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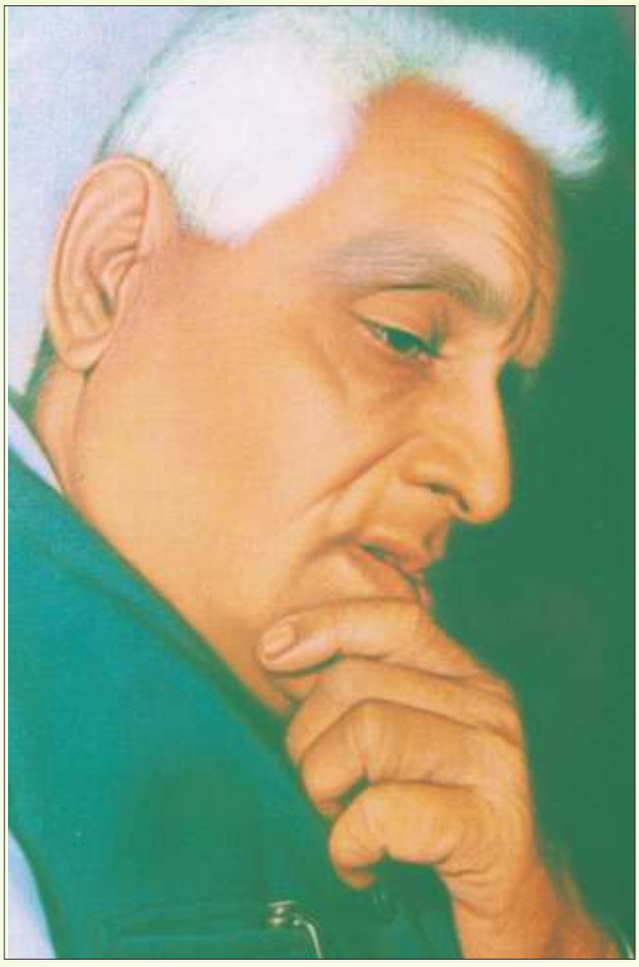
30 Minutes of brisk walking benefit health

Janardan Rai Nagar
Rajasthan Vidyapeeth
(Deemed) University, Udaipur

Our Beloved Founder



Late Manishi Pt. Janardan Rai Nagar

16th June 1911 - 15th August,1997

Popularly known as 'jannu bhai', the Late manishi's vision, farsightedness and sacrifice have enabled us reach the stature we enjoy today. He lit the lamp of knowledge by giving birth to an institution , named 'Hindi Vidyapeeth' on August 21, 1937 to spread education among those who were economically handicapped, and thereby enable them to learn the meaning of freedom Since then, the institution has been catering to the growing educational needs of an economically poor society having a rich socio-cultural heritage. Although the Manishi is not amongst us today, his ideals inspire us to fulfil the mission of imparting qualitative education to the society through preservation of our long cherished sociocultural values. We cherish his deeds and ideals, and strive to walk on the path shown by him.

Vice Chancellor's Message

It gives me immense pleasure to learn that the 8th Volume of Indian Journal of Physical Therapy and Rehabilitation is being published by department of physiotherapy. Sincere effort and keen interest taken by the members of department in the development of academic and research activities deserve all the admiration. I wish to express with a deep sense of joy and satisfaction on the release of this volume and the same moment to continue even in greater magnitude in the coming years so that the department accomplishes commendable place in the luminous field of physiotherapy at the international level.

Wishing all a scintillating success.

Prof. S.S. Sarangdevot
Vice Chancellor

Principal's Message

I have immense pleasure to gather that the Department of Physiotherapy, Janardan Rai Nagar Rajasthan Vidyapeeth (Deemed) University, Udaipur, is going to publish its 8th Volume of Indian journal of Physical Therapy and Rehabilitation this year.

We must engage in research and voice our opinions by publishing them in this, our local journal. To ensure wide leadership, the journal will carry a variety of articles of general interest, as well as scientific articles, based on topics relevant to our region. Articles in the following categories are welcome: Editorials, Letter to Editor, Major and Minor Reviews, Original Research, Notable Clinical cases, To conference report, New technique I clinical update. With so many categories, I am sure that all of you will be able to make regular contributions to this journal.

