener CM and his colleagues.(31,32)

The finding of our studies gives a better understanding of urinary incontinence. There are few limitations of this study. The factors that increase the prevalence of urinary incontinence 1-year post-partum were not studied. Only one route of delivery was studied. Other routes of delivery should be considered in future studies. This study was done on very small

scale with a small sample size. Future studies should be carried out on larger scale with larger population including females of different cities.

Conclusion:

The findings of our study concluded that moderate symptoms of urinary incontinence (nocturia, urgency, and bladder pain) occur in females during their postpartum period.

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Authors Contribution:

Tasneem S: Conception, design and final approval of work

Latif D: Conception and accountable for all aspects and integrity of work

Shaheen HW: Drafting, analysis, acquisition, and interpretation of work

Saeed M: Drafting and acquisition of work

Javaid A: Acquisition of data

Munir A: Conception and interpretation

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RESEARCH ARTICLE

Bumping along: Healthcare students' perspectives on interprofessional education

Tayyeba Iftikhar[1], Ayesha Ghassan[2], Irfan Shukr[1], Shazia Inam[1]

ABSTRACT

Background: Global regulatory bodies and the PM&DC (Pakistan Medical and Dental Council) share a competency framework that emphasizes the importance of graduates being effective communicators and collaborators in the healthcare system to achieve positive patient outcomes. However, due to unclear roles, conflicting power dynamics, and varying educational qualifications among healthcare professionals, effective interprofessional teamwork is often not realized, leading to suboptimal outcomes.

Objective: To evaluate the attitudes and readiness of healthcare students towards inter-professional education.

Methods: This comparative cross-sectional study was conducted from March to August 2020 by utilizing a pre-validated inventory called the Readiness of Interprofessional learning scale (RIPLS) to assess the readiness of students in healthcare programs. Data was collected using Google Forms, and the Kruskal-Wallis Test was employed to compare perceptions among the four groups.

Results: 157 students completed the questionnaire, resulting in a response rate of 58%. All four groups demonstrated high readiness for mutual learning (mean rank=78.78) although physiotherapy students had higher scores (mean rank=79.36) compared to the other groups, while nursing students had the lowest scores (mean rank=77.92).

Conclusion: The positive attitude of students towards interprofessional education and collaboration highlights the need for integration with other healthcare disciplines at both the curricular and co-curricular levels. Clinical case studies, problem-based learning, and simulations can be effective methods for fostering students' understanding of each profession's role.

Keywords: Attitude, Collaboration, Interprofessional Education, Readiness, Students.

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Introduction:

The healthcare workforce consists of diverse professionals, such as doctors, nurses, pharmacists, surgeons, therapists, and specialists. It is crucial for these experts to collaborate effectively in order to provide high-quality patient care. Failure to communicate or understand each other's roles can lead to errors in patient treatment.(1-3) Achieving effective teamwork in healthcare is challenging due to social and cultural factors, including unclear roles and conflicting power dynamics among different professions.(4)

Affiliations: [1]Foundation University Medical College, Foundation University Islamabad, Pakistan. [2]Baqai Medical University, Karachi, Pakistan.
Correspondence: Tayyeba Iftikhar
Email: tayyeba.iftikhar@fui.edu.pk
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To promote positive relationships and collaborative practice among healthcare professionals, global regulatory bodies consider interprofessional education (IPE) significant.(5,6) Recently, a new accreditation standard for medical schools emphasizes the importance of incorporating IPE into medical education. This recognition stems from the belief that IPE and interprofessional collaborative practice enhances patient outcomes, safety, and the quality of care.(7)

Introducing chances for interprofessional learning can enhance the readiness of future healthcare practitioners to function effectively as a cohesive team.(8) Several research studies have demonstrated that IPE enhances students' confidence in their respective professional roles. By engaging with other healthcare professionals, students acquire an understanding and appreciation for diverse perspectives, develop respect for knowledge and expertise of other professions, collaborate on problem-solving, and effectively communicate as a team to

ensure patient safety.(9,10) It is crucial to provide early exposure to IPE in health education for cultivating the right mindset towards other professionals and prevent the development of biases.(11,12)

Despite its importance, existing training programs frequently fail to incorporate sufficient opportunities for students to engage in cross-disciplinary learning with other healthcare professionals.(13) The integration of effective interprofessional education (IPE) into health professional training in Pakistan is of utmost importance. It enables the development of essential competencies such as integrity, accountability, interprofessional communication, collaboration and teamwork.(14,15)

As per the guidelines established by the Pakistan Medical and Dental Council (PM&DC), it is expected that graduates should possess the ability to effectively contribute as members of the healthcare team and recognize the roles and responsibilities of other healthcare professionals.(16) However, a significant obstacle in implementing IPE in medical and health professions education is the lack of the structured competencies that integrate various disciplines.(9)

This study surveyed third-year students from medical, dentistry, nursing, and physical therapy programs to assess their readiness and awareness of IPE.

Methods:

The survey was created using Google Forms and was then distributed to third-year students from four different disciplines via WhatsApp. The survey was open for a period of six weeks from the initial distribution of the link. Convenience sampling technique was used. The determination of the sample size was accomplished through the use of the Rao Soft software. The minimum sample size required was 148. However, a total of 157 students completed the survey including 70 medical students, 35 physical therapy students, 37 dentistry students, and 15 nursing student. Participation was voluntary. The study involved inviting third-year students from each discipline, as this particular year marks the initiation of clinical exposure and interaction with other healthcare professionals for students across all four disciplines. The Google form had a consent section for the students to agree to voluntary participation. Ethical Review Committee FUI (FF/FUM/215 Phy/20) accepted this study protocol.

The Readiness for Interprofessional Learning Scale (RIPLS) was used in this study that enabled the students to mark various parameters interprofessional learning. The questions were answered using 5-point Likert scoring where strongly agree was marked as 5 and strongly disagree as 1. There is a total of 19 self-reported items with four domains namely teamwork and collaboration (items 1–9), negative professional identity towards other professions (items 10–12), positive professional identity (items 13–16) and roles and responsibilities of professionals (items 17–19). A positive attitude towards IPL was shown by high scores.(17)

Additionally, age, gender, programme of study, and prior experience of IPE were also asked from students. To evaluate the distribution of the study sample using SPSS, the Shapiro-Wilk Test was conducted, revealing a non-normal distribution with a p-value of 0.00. Consequently, the non-parametric Kruskal-Wallis Test was employed to calculate the means and p-value.

Results:

The demographic characteristics of the participating students are presented in Table 1. The study examined the RIPLS questionnaire across four domains. In the teamwork and collaboration domain, Physiotherapy students scored highest in eight out of nine items (average mean rank=82.23), while nursing students scored lowest in six items (average mean rank=73.9). However, no statistically significant difference was found between groups. In the negative professional identity domain, Physiotherapy students had the highest scores (average mean rank=82.55), while Dentistry students had the lowest scores (average mean rank=76.01). In the positive professional identity domain, all students strongly agreed with statements, with Physiotherapy students scoring highest (mean rank=82.47), followed by MBBS, Dentistry, and Nursing students. The students of Physiotherapy, Medicine, and Dentistry rated item 17, which asserts that the primary role of nurses and therapists is to offer assistance to doctors, significantly higher. Strikingly, nursing students gave it a lower rating. However, the majority of the students from all disciplines believe that they need to acquire more knowledge and skills compared to students from other healthcare professions. Interestingly, the students demonstrate a strong awareness of their roles and strongly disagree with item 18, which suggests uncertainty about their professional roles. In each of the four domains, the p-value exceeds 0.05, indicating that there is no statistically significant

difference in the attitudes of students across all four disciplines. On the other hand, the high mean scores suggest that the students from all four disciplines demonstrate a positive inclination towards interprofessional education. (Table 1, 2, 3, 4, 5)

Table 1: Demographic characteristics

Descriptor		Frequency	Percentage
Gender	Male	33	21
	Female	124	79
Average Age	≤21	64	40.76
	22	60	38.21
	≥23	33	14.64
Curriculum type	Integrated	70	44.58
	Traditional	87	55.41
Examination type	Semester system	50	31.84
	Annual system	107	68.15
Prior exposure to IPE	Yes	5	3.2
	No	152	96.8
Disciplines	Medicine	70	44.58
	Dentistry	37	23.56
	Physiotherapy	35	22.29
	Nursing	15	9.55
	Total	157	

Table 2: Discipline-based comparison of students' attitude- Teamwork and Collaboration

Variable	Disciplines	Mean Rank	Median (Interquartile range)	p-value
Learning with other students will help me become a more effective member of a healthcare team	Medicine	79.17	5(1)	0.46
	Dentistry	76.40		
	Physiotherapy	85.86		
	Nursing	67.33		
Patients would ultimately benefit if healthcare students worked together to solve patient problems	Medicine	77.36	5(1)	0.99
	Dentistry	79.57		
	Physiotherapy	77.30		
	Nursing	79.23		
Shared learning with other healthcare students will increase my ability to understand clinical problems	Medicine	77.49	5(1)	0.53
	Dentistry	71.30		
	Physiotherapy	83.61		
	Nursing	82.81		
Learning with health care students before qualification would improve relationship after qualification.	Medicine	79.48	4(1)	0.54
	Dentistry	71.06		
	Physiotherapy	83.92		
	Nursing	71.88		

Communication skills should be learned with other health care students	Medicine Dentistry Physiotherapy Nursing	77.37 77.26 83.24 68.46	5(1)	0.68
Shared learning will help me think positively about other professions	Medicine Dentistry Physiotherapy Nursing	78.68 69.26 84.86 78.35	4(1)	0.43
For small group learning to work, students need to respect and trust each other	Medicine Dentistry Physiotherapy Nursing	78.82 75.90 79.53 74.88	5(1)	0.95
Team working skills are essential for all health care students to learn	Medicine Dentistry Physiotherapy Nursing	79.04 77.49 79.30 70.08	5(1)	0.88
Shared learning will help me to understand my own limitations	Medicine Dentistry Physiotherapy Nursing	76.07 79.37 82.43 72.08	4(1)	0.81

Table 3: Discipline-based comparison of students' attitude- Negative professional identity

Negative professional identity	Disciplines	Mean Rank	Median (Interquartile range)	p-value
I don't want to waste my time learning with other health care students	Medicine Dentistry Physiotherapy Nursing	75.42 73.84 84.53 84.50	3(3)	0.58
It is not necessary for undergraduate health care students to learn together	Medicine Dentistry Physiotherapy Nursing	76.53 75.07 80.97 85.35	3(3)	0.83
Clinical problem-solving skills can only be learned with students from my own department	Medicine Dentistry Physiotherapy Nursing	74.93 79.14 82.15 79.65	3(2)	0.30

Table 4 : Discipline-based comparison of students' attitude- Positive professional identity

Positive professional identity	Disciplines	Mean Rank	Median (Interquartile range)	p-value
Shared learning with other healthcare students will help me communicate better with patients and other professionals	Medicine Dentistry Physiotherapy Nursing	78.88 75.11 82.15 69.23	4(1)	0.74
I would welcome the opportunity to work on small group projects with other health care students	Medicine Dentistry Physiotherapy Nursing	77.01 76.41 83.01 73.35	4(1)	0.83
Shared learning will help to clarify the nature of patient problems	Medicine Dentistry Physiotherapy Nursing	75.24 73.59 86.64 80.15	4(1)	0.49
Shared learning before qualification will help me become a better team worker	Medicine Dentistry Physiotherapy Nursing	80.19 78.06 77.11 68.62	4(1)	0.81

Table 5: Discipline-based comparison of students' attitude- Attitudes towards roles and responsibilities

Attitudes towards roles and responsibilities	Disciplines	Mean Rank	Median (Interquartile range)	p-value
The function of nurses and therapists is mainly to provide support for doctors	Medicine Dentistry Physiotherapy Nursing	80.19 78.06 77.11 68.62	4(1)	0.85
I am not sure what my professional role will be	Medicine Dentistry Physiotherapy Nursing	79.38 74.96 76.46 83.15	2(2)	0.91
I have to acquire much more knowledge and skills than other healthcare students	Medicine Dentistry Physiotherapy Nursing	78.26 73.60 79.73 83.50	4(1)	0.88

Discussion:

Medical educators are continuously striving to upgrade the curriculum of medical colleges, by introducing innovative strategies for improved health outcomes.(18) The attitude of health professional students play a key role in the success or failure of a curriculum.(19)

The objective of this study was to assess the preparedness of our students for an IPE program. Interprofessional education is the talk of the town and various world regulatory bodies are emphasizing to make it a part of the curriculum.(20) Pakistan is one of the few countries in Asia where gradual transformation is being made in the curriculum, shifting it from traditional to integrated curriculum. .