This is a major milestone for the physiotherapy field and I encourage all my staff and colleagues in the health care Sec-tor, both public an private, to embrace and support this Journal. The continuing success of this journal should give us a sense of pride and achieve meant. Please contribute articles to this journal in a timely manner to ensure it becomes an important forum for the exchange of ideas and knowledge which will ultimately transfate to better health care.

My Congratulations to the entire team of my Department of Physiotherapy working for this remarkable Endeavour and I wish editor in chief all the best for the successful publication of the journal.

DR. SHAILENDRA MEHTA
Principal
Department of Physiotherapy

The Editor's Desk

It gives me immense pleasure to write editorial for this 8th volume of IJPTR. The Department of Physiotherapy J.R. Nagar Rajasthan Vidyapeeth University Journal with a vision to promote physiotherapy science including all the specialities of Physiotherapy and uptake knowledge through new innovative research papers, case reports and Review articles in various field of physiotherapy specialities. This Journal with consistent precious publications ultimately aims to reach out to the International standards.

Our world is changing we face mounting challenges of Health Care to name a few. Their solution will require new ideas, discoveries, talents and innovations the fruits of research. To achieve them we must start by changing the way we do research there has to be free movement of people & ideas.

At this Juncture i wish to express my profuse thanks to all those who made an appreciable contribution for this journal and further i anticipate that their majestic effort shall continue, so to bring greater glory to our endeavors.

The arena of physiotherapy which as a matter of fact, works as a back bone of medical rehabilitation field should further be developed, for greater benefit to our suffering humanities

I implore & solicit all our members to spare no stone unturned in this noble and glorious mission.

I whole heartedly wish to express my deepest sense of gratitude to Honb'e chancellor & Honb'e Vice chancellor for their untiring help, relentless support and tremendous encouragement without which the present work would not have achieved its glorious completion.

On the behalf of editorial board I request to all the physiotherapist academicians, clinicians, research scholars and students to contribute articles for this Journal.

I pray to Almighty to grant all of us still greater success in times to come.

(Dr. S.B. Nagar)
Editor in Chief

Editorial Board

IJPTR an international peer reviewed Journal for all physiotherapist & Rehabilitation professionals with a forum to discuss to days challenges.

INDIAN JOURNAL OF PHYSICAL THERAPY & REHABILITATION

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EFFECT OF EUHYDRATION AND HYPOHYDRATION ON HEART RATE RECOVERY IN YOUNG UNIVERSITY ATHLETE

Dr. Ronald B*
Dr Anand Misra Dr Arun Mohzi*** MPT (Sports), Dr Shid Dhar******

Abstract: Aims and Objectives: To compare the effect of euhydration and hypo hydration on young University athletes Study Design: Experimental Study. Participants: Total of 60 subjects was included based on the inclusion and exclusion criteria through convenient sampling and . Before exercise all the subjects were measured for urine specific gravity subjects falling under euhydrated level were taken basal heart rate and then asked to follow the protocol same was done for hypohydrated state Outcome measure: Heart Rate. Results: The results of the study show that there is a significant faster heart rate recovery (p=0.000) between the groups for Hypohydration Group . Conclusion:We conclude that during hypohydration the heart rate is much more stable than in euhydrated state .which promotes better cardio vacular endurance.

INTRODUCTION

Water is the largest single component of the human body, accounting for about 50–60% of total body mass. For a healthy lean young male with a body mass of 70 kg, total body water will be about 42 lit. The turnover rate of water exceeds that of most other body components. For the sedentary individual living in a temperate climate, daily water turnover is about 2–3 lit. In other words, about 5–10% of the total body water content is renewed every day.

Water is lost from the body in varying amounts via a number of different routes the main avenues of water loss are urine (about 1400 ml), feces (200 ml), insensible losses from the lungs (400 ml) and loss via the skin (500 ml). The total daily water loss is therefore about 2500 ml, but this varies greatly between individuals and depends on the environmental conditions.

Water is the medium of circulatory function, biochemical reactions, metabolism, and substrate transport across cellular membranes, temperature regulation, and numerous other physiological processes. Fluid-electrolyte turnover and whole-body water balance change constantly because water is lost from the lungs, skin, and kidneys, and because water is gained in food and fluids. Therefore, accurate and precise laboratory and field techniques are needed to evaluate human hydration status.

water to reach the intracellular compartment. The cells imbibe, drinking is inhibited and the kidneys excrete more water.