The overall result shows a positive attitude of students towards teamwork and collaboration. The students are well aware of the benefits of collaborative learning. The highest rated item of RIPLS was item 3 "Shared learning with other health care students will increase my ability to understand clinical problems." These findings align with the results of a previous study conducted at the International Medical University, Malaysia (2017).(21) Extensive research has demonstrated that this form of learning is an effective approach to promoting mutual understanding among practitioners in the workplace.(22) Thus, the program developers can use problem-based group learning strategies where students from all four disciplines can discuss clinical problems together. It has been defined as the perfect setting for IPE.(23)

The second important result was that our students value working in small groups and maintaining a respectful and trustworthy bond. Related results were found in a study conducted in Pakistan in 2019.(13) This positive finding will help medical educators; stakeholders in developing and implementing of IPE program.

Remarkably, the Physiotherapy students have exhibited the highest level of readiness, even though the integrated curriculum is currently only implemented in the MBBS program at FUI. This may be attributed to the fact that Physiotherapy students are exposed to collaborative practice at an earlier stage and have more opportunities for interprofessional interaction. The collaborative practice involves working alongside healthcare professionals, patients, their families, and the community to deliver effective healthcare. Research Studies strongly recommend the adoption of collaborative practice to enhance patient care, safety, and overall health outcomes.(24)

Significant majorities of the students in this study were well aware of their professional roles; however, they also believed that they needed to acquire more knowledge and skills compared to students from other healthcare disciplines. This contrasts with findings from other studies where students were unaware of their professional roles. Lack of clinical experience was cited as a reason for this lack of awareness in previous research conducted on students in the pre-clinical years.(25) Differences in study results worldwide may be attributed to variations in cultural and educational backgrounds, as well as different selection criteria for healthcare professional schools.(26)

Our study revealed that medical and dentistry students had significantly higher scores in the "negative professional identity". These findings align with previous studies that have reported similar results.(21) One possible explanation for this finding is the limited exposure of medical and dentistry students to the management of multidisciplinary healthcare teams. To address this issue, medical and dentistry schools should prioritize curriculum development that offers opportunities for students to learn and engage in interprofessional collaboration within healthcare settings.

There were no statistically significant differences observed in the mean scores of the RIPLS domains among students of various disciplines. This indicates that students from all disciplines possess the readiness for team collaboration and foster positive professional relationships. This matches with what another study found, which showed that undergraduate students are ready to understand Interprofessional Learning (IPL) ideas. The high mean scores support this idea in different parts of the Readiness for Interprofessional Learning Scale (RIPLS).(27) It is crucial for healthcare professional students to develop a comprehensive understanding of their own professional identity early in their careers to effectively engage with colleagues from other disciplines and enhance their problem–solving capabilities in healthcare contexts.(24)

Educational institutions need to implement reforms that foster a cultural shift towards IPE and encourage collaborative practices.(28) Transformational leaders can play a crucial role in creating environments that promote collaboration, facilitate the development of mutual curricula, and encourage resource sharing among all healthcare professionals.(29,30)

Additionally, the administration can support the formation of diverse teams for co-curricular activities. It is the responsibility of medical educators to ensure that the expected educational outcomes regarding IPE are clearly understood by academic institution leaders. Successful implementation of IPE, backed by skilled faculty and adequate resources, leads to improved patient care and well-being.(31,32)

Given the multidimensional and diverse nature of IPE, analyzing the curricula of different programs suggests that it can be effectively implemented by incorporating clinical case studies, problem-based learning, team-based learning, simulations, and e-earning. (33)

Conclusion:

Students from different healthcare professions exhibited a favorable disposition and preparedness toward interprofessional learning. Therefore, the integration of Interprofessional Education (IPE) at the undergraduate level will provide students with the opportunity to engage in collaborative learning, gaining insights from and about various professional disciplines right from the beginning of their academic journey. This early exposure will enhance understanding and appreciation of the importance and contributions of different professional fields.

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Authors Contribution:
Iftikhar T: Study concept, design, data collection, interpretation and manuscript writing
Ghassan A: Result interpretation
Shukr I: Critical analysis and review
Inam S: Drafting of manuscript and proofreading

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RESEARCH ARTICLE

Comparison of post isometric relaxation and post facilitation stretching techniques on hamstring muscle flexibility in collegiate athletes: A randomized clinical trial

Hafiz Zohaib Ahmad[1], Abdul Rehman[2], Nida Aslam[3], Muhammad Hassan[3], Muhammad Usman Khalid[3], Muhammad Ahmed Sajjad[4]

ABSTRACT

Background: The multi-jointed nature of the hamstring muscles causes them to shorten which impacts the biomechanics of the pelvis and lumber region. Hamstring tightness is more common in women than in males.

Objective: To compare the effect of post-isometric relaxation and post-facilitation stretching in improving hamstring muscle flexibility among collegiate athlete's athlete.

Methods: Study was a randomized clinical trial. Patients following the inclusion criteria from Pakistan Sports Board, Lahore were categorized in two groups; group A and group B. Male patients aged from 18 to 35 years, with a history of hamstring muscle tightness (bilateral) or acute hamstring injuries were included. Group A was treated with post isometric relaxation and conventional treatment while group B received post facilitation stretching and conventional treatment; for 4 weeks and with 3 sessions per week. The baselines data was taken for range of motion, sit and reach test, active knee extension test, and straight leg raise and lower extremity functional scale.

Results: There were a total of 17 male volunteers in each group. Group A's mean age was 28.58±3.9, years whereas group B's mean age was 29.25±4.4 The groups' respective Lower Limb Functional Scores (LEFS) were 58.41±4.84 in group A and 40.52±2.85 in group B, with a p-value of less than 0.05. Lower limb functional score (LEFS) within the groups with $p < 0.05$ was 22.17±8.63 and 40.52±2.85.

Conclusion: The current investigation found that post-isometric relaxing and stretching both improve hamstring flexibility.

Clinical Trial Number: NCT05727501

Keywords: Flexibility, Hamstring, Muscle Energy Techniques, Post Facilitation Stretching, Post Isometric Relaxation, Sports, Strain.

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Introduction:

Flexibility is important for both everyday physical fitness and for athletes like players, gymnasts, and runners. Enhancing physical activity and lowering injury risk are achieved through body fluid movement, which depends on flexibility. Flexibility refers to a muscle's ability to extend.(1) It is believed that if the muscle is not stretched, it will get stiff and may even snap. To move more easily, one must be flexible.(2)

The tightness or shortness of the muscles is frequently examined by the therapists to determine flexibility.(3) Among the muscles involved in lower limb flexibility are the hamstrings, quadriceps, and calf muscles; among which hamstring injuries are the most common. The decreased flexibility of the hamstring muscles alters the mechanics of the lumbopelvic region and lower extremities.(4) Tight hamstring muscles have an effect on the patellofemoral joint, planter fascia, lumbopelvic rhythm, and pelvic tilt. For maintaining proper posture, the hamstrings are crucial.(5) Hamstring shortening or tightness affects posture and may aggravate musculoskeletal pain.(6)

The lower extremities' two-jointed hamstring

Affiliations: [1]Bukhari Physiotherapy and Rehabilitation Centre, Multan, Pakistan. [2]Lahore College of Physiotherapy, Lahore Medical and Dental College, Lahore, Pakistan. [3]Multan College of Rehabilitation Sciences, Multan Medical and Dental College, Multan Pakistan. [4]Syeda Khatoon-e-Jannat Hospital, Faisalabad, Pakistan.

Correspondence: Muhammad Usman Khalid

Email: dr.usmankhalid@yahoo.com

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muscle is a tonic muscle. The hamstring's flexibility is essential to body's biomechanics. The multi-jointed architecture of hamstring muscles makes them stand out for their greater propensity to shorten, and hamstring shortening can have an impact on the biomechanics of the pelvis and the lumber region.(5) Disrupted biomechanics can lead to irregularities in lumbo-pelvic rhythm, low back pain, and increased nerve stress. Furthermore, reduced flexibility has an impact on the efficiency and standard of basic movements. Most individuals with hamstring tightness are in decent physical condition. Hamstring tightness is more prevalent in women (45%) than in men.(7)

There are various hamstring strains that have been described, each with a unique mechanism of injury. Type I acute hamstring strains can occur when sprinting quickly.(8) In the terminal swing phase of running, the hamstring muscles have been shown to eccentrically contract to slow the swinging limb and to get ready for food impact.(9) The long head of the biceps femoris, which is close by the proximal muscle-tendon junction, is the site where type I hamstring strains most frequently occur. On the other hand when hamstrings have become too long, type II hamstring strains happen.(10)

Fred Mitchell, Sr., D.O. introduced a technique in 1948 that he named Muscle Energy Technique (MET). This type of manual therapy, which is commonly employed in osteopathic treatment, is built on the body's innate capacity to stretch and relax muscles through autogenic or reciprocal inhibition.(11) Autogenic inhibition METs is based on the concept of autogenic inhibition. Two basic and well-known MET kinds that utilize the concept of autogenic inhibition are post-isometric relaxation (PIR) and post-facilitation stretching (PFS). The pain can be reduced by stretching short muscles and fascia, strengthening weak muscles, moving joints, and enhancing muscle tone and circulation and applying multiple approaches on patients.(12)

Alashram et al in 2020, conducted a study to check the end results of three discrete stretching regimes on hamstring muscle flexibility in professional soccer players. During the first four weeks of the precompetitive season, 24 professional soccer players were allocated to one of three groups: static stretching, whole-body vibration stretching, or global postural re-education (N = 8). Study explained that while static stretching techniques, whole-body vibration (WBV) stretching, and global postural reeducation techniques (GPR) all increase hamstring muscle flexibility, only static stretching on WBV retains the outcomes over time in professional soccer players.(13)

Post isometric relaxation and post facilitation stretching strategies are effective in improving hamstring flexibility. The muscle energy technique, which is based on the principle of autogenic inhibition, has been shown to be beneficial in the rehabilitation process for lengthening shortened muscle tissue. However, the effectiveness of these techniques has only been compared in a small number of studies, and even fewer have been conducted on Pakistani college students. Therefore, this study compares PIR and PFS in an effort to determine the efficacy of muscular energy strategies on hamstring tightness.(14)

A study included 20 male college students of age 18–24 years who were randomly allocated in one of the two groups. For eight weeks, each participant engaged in physical activity three times each week. Testing for agility, speed, and isokinetic strength was done both before and after the two therapies. The length of semimembranosus and biceps long head of participants in the flexibility group considerably increased ($p=0.026$), and peak muscular exertions in all three hamstring group muscles significantly decreased ($p=0.004$). While sprinting, participants in the strength-regime group experienced less peak muscular strain ($p = 0.017$), and their optimal musculotendinous lengths across all three hamstring muscles increased ($p = 0.041$). They discovered that for recreational male athletes, reducing hamstring injury risk may be achieved by enhancing hamstring flexibility or strength with the aid of an exercise programme. The effects were evaluated using paired t tests.(15)

Bowen technique in comparison of muscle energy technique on asymptomatic members having hamstring tightness and they concluded that performing three alternate sessions of Bowen technique and muscle energy technique was successful in improving of hamstring flexibility, ROM, and strength. When tested using popliteal angle, the group that received treatment with the Bowen technique showed more success in increasing flexibility and ranges. By the end of the third treatment session, the muscular energy technique group had improved more in terms of hamstring muscle strength.(16) These are the studies that demonstrated how other exercise regimens and stretching techniques can affect hamstring flexibility. As a result, more research is required to focus on hamstring muscle for

flexibility and injury prevention.

The main objective of this study was to compare post-isometric relaxation and post-facilitation stretching strategies in order to find an efficient method for increasing hamstring flexibility. There are few studies comparing the efficacy of these techniques. The muscle energy technique, which relies on the autogenic inhibition theory, has been shown to be effective in rehabilitation for elongating shortened muscle tissue. Numerous studies have been conducted on acute hamstring injuries, as well as hamstring tightness and flexibility, using various treatment modalities and regimens for rehabilitation. However, there isn't much data comparing post-isometric relaxation and post-facilitation stretching procedures in the recent five years' worth of literature reviews. Consequently, more research is required to address a related technique and strategy for hamstring flexibility. Therefore, this study compares PIR and PFS in an effort to determine the effectiveness of muscular energy strategies on hamstring tightness

Methods:

It was a randomized control trial with Clinical Trial ID NCT05727501. In this study the patients were blinded for their treatment group allocation. The data was collected from Pakistan Sports Board, Lahore. The study received approval from the ethical board on April 25, 2022 and was cited with reference number REC/RCR&AHS/22/0442 from Riphah University Lahore. The participant's consent was obtained prior to the commencement of the study. 34 people in total participated in the study using the simple random sample procedure, with even and odd reference numbers assigned to groups A and B, respectively. Group A was treated with Post Isometric Relaxation (PIR) and Group B with Post Facilitation Stretching (PFS). Male were included in the study aged between 18 to 35 years and athletes with hamstring muscle tightness (bilateral) or acute hamstring injuries. The selection of the participant age range was made because the athlete is more engaged in the game at this age. The study included participants who failed the 90/90 straight leg raising test, which was used to confirm hamstring tightness. Athletes with hip, buttocks and low back pain radiating to the back of thigh, history of fracture, dislocation and subluxation and any neurological disease and tumor of hip and knee were excluded from the study. The data was gathered by using Universal goniometer, straight leg raise (SLR) to, records range of motion and location of pain, the sit-and-reach test, which focuses on examining the flexibility of the hamstring and lower back muscles, is a standard way to evaluate flexibility. The Active Knee Extension Test was employed to measure the length of the hamstring muscles and the range of active knee extension when the hip is flexed. The Lower Extremity Functional Scale (LEFS) is a 20-question survey about a person's capacity to carry out commonplace tasks. Clinicians can use the LEFS to measure the initial function, continuous progress, and outcome of patients as well as to define functional goals. The maximum possible score is 80 points, which indicates exceptionally high function. The lowest possible score is 0, which represents extremely poor function. Group-A was treated with baseline treatment of electric heating pad for 15min and rehab protocol post isometric relaxation in which 3-5 repetitions for 7-10 seconds hold stretch in each session for three sessions per week on alternate days for 8 weeks were administered. Group-B was treated with baseline treatment of electric heating pad for 15min and rehab protocol post facilitation in which 3-5 repetitions for 7-10 seconds hold stretch in each session for three sessions per week on alternate days for four weeks C. Individuals' received treatment session for 8 weeks were administered.(17) There was no adverse effect noted during and after the treatment. The comparison between the groups was done using the independent t test, while the comparison within the group was done using the paired T test.