Methodology

Design

This is an experimental study. All the subjects were recruited from the various colleges and sports center from of Dehradun.

Sampling :

Total of 60 subjects were chosen as per the inclusion and exclusion criteria, and informed consent was obtained from all the subjects after the procedure was explained to them

Procedure :

Euhydrated and Hypohydrated states.1st day the subject were studied for Euhydrated state. And for this he/she was asked to consume normal required water the specific gravity was checked by myself. If it came under the specified limit that is 0.010 they were made to follow the protocol or else follow the above procedure. Temperature was set at25O C. A pre exercise data was recorded of their basal heart rate. Then the Euhydrated subjects had to follow

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their prescribed exercise protocol which is as follows:

- 5 min warm up at speed of 2m/sec inclination 0 degree
- 20 min running at 7 m/sec speed on treadmill at inclination 1degree
- Then the time taken for recovery heart rate was measured

Throughout this the heart rate was recorded in the last 10 sec of a min.

The same subjects were then studied for hypohydrated state on next day.

Results:

TABLE : INTER GROUP COMPARISON OF HEART RATE RECOVERY TIME BETWEEN GROUP A AND B

VARIABLES	MEAN		SD		T	P
HEART RATE RECOVERY TIME	GROUP A	GROUP B	GROUP A	GROUP B	6.167	.000
	11	8.75	2.16286	1.81915		

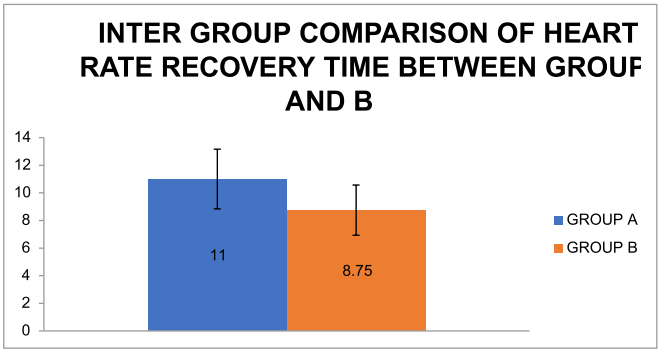

FIG 10: Shows significant difference in heart rate recovery time in group A and B

DISCUSSION

Hypohydration group showed significant early recovery after the exercise protocol. This could be explained by the reason that hypohydration causes decrease in blood volume. As result the arterial blood pressure falls leading to and there is decrease in blood volume level in the body which lead to increase incidence of orthostatic hypotension and syncope. As defense mechanism the body produces sympathoexcitation and increase in volume regulatory hormones like Angiotensin II. This increases blood volume in the body. So when there is increase in blood volume the heart rate does not increase this causes decrease in heart rate. This could be the possible mechanism of faster heart rate recovery in hypohydrated group.28

Adrenaline is a stimulator of heart rate, it increases the heart rate through sympathetic activity and thus increases heart rate but a physiological mechanism also says that when there is too much irritation by adrenaline it may causes decrease in the heart rate known as ADRENALINE BRADYCARDIA.25

In favor of present study it has been proved that during the period of dehydration there is an increase in concentration of epinephrine, norepinephrine and cortisol also cytokine along with adrenaline are precursor of sympathetic activity and shows that IL-6 component of cytokine is released 30 min after the exercise. So it suggest that for the first 30 min there is increased concentration of adrenaline which may cause adrenaline bradycardia, thus decreasing the heart rate3

In previous studies it was seen that when an athlete is made to exercise in a heat stress in a dehydrated state the heart rate recovery was faster in euhydrated subjects than dehydrated group but as per study done by me the heart rate of hypohydration group increased less which shows a contradictory results36, 37 and a need for future research.

Conclusion :

As per previous studies, euhydration and hypohydration both help in heart rate recovery but as per this study, hypohydration group showed an early recovery in a short period of time at 25ºC. This means that if we make an athlete enter a short term sport with moderate intensity in hypohydrated state, it can be beneficial for him/her as there will be early heart rate recovery which shows a better cardiovascular endurance in them.Thus.it will be beneficial for improving their performance at sport.