Results:

34 participants were recruited in the study with 17 participants in the group A and 17 participants in the groups B and only male participants were added in the study. Assessment after 4 weeks showed range of motion mean 128.82±0.54 in group A and 127.35±5.89 ($p=0.45$) in group B, mean SLR 76.58±1.69 in group A and 77.05±1.71 ($p=0.$ 0.42) in group B, mean SIT and REACH activity 18.29±2.201 in group A 19.70±2.02 ($p=0.60$) in group B. Left AKE mean 15.41±3.96 in group A 40.52±2.85 ($p=0.36$) in group B. Right AKE mean 58.41±4.848 in group A and 16.642±3.57 ($p=0.34$) in group B. LEFS mean 58.41±4.84 in group A and 40.52±2.85 ($p<0.001$) in group B shown in table 2. The findings of the within-group analysis of the pre-treatment and post-treatment assessments for Groups A and B are shown in Table 3, which showed considerable improvements in both groups. Notably, significant differences were found within the group analyses but not between Group A's Post-Isometric Relaxation (PIR) and Group B's Post-Facilitation Stretching (PFS).

Table 1: Descriptive statistics of participants

	Group A	Group B
N	17	17
Gender	Male	Male
Mean Age (years)	28.58±3.9	29.25±4.4

Table 2: Pre and Post lower extremity functions and Lower Extremity Functional Scale (LEFS) between the group analysis T test

Variable		Group A Mean±SD	Group B Mean±SD	P value
Range of motion	Pre treatment	119.82±6.11	121.41±7.76	0.51
	Post treatment	128.82±0.5.45	127.35±5.89	0.45
SLR	Pre treatment	74.23±2.07	75.00±2.20	0.30
	Post treatment	76.58±1.69	77.05±1.71	0.42
SIT and REACH	Pre treatment	14.52±2.06	14.94±3.21	0.68
	Post treatment	18.29±2.201	19.70±2.02	0.60
Left AKE	Pre treatment	14.65±3.98	22.17±8.63	0.36
	Post treatment	15.41±3.96	40.52±2.85	0.36
Right AKE	Pre treatment	15.41±3.96	16.68±3.57	0.33
	Post treatment	58.41±4.848	16.642±3.57	0.34
LEFS	Pre treatment	21.47±10.70	22.17±8.63	0.84
	Post treatment	58.41±4.84	40.52±2.85	0.00

Table 3: Pre and Post lower extremity functions and Lower Extremity Functional Scale (LEFS) within the group analysis paired t test

Variable		Pre Data Mean±SD	Post Data Mean±SD	P value
Range of motion	Group A	119.82±6.11	128.82±0.5.45	0.00
	Group B	121.41±7.76	127.35±5.89	0.00
SLR	Group A	74.23±2.07	76.58±1.69	0.00
	Group B	75.00±2.20	77.05±1.71	0.00
SIT and REACH	Group A	14.52±2.06	18.29±2.201	0.00
	Group B	14.94±3.21	19.70±2.02	0.00
Left AKE	Group A	14.65±3.98	15.41±3.96	0.00
	Group B	22.17±8.63	40.52±2.85	0.00
Right AKE	Group A	15.41±3.96	58.41±4.848	0.00
	Group B	16.68±3.57	16.642±3.57	0.33
LEFS	Group A	21.47±10.70	58.41±4.84	0.00
	Group B	22.17±8.63	40.52±2.85	0.00

Discussion:

The purpose of this study was to compare how post-isometric relaxation and post-facilitation stretching affect the hamstring flexibility of collegiate athletes. 34 people were included in a randomized control trial that was carried out after the inclusion and exclusion criteria were met.

The subsequent parameters of the present research are range of motion, functional disability, and muscle flexibility pre- and post-application of the post-isometric relaxation and post-facilitation stretching on hamstring in college athletes included age, gender, range of motion, sit-and-reach test, SLR, active knee extension test, and LEFS tests. After gathering data for each outcome measure for both groups, data was analyzed. The findings indicate that post-isometric relaxing has a greater impact than post-facilitation stretching. The research indicated that there was no appreciable difference in group analyses.

A study comparing the effectiveness of the muscular energy method and the Bowen treatment in individuals with asymptomatic hamstring tightness was carried out. The popliteal angle improved significantly (p 0.001) in the Bowen technique group when compared to the muscle energy technique group. The primary findings of this study were similar to those of a recent study; however, the new research compares the MET technique rather than the Bowen approach.(18)

This new study, however, examined the effects of reciprocal inhibition therapy and PIR on the hamstrings. The findings indicated that in both the PIR and RI groups, there was a significant improvement in hamstring flexibility (p=0.000).(19)

A second study assessed the effects of Muscle Energy Technique and static stretching on pre- and post-treatment visual analogue scales, active knee extension (AKE), and straight leg raise (SLR). In every treatment group, the within-group analysis revealed statistically significant differences (p value 0.05) for all outcome indicators. The VAS showed a mean reduction of 4.40±5.26 and 6.80±6.10 in the stretching and MET groups, respectively. The mean differences between the stretching and MET groups in AKE were 4.80±5.29 and 7.80±8.90, respectively. SLR indicated that the mean differences for the stretching and MET groups were 1.12 and 1.09, respectively. However, there was no discernible difference in the group comparison overall.(20) To determine how this strategy works in connection with other strategies, more research on a broad population is required.

Conclusion:

The current investigation found that post-isometric relaxing and stretching both improve hamstring flexibility.

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Authors Contribution:
Ahmed HZ: Conception and design of study
Rehman A: Acquisition of data
Aslam N: Analysis and corrections
Hassan M: Analysis and interpretation of data
Khalid MU: Drafting the manuscript
Sajjad MA: Revising the manuscript critically for important intellectual content

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RESEARCH ARTICLE

Physical activity and sleep quality in association to mental health among physical therapy students in different universities of Karachi: A cross sectional survey

Muhammad Mehran Haider[1], Kinza Fatima[1], Areeba Ali[1], Mehtab Abbasi[1], Hira Nadeem[1]

ABSTRACT

Background: Quality sleep is vital for mental function, with its deprivation reducing alertness and impairing concentration. Similarly, a lack of physical activity leads to problematic living and mental health issues such as depression and anxiety. Therefore, the main reason of this study was to solely focus on physiotherapy students and the effect of sleep and physical activity on their mental health.

Objective: The research project aimed to observed physical activity and sleep quality in association to mental health among physical therapy students in different universities of Karachi

Methods: A cross-sectional study on 360 DPT students in various. Karachi universities was conducted after obtaining approval from the Institute of Physical Medicine and Rehabilitation. The participants, DPT undergraduates aged 18-28 years, were selected through convenient sampling. Exclusion criteria included diagnosed systemic diseases or psychological conditions.The study utilized PSQI, DASS-21, and IPAQ short-form tools. Fisher's exact test was employed to analyse variable associations.

Result: The sample's mean age was 21.75 years, Range= 18-28 years. Most (80.60%) were females. Almost all were single (94.90%), and 97.5% were poor sleepers. However, no association was found between sleep quality and depression, anxiety, or stress levels (p values = 0.117, 0.181, 0.293).

Conclusion: The study revealed no association was found between poor sleep and physical activity levels with depression, anxiety, and stress in physiotherapy students, even though many face poor sleep. Students with poor sleep quality had higher physical activity levels than those with good sleep quality.

Keywords: Exercise, Mental health, Psychological adaptation, Rest, Sedentary behaviors, Sleep hygiene.

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Introduction:

Sleep quality is described as a person's fulfillment with their sleep experience which incorporates factors like sleep inception, sleep executives, sleep amount and alertness. Lack of sleep significantly impacts mental function, reducing overall alertness, impairing concentration, and delaying cognitive processing. Recommended sleep for adults is 7 hours or more each night, yet 70-76% of physical therapy students were identified as poor sleepers based on the Pittsburgh Sleep Quality Index (PSQI) in conducted studies using available research scales.(1) The University of Warwick Medical School conducted a multinational study across eight countries in Asia and Africa, revealing that sleep disorders impact approximately 150 million people worldwide, with 17% of individuals in developed countries affected. Notably, in Spain, 38.2% of the population experienced poor sleep quality. In South Africa, sleep problems were reported by 31.3% of females and 27.2% of males.(2,3) In Asia and Africa, 17% people face sleep issues. In China, 19% of medical students reported poor sleep quality. Over 90% experienced extreme sleepiness in class, more so among males. Hong Kong's clinical students had a high daytime sleepiness rate of about 70%.(4)

Positive mental health, according to the World Health Organization, is a state of full mental well-being in which an individual understands his own potentials, copes with life's challenges, and meets everyday demands while keeping his overall wellbeing in check, and does his job well in the society.(2) Students are the most frequent victims of anxiety and depression. They are unique individuals who are confronted with many

Affiliations: [1]Department of physiotherapy, Institute of Physical Medicine and Rehabilitation, Dow University of Health Sciences, Karachi, Pakistan.
Correspondence: Muhammad Mehran Haider
Email: mehranhaider14@yahoo.com
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obstacles, threats, and social developmental transitions day to day life.(5) Furthermore, this demographic had a high incidence of low sleep quality. Inadequate sleep has been associated to poor mental health, life satisfaction, and academic success and progress.(6) Physical activity is defined as energy-expending activities involving skeletal muscles, includes playing, serving, active transportation, house chores, and outdoor tasks. Insufficient activity and sleep may lead to gastrointestinal, cardiac issues, as well as stroke.(7)

Sleep and mental well-being are closely associated, influencing individuals and society. Addressing sleep issues in medical students is crucial for their quality of life and overall health, highlighting the need for effective remedies further.(8) Physical therapy students current and future work performance as practitioners may be impacted by poor sleep quality and Excessive Daytime Sleepiness (EDS).(9) As a result, the health-care system might be affected as well. Students and teachers are often unaware that sleep habits might have an impact on academic achievement.(10)

In most studies, poor sleep is a better predictor of future physical inactivity than the reverse, aligning with past research and indicating that insufficient sleep may result in reduced daytime activity.(11) Studies show high sleep difficulties in anxious youth and elevated anxiety in physical therapy students. Some indicate anxiety as a risk for future sleep problems, while others highlight a bidirectional association between anxiety (and depression) and sleep quality.(12) Sleep disturbances were traditionally seen as outcomes of mental health disorders. However, current evidence suggests that sleep problems can also contribute to the development of various mental health issues, influencing societal well-being.(13) Sleep disruptions, particularly in the circadian cycle, are associated to mood swings and depression, creating a cycle that worsens sleep problems and hastens the onset of mental health issues.(2)

The study was carried out to find out the prevalence of the association between sleep quality and physical activity in association to mental health among physiotherapy students. According to the authors, study related solely for this purpose are not conducted in their region.(8) Most of the studies on this topic were either conducted in Europe or America.(5) The study investigated sleep and physical activity's impact on physiotherapy students' mental health. Pandemic-induced disruptions in online classes altered sleep patterns, affecting various aspects, further highlighting the need for intervention. (2)

College students often experience mental health challenges due to independent living and lifestyle changes, highlighting the critical importance of maintaining optimal mental well-being during this significant transitional period from adolescence to adulthood. (14) Good mental health is not only the non-occurrence of mental disorders but also includes active behaviours such as taking steps to maintain overall health and working well within the community. Limited evidence exists on the extent to which social interaction contributes to the positive effects of physical activity on mental health, particularly among students where literature is scarce.(15) This research project aims to observe physical activity and sleep quality in association with mental health among physical therapy students in different universities of Karachi.