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EFFECT OF VIRTUAL REALITY VERSUS CONVENTIONAL THERAPY ON STATIC AND DYNAMIC IMBALANCE IN STROKE PATIENTS –A COMPARATIVE STUDY

Dr. Anand Misra, Dr. Deepti Garg**
Dr. Anuja Sharma,*, Dr. Subhash Garg******

ABSTRACT

Background: Stroke, or a cerebral vascular accident, is the sudden death of brain cells due to inadequate blood flow. The WHO clinically defines stroke as the rapid development of clinical signs and symptoms of a focal neurological disturbance lasting more than 24 hours or leading to death with no apparent cause other than vascular origin'. (WHO 2005) . Stroke is a global health problem. These include impaired neuromuscular control, altered sensation, neglect (i.e. failure to respond to stimuli on the affected side) and visual deficits. Thus increasing the risk for falls, leading to subsequent injuries.

Methodology: 30 patients were randomly selected male and female both of the age group 40 to 65 of age with difficulty in walking. They were divided into 2 equal groups. Group A was experimental group and was given virtual reality training along with few exercises and group was given conventional therapy alone for 30 minutes, 5 days a week for 4 weeks. Both the groups were assessed pre intervention and post intervention on berg balance scale and TUG test.

Results: After administration of virtual reality exercises among stroke patients of group A group between baseline and post intervention (22.13 points) were large and thus strongly significant ($p<0.001$). Less improvement noted among stroke patients of group B than group A at post intervention stage.

Conclusion: Ultimately, the present research showed that the physiotherapeutic regime such as virtual reality exercises on static imbalances are more effective intervention protocol in improving the balance and better functional status in patients with stroke.

Key-words: Stroke, Virtual Reality, Balance improvement, Head Gear.

INTRODUCTION

Stroke is a global health problem. It is the second commonest cause of death and fourth leading cause of disability worldwide1.

It is defined as the sudden onset of focal neurological deficits, as a result of the interruption of blood flow to a specific part of the brain.2 It is one of the most common causes of death and is the single most common cause of severe disability (30% - 40% of survivors).3This condition is usually characterized by loss of functions of the motor, sensory and higher brain cognitive faculties to various degrees4 typically on side of the body opposite to side of the lesion.3Such motor deficits will lead to dramatic alteration in lifestyle, compromising the functional independence, decreasing mobility and ability to perform activities of daily living.3

Although 60% of the stroke survivors regain walking independence after 3 months, several have continuing problem with mobility due to impaired balance, motor weakness and decreased walking velocities. The ability to walk in stroke subjects can be affected by various neurological deficits, which are typically unilateral. These include impaired neuromuscular control, altered sensation, neglect (i.e. failure to respond to stimuli on the affected side) and visual deficits.7 Thus increasing the risk for falls leading to subsequent injuries. Research reveals that diverse factors, such as timing and force scaling problems, sensory loss, abnormal muscle tone, loss

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of sensory and anticipatory postural control, contribute to the difficulties of dynamic balancing in post-stroke population.8

Deficits due to impaired balance include an increase in a postural sway, a decreased areas of stability in stance, and an uneven weight distribution on stance with less weight placed on the weaker leg.2 Moreover, during ambulation stroke patients have a higher risk of falls.9 Many people returning home after stroke rehabilitation walk at average speed that is insufficient to cross the street safely or even to walk safely in the community.10

Cheng and Marigold showed significant improvement in dynamic balance function measurements following balance training.2 . Two major goals of rehabilitation are the enhancement of functional ability and the realization of greater participation in community life. These goals are achieved by intensive intervention aimed at improving sensory, motor, cognitive and higher level-cognitive functions on the one hand, and practice in everyday activities and occupations to increase participation on the other hand .17 Virtual reality-based therapy, one of the most innovative and promising recent developments in rehabilitation technology, appears to provide an answer to this challenge. Virtual reality typically refers to the use of interactive simulations created with computer hardware and software to present users with opportunities to engage in environments that appear to be and feel similar to real world objects and events 22,23,24. Users interact with displayed images, move and manipulate virtual objects, and perform other actions in a way that attempts to "immerse" them within the simulated environment thereby engendering a feeling of presence in the virtual world . 25,26