Methods:

A cross-sectional survey was conducted on Doctor of Physical Therapy (DPT) students in different universities of Karachi. The data was collected from a convenient sample of 360 physiotherapy undergraduates which was estimated through open epi. Sampling technique of the study was purposive sampling. Total duration of the study was 6 months. Study setting for data collection was from different universities of Karachi which include Dow university of Health Sciences, Jinnah Sindh Medical University, Baqai Medical University, Ziauddin University and Indus University.

The inclusion criteria of our study was physical therapy students (DPT) (1-5 year) and undergraduates of age between 18-28 years old and exclusion criteria of the study was undergraduates with diagnosed cases of systemic disease (polio, fracture/surgery) or having any expressed psychological condition like (stress, insomnia etc). Written informed consent was taken from participants before data collection after assessing the ethical criteria of the study (Ref# SIPMR/2021/ approval).

The original designed questionnaire was according to three scales; the Pittsburgh Sleep Quality Index (PSQI) in which higher scores (greater than 5) indicated poorer sleep quality, the Depression Anxiety Stress Scales (DASS-21) which summed scores and categorized levels into normal, mild, moderate, severe, or extremely severe for depression, anxiety, and stress and the International Physical Activity Questionnaire-Short Form in which levels of physical activity are

categorized as low, moderate, or high based on calculated MET-minutes per week; for the assessment of active work, emotional well-being and rest quality levels among students.

To analyze the data, we used SPSS programming version 20 for Windows. The significance level was adjusted to 5%. Descriptive statistics, including means and standard deviations for continuous variables and frequencies with percentages for categorical variables, were used to summarize the sample characteristics. Mean and standard deviation were calculated for variables. Fisher's exact test was used for analyzing association between variables.

Results:

The outcomes showed that the sample's mean age was 21.75 years (standard deviation= 2.13, Range= 18-28 years). The predominant demographic comprised of females, with a noteworthy concentration among individuals who identified as single in terms of marital status.

In terms of mental health, the average stress score was 7, anxiety score was 6, and depression score was 7. These scores ranged from 0 to 21, 0 to 20, and 0 to 21, respectively. The participants reported an average sleep quality score of 13, with scores ranging from 1 to 27. Regarding physical activity, the participants engaged in an average of 1943 minutes per week, with a range from 1017 to 3969 minutes. These parameters provided a concise overview of the key characteristics observed in the study. Upon closer examination of the study outcomes, a striking revelation emerged: a substantial majority, specifically 351 out of the total 360 participants, exhibited poor sleep quality. Intriguingly, only a minor fraction, consisting of a mere 9 individuals, fell outside the category of poor sleepers. (Table 1)

Out of total, 97% of the undergraduates were poor sleepers while 2.5 % of the students were good sleepers. Almost 95% of the students had moderate physical activity levels while 5.3% of the students had high physical activity levels. Out of total, 90% students had normal stress levels while 7.8% and 1.9% had mild to moderate stress levels respectively. Out of total, 63% of the students had normal anxiety levels, 10.6% and 19.7% had mild to moderate anxiety levels while 6.4% and 0.3% had severe to extremely severe anxiety levels respectively. Out of total, 72% students had normal depression level, 11.9% and 15% had mild to moderate depression levels respectively, while only 1.1% students had severe stress levels. (Table 2)

According to the PSQI scale, 351 (97.5%) students out of 360 students were poor sleepers and no association was found between sleep quality and depression, anxiety and stress levels by using the fisher's exact test (p values= 0.117, 0.181, 0.293) respectively. (Table 2) The study revealed nonsignificant associations between subjective sleep quality and DASS-21, indicating no association between levels of physical activity, sleep quality, depression, anxiety, and stress scale. However, it was observed that students experiencing poor sleep quality exhibited higher levels of physical activity. The sample predominantly consisted of female students, constituting approximately 80.60%, while single students made up about 94.90% of the sample. (Table 3)

Table 1: Descriptive statistics on Age, DASS-21, PSQI and Physical Activity (n=360)

Parameters	Mean	Standard Deviation	Minimum	Maximum	Range
Age (years)	21.75	2.13	18	28	10
Stress score	7	5	0	21	21
Anxiety score	6	5	0	20	20
Depression score	7	6	0	21	21
Sleep quality score	13	5	1	27	26
Physical activity (mets/week in min)	1943	564	1017	3969	2952

Table 2: Association of Physical Activity with DASS-21 and PSQI

Parameters (DASS-21 & PSQI)		Physical Activity		p-value
		Moderate (n=341) Frequency (percentage)	High (n=19) Frequency (percentage)	
Stress Level	Normal	306 (89.7%)	19 (100.0%)	0.579
	Mild	28 (8.2%)	0 (0%)	
	Moderate	7 (2.1%)	0 (0%)	
Anxiety Level	Normal	216 (63.3%)	11 (57.9%)	0.911
	Mild	36 (10.6%)	2 (10.5%)	
	Moderate	66 (19.4%)	5 (26.3%)	
	Severe	22 (6.5%)	1 (5.3%)	
	Extremely Severe	1 (0.3%)	0 (0%)	
Depression Level	Normal	247 (72.4%)	12 (63.2%)	0.516
	Mild	39 (11.4%)	4 (21.1%)	
	Moderate	51 (15.0%)	3 (15.8%)	
	Severe	4 (1.2%)	0 (0%)	
Poor Sleep Quality	No	9 (2.6%)	0 (0%)	0.999
	Yes	332 (97.4%)	19 (100.0%)	

Table 3: Association of Sleep Quality with DASS-21

Parameters (DASS-21)		Poor Sleep Quality (PSQI)		P-value
		No (n=9) Frequency (percentage)	Yes (n=351) Frequency (percentage)	
Depression Level	Normal	5 (55.6%)	254 (72.4%)	0.117
	Mild	0 (0%)	43 (12.3%)	
	Moderate	4 (44.4%)	50 (14.2%)	
	Severe	0 (0%)	4 (1.1%)	
Anxiety Level	Normal	4 (44.4%)	223 (63.5%)	0.181
	Mild	1 (11.1%)	37 (10.5%)	
	Moderate	2 (22.2%)	69 (19.7%)	
	Severe	2 (22.2%)	21 (6.0%)	
	Extremely Severe	0 (0%)	1 (0.3%)	
Stress Level	Normal	7 (77.8%)	318 (90.6%)	0.293
	Mild	2 (22.2%)	26 (7.4%)	
	Moderate	0 (0%)	7 (2.0%)	

Discussion:

The main aim was to assess sleep quality, physical activity, and their association with mental health among physical therapy students from various Karachi universities. Results revealed a high prevalence of poor sleep quality, with nearly 97.4% of students experiencing this compared to 63.2% in a Saudi Arabian study. Given that a majority in our study had poor sleep, associations weren't observed in our data. Additionally, our goal was to examine the association between sleep quality and physical activity, finding that lack of physical activity significantly impacts sleep quality in 97.4% of students

These findings align with previous studies indicating a bidirectional association between sleep quality and physical activity which was calculated through fisher's exact test (p=0.999). Our analysis, utilizing scales such as PSQI, IPAQ short form, and DASS-21, demonstrates a clear association between poor sleep quality, insufficient physical activity, and mental health issues. Physical therapy students with inadequate physical activity and poor sleep quality exhibit higher scores on depression, anxiety, and stress scales according to the DASS-21. Poor sleepers who also refrain from physical activities (mild, moderate, and vigorous METs) are more likely to score higher on depression, anxiety, and stress scales. Contrary to the total sleep duration, the interplay of sleep quality, physical activity, and mental health is emphasized. Depression, anxiety, and stress among these students were reported at 28.1%, 36.9%, and 9.7%, respectively. These figures are notably lower as compared to a Saudi Arabian study with proportions of 42.1%, 52.6%, and 30.5%, and even lower than other Middle Eastern studies reporting depression, anxiety, and stress at 65%, 73%, and 59.9%, respectively (1). Results indicate that poor sleep is insignificantly associated with the presence of depression (p=0.117), anxiety (p=0.181), and stress (p=0.293).(1)

Physical activity significantly reduces mental health symptoms compared to no treatment or other interventions, such as antidepressant medications. In summary, exercise proves to be more effective than control interventions in alleviating symptoms of depression, anxiety, and stress.(2)

Physical activity enhances mental health by boosting self-esteem, self-efficacy, cognitive function, and reducing distress. Additionally, exercise is positively associated with improved sleep quality in adults. However, few studies have explored the associations between physical activity, sleep, and mental health.(5) Sensation of psychological well-being issues is accompanied by sleep. It has additionally been found in a few different studies that undergraduate students sleep less than the overall population, which might be because of because of high pressure and concern for studies and grades.(6)

The study recognizes the use of a relatively small sample size (360 students), especially when considering the larger population of physical therapy students in universities of Karachi. The sampling method chosen, purposive sampling, has the potential to introduce bias, restricting the extent to which the findings can be applied to a broader population. The study's cross-sectional design, capturing a single snapshot in time, limits its ability to establish cause-and-effect associations over a more extended period. Additionally, the exclusion of undergraduates with diagnosed systemic diseases or expressed psychological conditions may narrow the study's scope in representing diverse health conditions

Conducting studies over a longer time helps us understand changes in sleep, mental health, and physical activity. To make our findings relevant to more people, we should include more participants and use different ways to choose them. It would be helpful to add objective health data, like medical records, to get a fuller picture. Trying out specific interventions can show us what works to improve sleep and mental health. Working closely with healthcare professionals is essential to make sure we diagnose accurately and include people with different health conditions in our research.

Conclusion:

The study found that poor sleep and activity levels aren't significantly associated with depression, anxiety, and stress in physiotherapy students, mainly because many of them struggle with sleep. However, those with poor sleep surprisingly engaged in more physical activity. It emphasizes the importance for physical therapy students to understand how sleep and activity impact their mental well-being.

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Author declaration:

Haider MM: Conception of idea, data collection, data analysis, manuscript writing and critical revisions of final article.

Fatima K: Study design, data analysis, data interpretation and results, draft editing with critical revisions until final manuscript.

Ali A: Study design, questionnaire development, data collection and entry, critical revisions

Abbasi M: Study design, data entry, interpretation and drafting of tables, critical revision of the manuscript

Nadeem H: Study design, data entry, interpretation and drafting of tables, critical revision of the manuscript

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RESEARCH ARTICLE

Frequency and severity of neck pain among undergraduate students using screen devices

Haseeb Muhammad Khan[1], Anam Javed[1], Saad Tariq[2], Maria Naeem[2], Zoya Naveed[1], Sawaira Saleem[1], Ali Hamza[1]

ABSTRACT

Background: Screen use time has been on the rise among the students, which has detrimental effects on their health. One of the most frequent complaints from users is neck pain that predisposes individuals to functional limitations and persistent pain, which may result in poor academic performance.

Objective: To determine the frequency and severity of neck pain among undergraduate students using screen devices.

Methods: A descriptive cross-sectional study was conducted at Bashir Institute of Health Sciences from June to October 2022. A sample of 80 students was selected using the non-probability convenient sampling technique to evaluate the relationship between screen device usage and neck pain. The participants were the undergraduate students, both male and female with age ranging from 18 to 25 years. Data was collected using a self-structured questionnaire and Numeric Pain Rating Scale and was analyzed by SPSS version 25.

Results: The findings showed that a substantial proportion of participants, specifically 71 (88.75%) reported experiencing neck pain at least once during or after device use. Moreover, the frequency of neck pain was found to be 73.8% annually, 43.8% within the last month, and 22.5% at the time of assessment. Moderate pain intensity was reported by 41 (51.3%) participants, while 22 (27.5%) reported mild pain on the Numeric Pain Rating Scale.

Conclusion: The study concluded that neck pain is frequently reported in students using screen devices with the majority having moderate level of pain severity.

Key words: Musculoskeletal Pain, Neck Pain, Students, Undergraduate.

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Introduction:

The number of people who own handheld gadgets and devices is rapidly increasing.(1) Over the past few years, the progress of technology has significantly improved and empowered individuals' ability to use digital screens, resulting in a faster pace of global transformation. These innovative technologies are present in every facet of our lives, providing improved opportunities for entertainment, education, and work, thus raising overall living standards.(2-4) Pakistan, a nation boasting a substantial count of internet and mobile data consumers, has likewise observed this pattern, with more than 64 million individuals utilizing the internet and 62 million subscribers to mobile data services.(5) Earlier research has indicated that the typical duration of screen exposure per day is below 2 hours; however, this has dramatically increased over the past decade.(6) In recent years, the growing utilization of electronic devices with screens has emerged as a source of worry, as it is connected to adverse health effects. This not only gives rise to ocular issues like eye fatigue, blurred vision, dryness, and redness but is also associated with musculoskeletal problems.(7-9) Musculoskeletal pain poses a significant challenge for millions of individuals in both developed and developing countries, causing considerable impairment and hardships. This type of pain can affect people of all age groups, significantly impeding their ability to function, perform tasks, and achieve productivity.(10) Neck pain, low back pain, and shoulder pain has increased noticeably in occurrence over the past few years.(11) Neck, shoulder, and upper limb pain has been linked to reduced educational achievements and higher rates of absence from university classes.(12) Musculoskeletal issues are prevalent among

Affiliations: [1]Bashir Institute of Health Sciences, Islamabad, Pakistan [2]Riphah International University, Islamabad, Pakistan.
Correspondence: Saad Tariq
Email: chaudarysaad@gmail.com
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undergraduate students, primarily caused by the continual and repetitive movements involved in internet usage, social networking, studying, and documents making.

Neck pain refers to any sensation of pain, soreness, or discomfort experienced within the region extending from the occiput to the first thoracic vertebra, occurring within the past 12 months.(13) A hypothesized explanation is that prolonged screen time activities produce continuous muscle tension, which can lead to musculoskeletal pain if not addressed in time.(14) Forward head posture while using electronic devices has been recognized as a risk factor in studies.(9)

Subjecting the cervical spine to different degrees of forward flexion imposes considerable stress on it, potentially resulting in early wear and tear, degeneration.(15) The user's static motion decreases blood circulation, stops nutrients from reaching muscles, and causes mild weariness and soreness. Previous cross-sectional research studies have shown that device usage patterns, such as length, break frequency, and activity categories, have an impact on symptoms. But no study has provided the evidence related to both the frequency and severity of neck pain among undergraduate students using screen devices. So, this study aimed to determine the frequency of neck pain along with its severity associated with usage of screen devices among undergraduate students.

Methods:

A cross-sectional study was conducted at Bashir Institute of Health Sciences from June 2022 till October 2022, Open Epi sample size calculator was used and a sample of 80 undergraduate students was selected through non-probability convenient sampling technique based on inclusion (both Genders, age ranging from 18 to 25) and exclusion (history of neck surgery, discogenic pain, use of pain medications) criteria. The study was reviewed and approved by the Institutional Review Board and Ethical Committee for Clinical Research of Bashir Institute of Health Sciences (Letter reference No. B1-86/DPT-2022). Informed consent and confidentiality agreement was signed prior to enrollment of participants in the study.

Data was collected from students by using self-administered questionnaire adapted from Nordic Musculoskeletal questionnaire which included demographics, screen usage questions, pain prevalence questions including lifetime prevalence, annual prevalence, last month prevalence and point prevalence.(16) To assess the severity of the pain, Numerical pain rating scale was administered. Questionnaires were distributed among students and the responses were collected by hand. For descriptive analysis frequency and percentages, data was analyzed through Statistical Package for Social Sciences (SPSS version 25).

Results:

The demographic data showed that out of total 80 participants 36 were males and 44 were females with a mean age of 21 years. (Figure 1). Out of total 80 participants, 71(88.75%) had pain in their neck once in lifetime after screen device use, while 9(11.25%) reported no pain ever. The lifetime frequency of neck pain was found in 88.75% participants. Out of 71 participants who showed positive response regarding neck pain after screen use once in lifetime, 59(73.80%) reported pain in the past 12 months. Annual neck pain frequency was found in 73.8% participants. 35 out of 59(43.80%) participants who reported pain in previous 12 months also had pain in the last month during or after screen device use. 18 participants also reported pain at the time of assessment which shows point occurrence of 22.5%. (Figure 2)

Severity of neck pain assessed through Numeric Pain Rating Scale of 0-10, where 0 depicts no pain and 10 being the worst pain. Results showed that out of 80 participants,9 had no pain, 22 had mild, 41 had moderate and 8 had severe pain ($M=1.60 \pm 0.821$). (Figure 3)

Results also showed that majority of the participants, i.e., 90% reported mobile phone as their most commonly used screen device followed by laptop and tablet users. Analysis of the screen usage patterns revealed that 48.8% of the participants reported a daily usage exceeding 5 hours. The predominant purpose for which the device was used was leisure reported by 45% participants. Furthermore, the most adopted posture during the screen device usage reported by 48.8% participants was lying, followed by sitting, walking, and standing. 37.5% of the participants also reported that they change their posture every 10 minutes while using the screen devices. (Table 1)

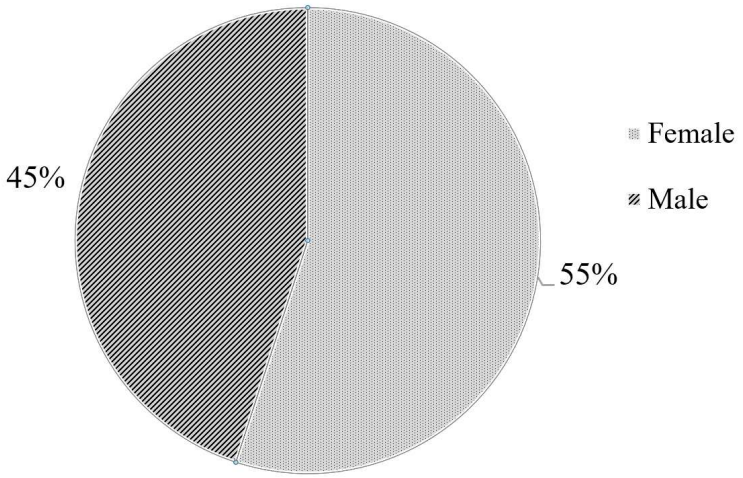

Figure 1. Pie chart showing gender distribution of participants

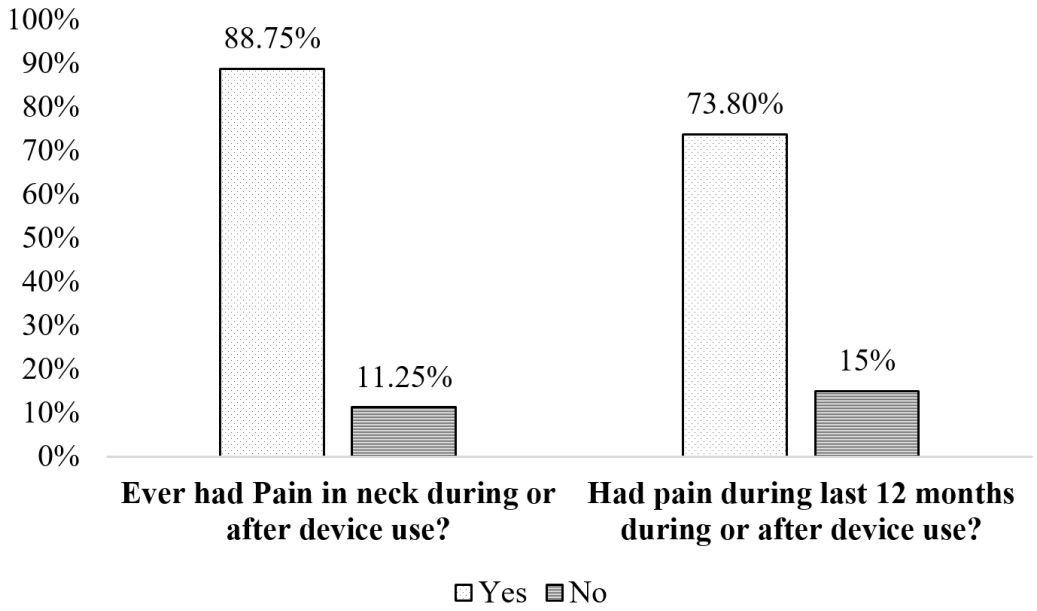

Figure 2. Bar Chart Showing Lifetime & Annual Occurrence of Neck Pain among Screen Device Users

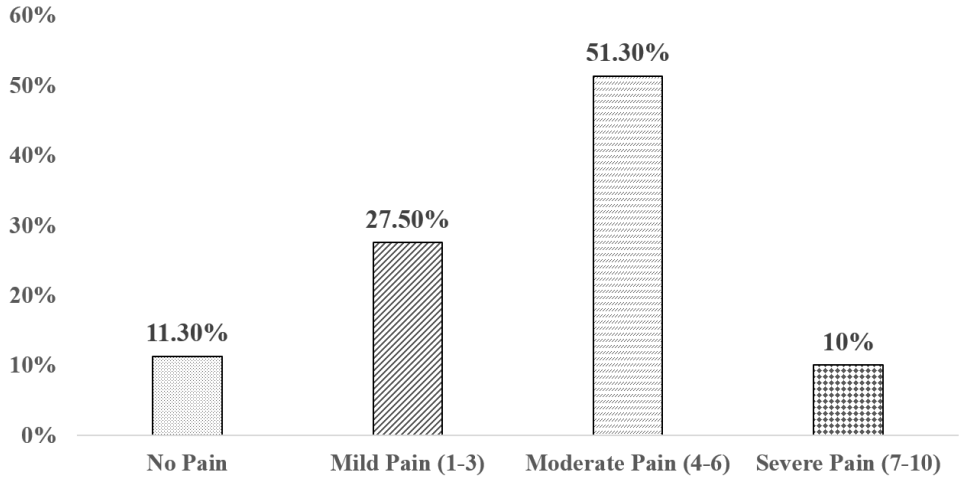

Figure 3. Bar Chart Showing Neck Pain Severity among Screen Device Users

Table 1: Frequency and Percentage of Participants in Relation to Type of Screen Device, Purpose, Duration, & Posture.

Variable		Frequency	Percentage
Most used screen	Laptop	7	8.8%
	Tablets	1	1.3%
	Mobile phones	72	90.0%
Duration of device usage (per day)	1-2 hours	4	5.0%
	2-3 hours	4	5.0%
	3-4 hours	16	20.0%
	4-5 hours	17	21.3%
	>5 hours	39	48.8%
Purpose of device use	Work	6	7.5%
	Education	21	26.3%
	Leisure	36	45.0%
	Others	17	21.3%
Posture during screen use	Sitting	30	37.5%
	Standing	3	3.8%
	Lying	39	48.8%
	Moving around	8	10.0%

Discussion:

The results of the current study showed that neck pain is frequent among undergraduate students using screen devices and 48.8% of subjects have screen device usage of more than 5 hours a day. The pain severity for most of the participants falls under moderate level followed by mild level on numeric pain rating scale.

In 2019, a cross-sectional study was carried out by Sileshi Ayhualem et al at the University of Gondar in Ethiopia, focusing on individuals who use smartphones. A self-administered questionnaire based on a modified version of the Nordic Musculoskeletal Questionnaire was used to collect data from university students. The findings of the study indicated that approximately half of the participants reported experiencing neck pain within the previous 12 months, and the majority of students used smartphones for more than six hours daily.(16) Although the study has larger sample size but no evidence was provided regarding the severity of pain, The current study was aimed to find the frequency of neck pain as well as it's severity among all screen device users, including same age group students, and data was collected through a self-structured questionnaire and Numerical Pain Rating Scale. Result showed that more than half of students had neck pain after screen device usage and screen usage of 48.8% participants was > 5 hours a day.

Siao Hui Toh et al conducted a cross-sectional survey on the association between the use of touch screen devices and musculoskeletal symptoms and visual health. Adults who completed an online survey were enrolled in the study. Using a modified Nordic musculoskeletal questionnaire, participants reported pain or discomfort in the neck/shoulder, upper and lower back, and wrist/hand areas.. The questionnaire also inquired about symptom prevalence in the past month. The study findings revealed that the highest occurrence of symptoms was observed in the neck/shoulder region, with a prevalence rate of 42.4% in the previous month. Among the participants, mobile phones were the most frequently used device, with a maximum usage time of 12 hours per day.(17) The current study also showed that mobile phones were the most frequently used screen and overall usage was more than 5 hours per day and 43.8% students had neck pain in the last month.

In 2015, Betina Blair et al conducted a cross-sectional study at the University of Nevada Las Vegas with the aim of determining the occurrence and factors contributing to musculoskeletal symptoms in the neck and shoulder among individuals who use touch-screen tablet computers. The study included a varied range of participants, including university students, staff,

teachers, and alumni. The data of participants was gathered via an online survey. The findings revealed that the prevalence of symptoms experienced during tablet use was 67.9%. The majority of symptoms were reported in the neck region (84.6%), with 42.5% reporting aching or pain. The severity of discomfort was primarily categorized as moderate (rated between 4 and 6 on a pain scale), accounting for 55.4% of cases.(18) While our study only focused on undergraduate students as study participants and showed results where neck pain was frequently reported in the undergraduates and 51.3% participants had moderate level pain.

Helle K. Falkenberg et al conducted a research project examining the effects of tablet and mobile phone usage on eye strain, headaches, and musculoskeletal symptoms in a group of healthy teenagers. The study involved visually assessing participants and administering a questionnaire to identify musculoskeletal symptoms. The findings revealed that the most frequently reported symptoms included fatigue in the eyes, discomfort in the neck, and a general feeling of unease. A considerable number of participants experienced neck pain linked to the use of electronic devices.(19) Our study also showed that most of the participants had neck pain after screen device usage.