Virtual reality has a number of well-known sets, which make it highly suitable as a rehabilitation intervention tool .27 These assets include the opportunity for experiential, active learning and the ability to objectively measure behavior in challenging but safe and ecologically-valid environments while maintaining strict experimental control over stimulus delivery and measurement. VR also provides the capacity to individualize treatment needs, while gradually increasing the complexity of tasks and decreasing the support provided by the clinician .21,28

Given the variety of VR platforms and the diverse clinical populations that may benefit from VR-based intervention, it is helpful to view the VR experience as a multidimensional model that appears to be influenced by many parameters. A conceptual model was developed within the context of terminology established by the International Classification of Functioning, Disability and Health (ICF) 18 and the rehabilitation process 39,40. This model helps to identify the clinical rationale underlying the use of virtual reality as an intervention tool in rehabilitation as well as to design research to investigate its efficacy for achieving improved performance in the real world. The process of using VR in rehabilitation is modeled via three nested circles, the inner "Interaction Space", the intermediate "Transfer Phase" and the outer "Real World".

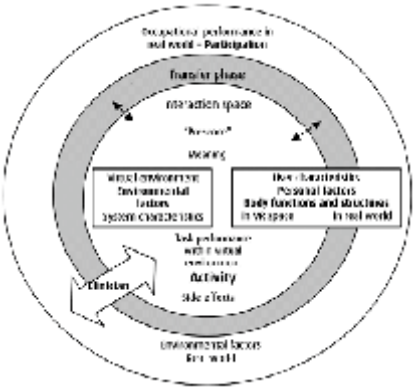

Figure: Model of VR-based rehabilitation within the context of terminology from the ICF(indicated in bold). (Weiss et al., 2006)

The "Interaction Space" denotes the interaction that occurs when the client performs within the virtual environment, experiencing functional or game-like tasks of varying levels of difficulty, i.e., the activity component according to the ICF terminology. This

interaction is influenced by user characteristics, which include personal factors (e.g. age, gender, and cultural background), body functions (e.g. cognitive, sensory, motor abilities) and structures (e.g., the parts of the body activated during the task). It is also influenced by the characteristics of VR platform and its underlying technology (e.g. point of view, encumbrance) that presents the virtual environment and the nature and demands of the task to be performed within the virtual environment.

It is during the interaction process that sensations and perceptions related to the virtual experience take place; here the user's sense of presence is established, and the process of assigning meaning to the virtual experience as well as the actual performance of virtual tasks or activities occurs. The sense of presence enables the client to focus on the virtual task, separating himself temporarily from the real world environment. This is an important requirement when motor and, especially, cognitive abilities and skills are trained or restored. The concept of meaning is also thought to be an essential factor that enhances task performance and skills in rehabilitation in general 16,18 and thus also in the VR-based rehabilitation 40. Environmental factors within the virtual environment may contribute information about issues that facilitate or hinder the client's performance, and may serve as facilitators of performance in the virtual environment leading to improved performance in the real world.

Two outer circles, the "Transfer Phase" and the "Real World" denote the goal of transferring skills and abilities acquired within the "Interaction Space" and eliminating environmental barriers in order to increase participation in the real world (i.e., participation in the natural environment according to the ICF terminology). The "Transfer Phase" may be very rapid and accomplished entirely by the client or may take time and need considerable guidance and mediation from the clinician. The entire process is facilitated by the clinician whose expertise helps to actualize the potential of VR as a rehabilitation tool.

VR-delivered therapy program, increased enjoyment while doing the exercises, improved confidence while walking and fewer incidents of falling.

Analysis of conventional and video capture VR treatment for SCI by specialists in rehabilitation highlighted several key differences between the two methods of intervention 45. First, control over delivery of the stimuli via the VR platform enabled the therapist to intervene more effectively, especially in terms of physical guidance and support. In addition, the VR platform allowed precise control over delivery of the number of stimuli simultaneously presented to the patient as well as their speed and direction. These features appeared to increase the number of times a desired balance-recovery movement was performed by patients. Finally, the ease with which this platform elicited dynamic equilibrium recovery responses, an essential component in balance training and encouraged weight transfer movements was remarkable. In contrast, the static presentation of stimuli during conventional therapy restricts intervention to focus almost exclusively on weight transfer.