The findings of study emphasize the need for reduction in screen device usage, postural education and teaching of proper ergonomics. Furthermore, the study also provides an insight to physiotherapists and orthopedists regarding risk factors and the population susceptible to neck pain.

This study was conducted on a small sample size exclusively taken from a single educational institution which constrains the generalizability of the findings. A cross-sectional study design captured data at a single point in time, which makes it challenging to establish causal relationships between screen device use and neck pain. Conducting longitudinal studies in future is suggested that would provide more insight into how changes in device use over time correlate with changes in neck pain. Various confounding factors that contribute to neck pain among undergraduate students, such as ergonomics, physical activity, sleep quality, and stress levels were not taken into account in this study. The data in the study relied upon self-reported information, therefore individual biases cannot be ruled out.

Conclusion:

Neck pain is frequently reported among undergraduate students using screen devices. Pain severity was found to be of moderate level followed by mild level on Numeric Pain Rating Scale.

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Javed A: Conception of idea, writing of manuscript, interpretation of data, editing and revision
Tariq S: Data analysis, writing, interpretation and results, drafting of tables, draft editing with critical revision until final
Naeem M: Revision of manuscript
Naveed Z: Data collection and entry
Saleem S: Data collection
Hamza A: Data collection

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RESEARCH ARTICLE

Association of stress and sleep quality among the health sciences students: An analytical study

Rameeza Razaq[1], Eman Babar[1], Rafsha Sajjad[1], Qandeel Yousaf[1], Tahir Mahmood[2]

ABSTRACT

Background: Stress termed as a state of both mental and physical tension and sleep quality defined as how well an individual sleeps, stress and sleep quality regarded as significant physical and mental health determinants.

Objectives: To determine frequency of stress and sleep quality and to determine association between stress and sleep quality among health sciences students of Sialkot.

Methods: The cross-sectional study was conducted after ethical approval on a sample of 264 students in Sialkot. A convenient sampling approach was utilized. The sample was gathered from private medical colleges of Sialkot having undergraduate health sciences students. Perceived Stress Scale (PSS) was employed to assess the levels of stress in students and Pittsburg sleep Quality Index (PSQI) was used for student's sleep quality. The Data was analyzed through SPSS software, version 22. Chi-square test was used (p-value ≤0.05 was considered significant).

Results: Study comprised of 264 undergraduates having a mean age of 20.82±1.34 including 224 (84.4%) females and 40 (15.2%) males. Study showed high prevalence of stress and poor sleep quality with statistically significant association (p=0.027). Majority of students were experiencing poor sleep quality 232 (87.9%). 15 (5.7%) participants had low stress, 191 (72.3%) students were at the level of moderate stress and 58 (22%) were at severe stress level due to bad sleep quality.

Conclusion: The study concluded that there was high frequency of stress and poor sleep quality with significant association between stress and sleep quality but no significant association with demographics in targeted health sciences undergraduate students in Sialkot.

Keywords: Health sciences, Perceived Stress Scale (PSS), Pittsburgh Sleep Quality Index (PSQI), Quality, Sleep disturbance, Stress, Students.

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Introduction:

Stress is termed as a feeling of physical and emotional tension which might emerge from any incident or thought that prompted someone to become annoyed, angry, or nervous. Anxiety, anger, grief, guilt, or low self-esteem can cause stress. Stress can be physical, psychological, psychosocial, or psycho-spiritual.(1) Perceived stress is one of the crucial psychological factors which refers to the extent to which one's life circumstances are stressful, uncontrollable, and unpredictable.(2)

It is crucial to comprehend how stress is commonly viewed in one's life because stress has been widely acknowledged as a significant contributor to health outcomes.(3) Stress has an association with different factors including working hours, sleep deprivation, a heavy administrative and clerical workload, a lack of allied health practitioners' support, high volume of challenging patients, subpar acquiring environments such as family, friends, and relationship issues. Inadequate spare time to relax or form new support networks, psycho-social difficulties caused by residence stress, insufficient coping skills, responsibilities for patient care, supervision of less experienced residents and students, challenging patients, information overload, and career development can be termed as some common stressors.(4) Students,

Affiliations: [1]Department of Physical Therapy, Imran Idrees Institute of Rehabilitation Sciences, Sialkot, Pakistan. [2]Department of Physical Therapy Rashid Latif Khan University, Lahore Punjab, Pakistan

Correspondence: Tahir Mahmood

Email: tahirmahmoodphysio@gmail.com

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especially medical students are those who experience stress more than others. Students who experience excessive stress during their medical education were more likely to have trouble resolving interpersonal disputes, have sleep issues, pay less attention, concentrate less, be tempted to cheat on exams, experience depression, lose their objectivity, commit more mistakes, and engage in improper behavior like negligence.(5)

Sleep is always termed as a state of rest as it is a periodic suspension of the state of awareness.(6) Sleep issues are widely spreading and becoming worse day by day. A decline over the past few years has been seen in the sleep quality among young adults, and huge ratios of them are students. Due to increased academic and social demands, irregular schedules, and other circumstances, students are more vulnerable to sleep problems and deprivation. The social life of college students involves a variety of entertainment alternatives as well as sleep-inducing products.(7) Poor sleep is considered a major health problem that exists around the world. In universities, insufficient sleep can seriously harm students' psychological and physical health as well as their ability to concentrate on their studies.(8)

Lack of sleep, an increase infrequency of short-term sleep, staying up late, rising up early have been associated to lower learning capacity, academic performance, and neurobehavioral functioning. Reduced or disturbed sleep, low academic performance, and extreme weariness have all been linked.(9) Perceived stress and sleep have some association with each other among undergraduate students of medical colleges.(10)

In most of the students, it has been observed that poor sleep quality has been associated with stress but lack of literature on demographics factors. This study addressed sleep disturbances and underlying stress in health sciences students and explored their relationship. The findings can help students to be well aware of their sleep quality and current level of stress. Thus, modifications can be done to minimize stress levels that can improve the quality of sleep and its related factors.

Methods:

The cross-sectional study was conducted after taking ethical approval from Imran Idrees Institute of Rehabilitation Sciences (Ref # IIIRS/DPT/PRI/IRB-605) from 23rd January 2023 to 25th May 2023. After calculation sample size turned out to be 264. Sample size was figured out by epitool software through formula: n = (Z2 x P x (1 - P))/e2, where: - Z = value from standard normal distribution corresponding to desired confidence level (Z=1.96 for 95% CI) - P was expected true proportion - e was desired precision (half desired CI width) Estimated true proportion 27% (0.27) estimated population 2000, desired precision 0.05(5%), confidence interval 95%.Study comprised of undergraduate students of health sciences from Department of Physical Therapy (DPT), Human Nutrition and Dietetics (HND), and Doctor of Pharmacy (Pharm-D) of age between 17 to 23 from the private medical colleges of Sialkot including IIIRS(Imran Idrees Institute of rehabilitation sciences Sialkot), Islam College of Physical Therapy Sialkot, Sialkot College of Physical Therapy, University of Sialkot (Department of Pharmacy and Allied Health Sciences), University of Management and technology Sialkot, Imran Idrees College of Pharmacy, Sialkot. Convenient sampling approach was implemented for data collection. Self-reported questionnaire was prepared with the inclusion of basic information and informed permission, assuring security for data and confidentiality. The outcome tools were the perceived stress scale (PSS) with cronbach's alpha coefficient in between 0.70 and 0.85.—(11) Stress was categorized according to the scores on PSS as 0-13= Low stress, 14-26=Moderate stress, and 27-40=High perceived stress.(12) The other outcome tool was Pittsburgh Sleep Quality Index (PSQI) that has a reliability of 0.78.(13) Adding up the average scores of the seven factors gave PSQI score from 0 to 21, 0 to 4 representing good sleep and 5 to 21 denoting poor sleep.(14) SPPS Version 22 was used to analyze the data, frequency tables of categorical and mean and standard deviations were calculated for numerical data and fisher's exact test was applied for association of categorical data.

Results:

The participants had the mean age of 20.82±1.34 years. Females were 224 (84.8%) and males were 40 (15.2%). (Table 1) Out of total, 55 (22%) participants had high level of stress. (Table 2) The sleep quality index of 232 (87.9%) was poor and only 32 (12.1%) had good sleep quality. (Table 3) The fisher exact test scoring showed significant association in between perceived stress and sleep quality in undergraduate health sciences students of Sialkot with a p- value 0.027. Most of the students denoted moderate forms of stress with poor sleep value and p-value was significant at <0.05. (Table 4)

Table 1: Demographic characteristics of the participants

Demographics	Category	Frequency(%age)
Gender	Male	40 (15.2%)
	Female	224 (84.8%)
Body mass index	Underweight	46 (17.4%)
	Healthy weight	143 (54.2%)
	Overweight	54 (20.5%)
	Obese	21 (8.0%)
Socioeconomic status	Lower class	2 (0.8%)
	Middle class	247 (93.6%)
	Upper class	15 (5.7%)
Type of enrollment	Semester system	179 (67.8%)
	Annual system	85 (32.2%)
Semester no./ academic year	1-2 semester/ 1st year	31 (11.7%)
	3-4 semester/ 2nd year	23 (20.5%)
	5-6 semester/ 3rd year	89 (33.7%)
	7-8 semester/ 4th year	32 (12.1%)
	9-10 semester/ 5th year	89 (33.7%)
Sleeping hours	2-4	44 (16.6%)
	5-7	155 (58.7%)
	8-10	61 (23.1%)
	11-12	4 (1.5%)

Table 2: Perceived stress categories of participants

Variable	Categories	Frequency(%age)
Perceived stress scale	Low stress	15 (5.7%)
	Moderate stress	191 (72.3%)
	High perceived stress	58 (22%)
	Total	264 (100%)

Table 3: Sleep quality index of participants

Variable	Categories	Frequency(%ages)
Sleep quality Index	Good sleep quality	32 (12.1%)
	Poor sleep quality	232 (87.9%)
	Total	264 (100%)

Table 4: Association of stress and sleep quality index of participants

Variable	Category	Perceived stress scale			Total	P value
		Low	Moderate	High		
Sleep quality index	Good sleep quality	1 (0.37%)	29 (10.98%)	2 (0.75%)	32 (12.12%)	0.027
	Poor sleep quality	14 (5.30%)	162 (61.36%)	56 (21.21%)	232 (87.87%)	
Total		15 (100%)	191 (100%)	58 (100%)	264	

Discussion:

The cross-sectional study on 264 undergraduate health sciences students of Sialkot was conducted to figure out the prevalence of stress and sleep quality and association between perceived stress and sleep quality in health sciences students of Sialkot. The study found that students were suffering from different levels of stress and had different types sleep quality. The designed study observed high frequency of stress and poor sleep quality with a significant association among them. Results of study were in line with a cross-sectional study conducted in Pakistan in 2021 which showed that most of the students belong to moderate stress level that had compromised their sleep. We observed that there was significant association between perceived stress and sleep quality, poor sleep quality led to the building of a moderate form of stress and its prevalence seemed high in medical students.(15) Students' especially medical students are those who experience stress more than others. Students who experienced excessive stress during their medical education were more likely to have trouble resolving their issues and experienced poor sleep quality. Our study found moderate stress and poor sleep quality had prevalence high among health sciences students of Sialkot. There was another study conducted in Indonesia that concluded that stress and the poor sleep quality were quite common in students and students with poor sleep quality were 4.7 times more likely to be stressed than those having good sleep quality. The study showed association between sleep quality and the level of stress among Students at the University of Indonesia ($p = 0.001$; $\alpha = 0.05$).(16) Sleep quality and stress both affect the health and academic performances of students. Our study showed that there was a huge ratio of students who experienced the stress and poor sleep quality at same time. In Jordan in 2022, a study stated that stress and poor sleep quality were significantly frequent and strongly associated in medical students at the University of Jordan. 66.3% of the participants were stressed and out of 282 participants 61.7% were represented as poor sleepers. The chi-square test indicated significant association between stress and sleep quality ($P < 0.01$).(17) High prevalence of stress considered as a common issue in medical students, which can be favorable or unfavorable, while favorable stress facilitated the learning process in students while unfavorable stress affected the mental and physical health of students.(18) Stress affected the sleep quality of students and our study well documented that stress and poor sleep quality were highly prevalent and the stress and sleep quality were significantly associated among health sciences students of Sialkot. The results were similar to a study executed out in 2017 in Saudi Arabia at King Saud bin Abdul-Aziz University in which demonstrated that there was statistical significant association ($p < 0.001$)with high prevalence of poor sleep quality (76%) and stress (53%).(19) It's critical to identify student stress early. Early stress diagnosis allows us to properly counsel students and provide them with a variety of coping mechanisms to control stress. To avoid having stress impair their daily activities, students should be able to handle stress healthily. In this regard university administration professors and parents can assist students to overcome stress.(20)

There was a small sample size and a limited number of private medical colleges in Sialkot. Because of more females in health sciences the study can affect the implementation of results on both gender as females were more in the study. Further associated factors were not considered in the study including socioeconomic status, family education, and residential differences, job status and menstruation or such phase that can warrant the findings. The institutes should offer academic and

psychosocial support mechanisms to lower the level of stress and students should improve their sleep quality to have a healthy physical and mental state. Policy makers should be concerned about higher levels of perceived stress, and it is vital to create coping mechanisms to help students cope with this pressure and to create a proper learning atmosphere, so they can do better in exams and become leaders in their areas. We recommend students to receive appropriate counseling.

Conclusion:

The study concluded that there was high frequency of stress and poor sleep quality with significant association between stress and sleep quality.

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Authors Contribution:

Razaq R: Conception, Design, Data collection

Babar E: Conception, Design, Data collection, Literature review

Sajjad R: Statistical analysis, Design, Data collection, Literature review

Yousaf Q: Statistical analysis, Critical revision of drafted version to be published

Mahmood T: Statistical analysis, Design, Data collection, final approval, and guarantor of the version to be published

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RESEARCH ARTICLE

The frequency of dizziness among mild to moderate traumatic brain injury patient

Maham Ahmad[1], Nabeela Safdar[2], Sumbal Salik[2], Somia Faisal[2], Muhammad Nouman Tabassum[2], Raheel Munawar[3]

ABSTRACT

Background: Traumatic brain injury (TBI) is one of the leading factors of disability and death in population after any vehicle accident. Dizziness is one of the common complaints caused by TBI affecting their normal activities of life.

Objective: To determine the frequency of dizziness in mild to moderate traumatic brain injury patients.

Methods: The descriptive cross-sectional study was conducted on 78 patients, after receiving ethical permission from University. The sample was collected through nonprobability convenience sampling technique. The patients were selected according to the designed inclusion criteria in which male and female patients of 20 to 60 years of age with mild to moderate traumatic brain injury having GCS score of 9-15 were enrolled in the study. The dizziness handicap inventory was used for assessment of dizziness. The data was analyzed using software of SPSS version 26 in which frequency and percentage were determined.

Results: Among 78 patients, 44.23±12.42 was the mean age, 57.7% were male and 42.3% were female. Furthermore, 11.5% were mildly handicapped, 47.4% were moderately handicapped and 41% were severely handicapped due to dizziness.

Conclusion: It was concluded that dizziness is highly prevalent among mild to moderate TBI patients that made them moderate to severely handicap in performing their normal activities of life.

Key Terms: Dizziness, Frequency, Mild to moderate traumatic brain injury.

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Introduction:

Traumatic brain injury (TBI) is a major factor of disturbing function of brain leading to increase mortality and morbidity rate. TBI can either be caused by any central nervous system pathology or any other external trauma.(1) Any acceleration and deceleration injury or motor vehicle accidents are the major blunt traumas that causes the laceration of the scalp and changes in the intracranial contents leading to mild to moderate TBIs.(2) It is one of the leading cause of mortality as approximately 1.5 to 2 million annually experience TBI, among which 1.4 million were admitted to emergency department from which 27000 got hospitalized while the death rate was up to 52000 annually.(3) According to survey, 2673 people of 18-34 years of age had history of TBI being a prevalence of 442.4 per 100,000 person.(4)

The most common sign and symptoms of the Traumatic Brain Injury includes loss of consciousness from several minutes to hours, persistent headache, nausea, vomiting, raised intracranial pressure, intracranial hematoma, and cerebral contusions etc. Furthermore; TBI leads to the development of multiple impairments including dizziness, Benign Paroxysmal Positional Vertigo (BPPV) and balance problems.(5)

Dizziness is the vague terminology that described as persistent and unexplained postural sensation of light lightheadedness developing balance and vestibular problems.(6) The pathology of Dizziness is still unknown, however; some vestibular and non-vestibular factors increase its prevalence. Benign Paroxysmal Positional Vertigo (BPPV) is one of the major vestibular issues causing dizziness among patients. Neck injuries, traumatic brain injury, migraine, anxiety and spinal cord injuries cause dizziness.(7, 8) Around 17% of traumatic brain injury patients had post-traumatic dizziness with

Affiliations: [1]Ghurki Trust and Teaching Hospital, Lahore, Pakistan. [2]Lahore College of Physical Therapy, Lahore Medical and Dental College, Lahore, Pakistan. [3]Johar Institute of Professional Studies, Lahore, Pakistan.
Correspondence: Sumbal Salik
Email: sumbalsalik2@gmail.com
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recurrence occurring in 9 (40.9%) of the patients.(9) Dizziness is 46% prevalent among TBI patients in which 38.9% suffering after mild TBI within 6 weeks while 25.4% reported its occurrence after 12 months of TBI.(8)

Harrell et al (2021) reported that TBI is the major risk factor of developing dizziness and balance issues among the patients admitted in emergency department. The trauma causes vestibular hypofunction and swelling of vestibular labyrinth while disturbing the impulses generating from vestibular nucleus causing dizziness, balance issues and BPPV(5). Similarly; Giaonli et al (2022) stated that dizziness is the second most prevalent complaint of patients who had mild Traumatic Brain injury that might have non-vestibular and central or peripheral vestibular causes.(10)

Therefore, the current study was designed to find out the frequency of dizziness in mild to moderate TBI patients as various literature tried to determine the vestibular, musculoskeletal, and neurological abnormalities among these patients. This study will further help in improving the quality of life for the patients who will be prone to developing any vestibular pathology.

Methods:

A descriptive cross-sectional study was conducted after receiving an ethical approval from the Ethical Committee of Lahore college of Physical Therapy, Lahore Medical and Dental College with Reference number LCPT/DPT/22/937. The sample of 78 patients was selected by using WHO sample size calculator (n= Z^2 P (1-P) / d^2) as a non-probability convenience sampling technique.(11) Patients were included according to designed inclusion criteria in which males and females patients of 20 to 60 years of age, and having GCS score between (9-15) were included in study for the categorization of TBI injury.(12) Patients suffering with any co-morbidities including stroke, paralysis, spinal cord injuries and patients having TBI from wheeling, blast injuries, falls and sports injuries were excluded from the study.

Proper written and verbal consent was taken from each patient by therapist. Data was collected using a questionnaire including demographic variables (age and gender) and Dizziness Handicap Inventory Scale (DHI). The DHI is a highly reliable assessment tool for analyzing self-perceived severity of dizziness. The questionnaire includes 25 questions focusing on functional, physical, and emotional aspects of patients with maximum score of 100. The score ranging from 16-34 is marked as mild handicap, 36-52 scores shows moderate handicap and above 54 scores are marked as severe handicapped. It provides subjective and objective assessment for dizziness among vestibular diseases, brain injury, persistent whiplash-associated disorders, major anxiety disorders and older population.(13-15) Furthermore, DHI has positive correlation with functional gait and balance assessment.(15, 16)

The data was analyzed by using SPSS version 26 in which results were described in the form of frequency and percentage along with graphs.

Results:

The results of the current study were described in tabulated method including frequency and percentage along with the histogram form. Table 1 described the results of demographic variables of TBI population. The mean age of patients was 44.23±12.42 years having the minimum age of 20 years and maximum age of 60 years. Similarly. Out of total, 45 (57.7%) were males and 33 (42.3%) were females.

Table 2 and Figure 1 described the severity of dizziness assessed by DHI among TBI patients. According to analysis, 9 (11.6%) were suffering with a mild handicap, 37 (47.4%) were with moderate dizziness handicap and 32 (41%) were suffering with severe dizziness handicap.

Table 1: Descriptive table of Demographics variables:

Variables	Category	Frequency (%)
Age	20-30	16 (20.5%)
	30-40	22 (28.2%)
	40-50	26 (33.3%)
	50-60	14 (17.9%)
Gender	Male	45 (57.7%)
	Female	33 (42.3%)

Table 2: Frequency of DHI among TBI population:

Category of DHI	Frequency (%)
Mild dizziness	9 (11.6 %)
Moderate dizziness	37 (47.4%)
Severe dizziness	32 (41.0%)

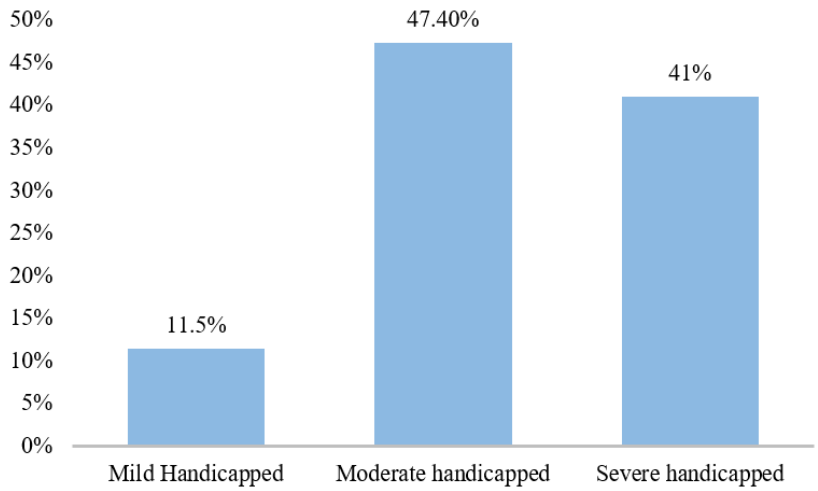

Figure 1: Frequency of DHI among TBI population:

Discussion:

Traumatic brain injury has been considered as one of the major causes of dizziness. The current descriptive cross-sectional study shows that moderate dizziness is frequent in traumatic brain injury. This study has the consistent results with the previous study which was done by Harrell et all and reported that prevalence of dizziness is above 50% among patients who were admitted with TBI with value $\chi 21 = 5.715$, $p = 0.017$ and Cohen's $W = 0.279$.(17)

Chae et al. stated that prevalence of TBI was common in age above 17 years in which incidence of dizziness was significantly present in age of 41.6. Furthermore; among TBI patients; 40-60% had episode of dizziness in which 26% suffered with moderate or severe dizziness.(18)

Kleffelgaard et al. further supported that dizziness is one of the major problem among TBI patients as it was 23.8%-81% prevalent; affecting their social and personal life. (11) Additionally; Storlos et al stated that mild to moderate TBI develops dizziness in more than 36% patients affecting their activities and prevent them from performing their professional work on daily basis.(19)

Dizziness is a major symptom associated with the TBI pathology supported by Kleffelgaard et al. as TBI leads to the development of multiple comorbidities including headache, vertigo, BBPV, dizziness, neck pain and post-concussion symptoms. These conditions further increase dizziness related disability in patients after one year that affects their quality of life. This highly supported current study results as patients showed significant dizziness level with moderate to severe handicap.(20)

The study has its own strength while it also had some limitations. Firstly, the sample size of the study was very small. Therefore, it is highly recommended that a new study should be conducted with a larger sample size for better analysis and the outcome of study. Secondly, the study included all the patients who were suffering with TBI rather than focusing on the specific time duration of the TBI. Therefore, it is recommended to conduct a study in which patient should be enrolled in acute, subacute, and chronic TBI condition as it will help in analyzing which type of patients are suffering with mild or severe dizziness. Thirdly, the study just focusses on determining the prevalence of dizziness. Therefore, it is required to determine what are the major complications or pathologies that can be developed due to dizziness in TBI patients that affect their quality of life. Fourthly, the study did not find prevalence of any comorbidity associated with TBI or that increase or reduce the severity of dizziness and handicap. Therefore, a study will be recommended with the aim of determining other pathologies that affect the quality of life and severity of dizziness among TBI patients.

Conclusion:

Post-traumatic complications, especially dizziness, is one of the major complications of traumatic brain injury. Patients having mild to moderate traumatic brain injury had moderate to severe dizziness level that made them handicapped for performing their daily activities of life.