Virtual reality (VR), which will be helpful in promotion of visual, auditory, tactile input and motivation and motor learning has been applied to improvement of motor skill after stroke .54 The number of studies and experimental applications exploiting VR in the rehabilitation environment has shown a rapid increase over the last few years. VR technology uses the principles of motor learning and neural plasticity in order to optimize recovery after brain damage .55 Application of VR is also varied, including gait and balance retraining and upper and lower limb rehabilitation. VR is the most recent intervention in stroke rehabilitation .56 VR is a powerful tool in a rehabilitation environment, providing the patients with repetitive practice, feedback information, and motivation for endurance practice .57

NEED FOR THE STUDY

In stroke balance dysfunction is common due to abnormal posture, reduced core stability, functional limitation. Thus the need of this study to find out the effectiveness of virtual reality for improving balance, improve core stability and posture control ,and activity of daily living. Thus improving their multitasking activity of stroke patients.

METHODOLOGY:-

The sampling technique was a purposive sampling technique. A sample size of 30 patients divided into 2 equal groups. The study was a quasi experimental study. Study time was 6months and the treatment was given for 4 weeks and 5days a week. Both the groups received treatment for 30 minutes. Inclusion criteria were no visual impairment, no Hearing disorder, patient must have ability to walk independently without use of walking aids for more than 10 meters, patient is able to understand and follow simple verbal instructions, having motor aphasia. Both males and females have been selected between 40 to 65 years. Patients with orthopedic or neurological diseases uncontrolled BP, presence of cardiac arrhythmias, homonymous hemianopia, mental retarded person, signs of deep vein thrombosis and patients with wernicke's aphasia were excluded. It was measured on the berg balance scale and TUG test.

OBSERVATIONS AND RESULTS:

TABLE-1

Comparison In Score On Berg Balance Scale In Group A And Group B Between Baseline And Post Intervention Sampling Stages

Sampling Stage & group	Score on BBS Mean ± SD	Mean Diff	t-statistic	LOS
Group A (Virtual Reality)				
Baseline	26.93±3.85	22.13 points	24.48	p<0.001 #
Post- intervention	49.07±3.20			
Group B (Conventional Therapy)				
Baseline	25.13±2.64	14.34 points	17.86	p<0.001
Post- intervention	39.47±3.91			

#The mean differences are highly significant at the 0.001 level of significance. [Mean Diff-Mean Difference; LOS-Level of Significance]

Table projects that the virtual reality and conventional exercises were the effective treatment protocols for improving the static and dynamic imbalance of stroke patients. In group A, the static imbalance was significantly differed and improved recorded after administration of a virtual reality exercises among stroke patients at post intervention stage as compared to baseline stage. The stroke patients in group B group also experienced improvement in static imbalance at post stage but less as compared to stroke patients of group A.

After administration of virtual reality exercises among stroke patients of group A group, the average of score (Mean ± SD) at post- intervention (49.07±3.20 points) was increased and improved as compared to score at baseline (26.93±3.85 points). Statistically, the differences in mean score of stroke patients of group A between baseline and post intervention (22.13 points) were large and thus strongly significant ($p<0.001$).

Less improvement noted among stroke patients of group B than group A at post intervention stage. In group B group, the differences in mean score (14.34 points) after administration of conventional exercise between baseline (25.13±2.64 points) and post intervention (39.47±3.91 points) was highly significant ($p<0.001$) that was confirmed statistically. The differences at post- intervention in mean score among stroke patients of group B found to be less (14.34 points) was measured on Berg balance scale as compared to patients of group A (22.13 points).

Moreover, it was inference statistically that stroke patients intervened with virtual reality exercises had more significantly improved static imbalance than stroke patients of group B treated with conventional exercise.

Furthermore, this study reported that virtual reality exercises on static and dynamic imbalance considered as a tool to combat the weak static imbalance statuses among stroke survivors.

TABLE-2

Comparison Between Group A And Group B In Berg Balance Scale Scoring At Baseline And Post Intervention Sampling Stages

Sampling Stage	Group	Score on BBS	Mean Diff	t- statistic	LOS
		Mean ± SD			
Baseline	Group A	26.93±3.85	1.80 points	1.50	p>0.05
	Group B	25.13±2.64			
Post-intervention	Group A	49.07±3.20	9.60 points	7.37	p<0.001 #
	Group B	39.47±3.91			

The mean difference is not significant (insignificant) at the 0.05 level of significance. #The mean difference is highly significant at the 0.001 level of significance. Post-treatment observations recorded after 4 weeks protocol. [Mean Diff-Mean Difference; LOS-Level of Significance]

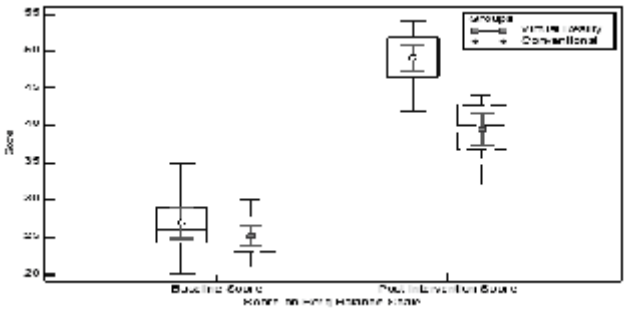

Figure -Box and Whisker diagram depicting the comparison of score on Berg Balance Scale at baseline and post intervention between group A and group B.

TABLE-3

Comparison In Time Of Tug Test Between Group A And Group B At Baseline And Post Intervention Sampling Stages

Sampling stage	Group	Time (second) on TUG Test	Mean Diff	t- statistic	LOS
		Mean ± SD			
Baseline	Group A	18.33±1.88	0.80 second	0.96	p>0.05
	Group B	19.13±2.62			
Post (At 4th week)	Group A	9.47±0.83	0.53 second	1.74	p>0.05
	Group B	10.00±0.85			

*The mean difference is not significant (insignificant) at the 0.05 level of significance. Post-treatment observations recorded after 4 weeks protocol. [Mean Diff-Mean Difference; LOS-Level of Significance]

TABLE -7

reports that the difficulty and functional status after administration of virtual reality exercises of stroke patients of group A was not significantly differed at post intervention sampling stage as compared to stroke patients of group B who received conventional exercises. This showed that both the methods had same potential to cope with dynamic imbalances among stroke survivors.

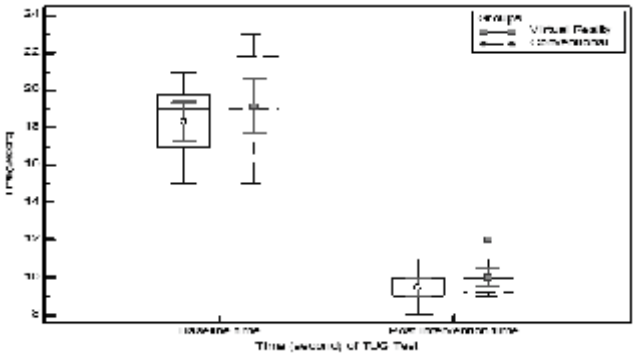

Figure - Box and Whisker diagram depicting the comparison of time (second) of TUG test between group A and group B at baseline and post intervention.

CONCLUSION

Hence, this was concreted statistically that patients with stroke intervened with virtual reality exercises had significantly improved static imbalances with better timings to overcome difficulties. Overall, present research highlighted that the virtual reality exercises is an effective conservative treatment for stroke survivors to improve static imbalances.

Ultimately, the present research showed that the physiotherapeutic regime such as virtual reality exercises on static imbalances are more effective intervention protocol in improving the balance and better functional status in patients with stroke. Finally, the above all statements and inferences from all the tables indicated the rejection of null hypothesis. Therefore, the alternative hypothesis is accepted which stated as "There will be more significant effect of virtual reality as compare to conventional therapy in static imbalance in stroke patients".

DISCUSSION

The aim of study to investigate the effect of virtual reality and conventional therapy in balance imbalance in stroke patients. Thirty subjects suffering from stroke were available for the study. The patients with stroke in group A received virtual reality with sitting, standing and maintenance of trunk stability in standing position while rest other stroke patients of group B received conventional therapy. The scores on Berg balance scale (BBS) and time on timed get up and go (TUG) test had collected prior to administration of exercises and after administration of exercises in groups, the scores had recollected at 4th week.