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Authors contribution:

Ahmad M: Conception of work, design, acquisition

Safdar N: Conception of work, final approval and agreement to be accountable for all the work

Salik S: Acquisition, interpretation, drafting, revising

Faisal S: Acquisition, analysis, interpretation, drafting, revising

Tabassum MN: Final approval and agreement to be accountable for all the work

Munawar R: Acquisition, interpretation, drafting, revising

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LETTER TO THE EDITOR

A multidisciplinary approach to temporomandibular disorders (TMD): The role of physical therapy

Sabah Afridi[1]

Sir,

The temporomandibular joint (TMJ) serves as a crucial component of the musculoskeletal system, enabling essential functions like chewing, speaking, and swallowing.(1) Temporomandibular disorders (TMD) are a musculoskeletal conditions that affect the TMJ, masticatory muscles, and associated structures.(1) These conditions represent the most prevalent chronic orofacial pain ailments, affecting a significant portion of the population in Pakistan, with a prevalence rate of 44.3%.(2) Consequently, TMD lead to discomfort and a reduced quality of life.(1) Common TMD symptoms include pain in TMJ and muscles of mastication, limited mouth movements, joint sounds, and headaches.(1) To effectively manage TMDs, a multidisciplinary approach is vital, and physical therapy (PT) stands out as a non-invasive, highly effective treatment. PTs possess the ability to identify the musculoskeletal factors contributing to TMD symptoms and administer manual therapy, jaw exercises, and postural re-education. Systematic reviews have consistently shown the effectiveness of these treatments in alleviating TMD pain and enhancing mobility and function.(3-5) However, studies suggest that dentists may not have a comprehensive awareness of the potential benefits of incorporating physical therapy in the management of TMDs.(1)

Another systematic review from 2020 determined the medium- and long-term effectiveness of manual therapy for TMDs. It concluded that manual therapy has a significant positive effect on alleviating pain and improving mouth opening, although the effect may diminish over time.(3) However, when combined with therapeutic exercises, the benefits can be maintained in the long term.(3) In a recent 2022 systematic review and meta-analysis that scrutinized patients with muscle-related TMDs, the study focused on the impact of rehabilitative approaches for pain reduction. The findings showed the substantial efficacy of rehabilitative approaches in alleviating pain, with laser therapy emerging as the most frequently approach used.(4) In another systematic review published in 2022, the objective was to evaluate the effectiveness of manual therapy for craniomandibular conditions in treating TMDs. The results indicated a significant improvement in both pain reduction and maximum mouth opening.(5) Unfortunately, not all dentists have a complete awareness of the critical significance of physical therapy in the management of TMDs. Therefore, there is a need for enhanced collaboration between dental professionals and physical therapists.(1)

Keywords: Craniomandibular manual therapy, Orofacial pain, Temporomandibular disorders, Temporomandibular joint.

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Affiliations: [1]Rawal Institute of Health Sciences, Islamabad, Pakistan.
Correspondence: Sabah Afridi
Email: sabahafridi27@gmail.com
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LETTER TO THE EDITOR

Practicing emerging therapeutic interventions without proper knowledge: A growing concern among physical therapists

Sana Shahzad[1], Faryal Shoukat[1], Komal Komari[2]

Sir,

Clinical practice should be based on the latest credible evidence and guidelines. At the same time, hands-on experience is essential for dealing with daily challenges, even if it's not explicitly mentioned in research. While research-based knowledge is valuable, it may not always provide immediate solutions for practical situations.(1)

Emerging techniques refer to innovative approaches for managing pain and treating various musculoskeletal conditions, such as dry needling and extracorporeal shock wave therapy. Dry needling employs thin, needle-like tools to stimulate specific points in muscles, connective tissue, and fascia, aiming to alleviate pain and enhance movement. However, it carries various risks, ranging in severity from mild to severe adverse events. Mild adverse events, occurring at a frequency of 1-10%, include bruising, bleeding, nausea, pain, fatigue, temporary worsening of symptoms, and dizziness. Moderate adverse events (frequency: 0.1-1%) encompass prolonged pain, nerve injury, headache, vomiting, forgotten needles, extreme fatigue, and seizures. Severe adverse events (frequency: 0.1-1%) involve pneumothorax/haemothorax, infection, broken needles, and cardiac tamponade. Reports indicate that 36.7% of dry needling treatments result in minor potential negative events namely bruising (7.7%), pain (5.9%) and bleeding (16%) being most common.(2) Serious adverse effects may include prolonged symptom worsening, fainting, forgotten needles in the skin, flu-like symptoms, infections, excessive bleeding, and weakness or numbness in the legs.(3) Another emerging therapeutic intervention widely used by physiotherapists is extracorporeal shock wave therapy (ESWT), a non-invasive treatment for musculoskeletal disorders. ESWT utilizes mechanical energy to induce changes in cellular structures, triggering reactions in cell components such as mitochondria, endoplasmic reticulum, and intracellular vesicles. This enzymatic response enhances the healing process.(4) Potential risks and side effects of extracorporeal shockwave therapy include local effects hematoma formation, pain at applicator site, skin bruising, skin erythema, nerve irritation with numbness or tingling and superficial edema and systemic effects migraine and headache.(5)

In conclusion, we emphasize on the critical need for evidence-based clinical knowledge when employing emerging therapies like dry needling and shock wave therapy. While these techniques offer potential benefits for musculoskeletal issues, they also pose significant risks and potential side effects. The overarching concern among physical therapists revolves around the application of these therapies without proper knowledge, underscoring the necessity for comprehensive education and expertise to ensure safe and effective use in clinical settings.

Keywords: Dry needling, Extracorporeal shock wave therapy, Emerging therapeutic interventions.

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Conflict of interest: None to declare.

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Affiliations: [1]Ziauddin College of Rehabilitation Sciences, Ziauddin University, Karachi, Pakistan [2]Abu Zafar Institute of Medical Sciences, Karachi, Pakistan.
Correspondence: Sana Shahzad
Email: saniashahzad098@gmail.com
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LETTER TO THE EDITOR

Vibration therapy: An adjunct to neuro-rehabilitation in cerebral palsy

Ayesha Ahmad[1]

Sir,

Cerebral palsy (CP) is a common motor disorder in children. It is a non-progressive brain damage and the features can include spasticity, reduced motor control and strength, balance issues, contractures, deformities, etc. The GMFCS (Gross Motor Function Classification System) classifies the physical mobility level of the CP child into five levels.

Vibration therapy has been used in various neurological conditions like stroke, spinal cord injuries Parkinson's disease etc. It works by stimulating the alpha-motor neurons found in the muscle spindles and leads to the tonic vibration reflex. This reflex increases voluntary muscle contraction. The vibration also stimulates the peripheral mechanoreceptors that can induce neuroplasticity through the somatosensory as well as motor pathways if repeatedly applied. Whole body vibration can recruit the previously asleep motor units and this can lead to an increase in muscular strength and mass. Vibration can also be applied to certain muscles instead of the whole body. A device with a vibrating frequency of a few to 50Hz can be used.(1)

A study conducted by Alena et al in 2023 concluded that Vibration therapy affects mobility and gross motor function positively, irrespective of the used frequency.(2) Tekin et al 2021 had a study on spastic and hemiparetic cerebral palsy patients and they found that whole-body vibration therapy inhibited spasticity and improved motor function.(3) A systematic review by Syed Ali Hassain et al in 2023 concluded that vibration therapy was cost-efficient, safe to use, and had positive effects on spasticity, balance (both static and dynamic), motor function, and range of motion in patients with spastic cerebral palsy.(4) A feasibility study by Amanuele et al in 2019 found that rMV (repeated muscle vibration) can be effective in patients of CP with excessive drooling. Morever, it can also improve swallowing and help in maturing the oral motor control in cerebral palsy patients.(5)

Vibration therapy is a technique that further needs exploration, yet the available literature suggests that it is effective, safe, and easily applicable in both home and clinical settings. It is the need of the hour that it is used as an adjunct to the neurorehabilitation techniques of cerebral palsy. It can prove to be a simple but technical modification in the conventional treatment approaches for CP.

Keywords: Cerebral palsy, Vibration therapy, Neurorehabilitation.

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Affiliations: [1]University Institute of Physical Therapy, The University of Lahore, Lahore, Pakistan.
Correspondence: Ayesha Ahmad
Email: ahmedayesha460@gmail.com
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From awareness to action: Propelling virtual reality into routine physiotherapy in Pakistan

Zainab Rahman[1], Hijab Aleem[1], Sameera Gul[1]

Sir,

In recent years, VR technology has emerged as a promising tool in healthcare, providing an immersive and interactive environment that mimics everyday situations.(1) This has the potential to revolutionize the way we assess and rehabilitate musculoskeletal conditions.

Although the global application of Virtual Reality (VR) for therapeutic purposes has become increasingly prevalent worldwide, its application in Pakistan is still limited.(2) However, the slow integration of virtual reality (VR) into routine physiotherapy practices treating musculoskeletal conditions in Pakistan is a missed opportunity for the advancement of patient care and rehabilitation in the country. While global initiatives have successfully employed VR to improve outcomes for musculoskeletal and neuro conditions, Pakistan faces multifaceted challenges hindering the widespread adoption of this innovative technology.

One of the primary obstacles is the limited awareness among healthcare professionals. For this purpose, educating and raising awareness among physiotherapists about the efficacy of VR in rehabilitation could play a pivotal role in overcoming this barrier.

The lack of proper infrastructure and limited resources represents yet another substantial obstacle. The acquisition of VR equipment, and software, and the training of personnel require a substantial investment. Addressing these resource constraints through strategic planning, partnerships, and possibly government support can help create an environment favorable to the integration of VR technologies.

Affiliations: [1]Gul's Rehab, Rawalpindi, Pakistan.
Correspondence: Zainab Rahman
Email: zainabpt88@gmail.com
Received: January 12th, 2024; **Acceptance:** January 22nd, 2024
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Furthermore, the regulatory landscape in Pakistan may need to adapt to accommodate the use of VR in healthcare settings. For this, streamlining approval processes and ensuring that regulations align with technological advancements can expedite the incorporation of VR into routine physiotherapy activities.

Introducing VR in regular physical therapy settings can reduce the burden on therapists, offering a dynamic and immersive platform for rehabilitating musculoskeletal conditions. Moreover, the incorporation of VR into home plans presents a groundbreaking opportunity, allowing patients to continue therapeutic activities in a safe and controlled environment.

By introducing VR games at home, patients can actively participate in their rehabilitation, promoting consistency and engagement.(3) Additionally, incorporating group activities through VR can foster a sense of community and competition, positively impacting patient performance.(4,5) It is imperative for healthcare stakeholders, policymakers, and professionals to collaboratively work towards overcoming these challenges, unlocking the transformative potential of VR in advancing physiotherapy practices and enhancing patient outcomes in Pakistan.

Keywords: Healthcare, Musculoskeletal conditions, Musculoskeletal rehabilitation, Neuromuscular, Virtual reality

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Lack of utilizing evidence based training protocols for fitness training and injury prevention in athletes: The need to promote sports physical therapy in Pakistan

Hammad Najam[1]

Sir,

Sports physical therapy is a specialized field that is growing in cultures that strive to foster an active lifestyle and athletic excellence.(1) Sports physical therapy incorporates scientific knowledge, skills and attitudes for the context of practice as a sports physical therapist whereas Sports physical therapist provide evidence based rehabilitation and treatment of injuries.(2) They also support athletic performance through injury prevention, improving, recovery and maintenance interventions.

Pakistan's sports momentum has been rising recently. For the first time, male football team won a qualifying game in 2023. Many clubs and academies are being opened day by day yet the lack of qualified trainers and proper training programs persist. In context of sports in Pakistan, insufficient data is available about programs and structures related to development of sports in Pakistan. Furthermore, Pakistan's sports policy revealed administrative inefficiencies, ineffective management, and failure to adapt to modern international standards which hinders the development of the country's sports system.(3)

Concerns regarding lack of appropriate level of fitness among Pakistani athletes have also been raised. (4) Such fitness related problems could have been tackled by initiating fitness training early during the course when young players are being recruited in the sports club way before when they make their debut.

Another issue is the common practices of exhaustion based training by many coaches and athletes to boost stamina and strengthen musculature. There is a believe that performing sprinting sessions at the end of a regular practice session or game when fatigue level is high, has more profound effect on enhancing stamina. Training more than the requirement of the body leads to over- training syndrome. Over- training syndrome (OTS) occurs when excessive exercise leads to an imbalance between fatigue and post-exercise rest, resulting in skeletal muscle weakness rather than strength, increasing injury risks and a decline in player performance.(5) Insufficient resting intervals after training further add on to more impaired recovery patterns among athletes.

Considering above stated facts, the necessity of ensuring availability of sports physical therapist in sports clubs and academies cannot be over stated. Sports physical therapists are equipped with extensive and evidence-based knowledge needed for maintaining and improving cardio-respiratory fitness and muscular strength of athletes. They also provide post-injury rehabilitation and reduce injury risks thereby decreasing the time spent outside the sports and minimize the cost of medical treatment expenses. Hence, sports physical therapy is crucial for maintaining the health and performance of the athletes who are the future stars of our country.

Keywords: Evidence based practice, Fitness training, Sports, Sports physical therapy, Over-training syndrome.

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Affiliations: [1]POPO Football Club, Islamabad, Pakistan.
Correspondence: Hammad Najam
Email: najam.hammad14@gmail.com
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4. Complete Manuscript
5. Tables and Figures (If any)
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Discussion should begin with a summary of the main results which are then discussed with results of previously published relevant studies. Any new findings of the research should be emphasized and the relevance should be stated. Limitations of the study should be stated at the end of the discussion in a separate paragraph.

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Narrative Review	Unstructured	150	6	4,000	40	5

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Foundation University Islamabad
Defense Avenue, DHA Phase I, Islamabad, Pakistan
Website: fujrs.fui.edu.pk
Email: fujrs@fui.edu.pk