The result indicates that the stroke patients intervened with virtual reality exercises had significantly improved static imbalance than stroke patients intervened with conventional exercises.

Mancini et al 2002 says that conventional postural control training, which patients might find boring and aimless, leads to a low participation rate and decreased motivation.

Generally, balancing the body is by the coordination of three major systems, including visual, vestibular and proprioceptive sensation. The cortex area of brain, brainstem and cerebellum control the balance of body. The prefrontal cortex is one of the most important brain areas in controlling human balance (Nancy, 1980; Virk et al., 2006; Walker et al., 2010; Bolton et al., 2012).

They provided information about the position and motion of the head with respect to the surroundings, and based on information in the visual surroundings provided by visual cues. The main role of this proprioceptive and somatosensory system is to sense the distributed tactile input stimuli at the neural level, and to provide a relationship between limb position and the central nervous system. The vestibular system, located in the inner ear, is used to control and perceive the motion and position of the head in space (Virk et al., 2006). The function of these systems reduced after the brain is impaired. When one or two of these sensory input systems are dysfunctional the allocation of different gains to the sensory inputs can be exploited to compensate for the impaired systems (Nancy, 1980; Walker et al., 2010). Virk et al. (2006) proposed that such an adaptation can take place in everyday life or in a virtual environment virtual environment to train the eye-head movement, balance in older people can be improved and occupational falls are minimize. Balance control in standing is a complex sensorimotor action based on automatic and reflexive spinal programs under the influence of several distinct and separate supra-spinal centers in the brainstem, cerebellum and cortex (Drew et al., 2004).

Cortical areas were activated to these artificial environment tasks. The prefrontal cortex would be activated when participants performed spatial orientation tasks. Virtual reality training over 4 weeks could activate the region of the prefrontal cortex (Tachibana et al., 2011). Results suggest a corresponding relationship between the prefrontal cortex and spatial orientation ability.

Another study by Basso Moro also demonstrated that, when healthy participants performed an incremental swing balance task in a semi-immersive virtual reality environment, the effect of oxygenation increased in the prefrontal cortex of both hemispheres (Basso et al., 2014). The density of oxygenated hemoglobin increased, but that of deoxygenated hemoglobin was not found in the frontal cortices. Moreover other studies found a positive correlation between presence and parietal brain activation and a negative correlation between presence and frontal brain activation during interactive virtual reality training (Mihara et al., 2008).

The CPT protocol consisted of targeted lower extremity muscle strengthening and static, dynamic balance training, and gait training. A muscle-strengthening exercise for the gluteus medius and

quadriceps muscle (esp. rectus femoris) was activated for improvement of eccentric controlled mobility of pelvis. In addition, strengthening of the tibial anterior and Gluteius medius was facilitated for improvement ankle dorsiflexion and push off (propulsion) at swing phase, respectively. For static balance training, patients were induced to shift their weight onto the paretic limb by verbal and tactile cues. In addition, in dynamic balance training, patients were induced to shift their weight in the anterior posterior and medial lateral planes while performing a functional reaching task .It allowed them to shift their mobile weight during gait training.

Sisto et al 2002 says that A multi-disciplinary approach for postural control is required for patients to maximize restoring lost function The model of vasomotor training was demonstrated in eighteen healthy right-handed volunteers from the analysis of functional magnetic resonance imaging that showed extensive activity in frontal, parietal, temporal, cingulate and cerebellar areas (Prochnow et al., 2013).The head mounted devise will improve the head and trunk rotation and will improve the postural stability and balance .

The environmental based virtual reality system has demonstrated to provide benefits to stroke patients affected by motor impairments and in over study could be especially useful for balance rehabilitation under static conditions. This fact is well documented not only in the field of motor domain. Ultimately, the present research showed that the physiotherapeutic regime such as virtual reality exercises on static imbalances are more effective intervention protocol in improving the balance and better functional status in patients with stroke.

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EFFECT OF BMI ON MUSCULOSKELETAL PAIN AMONG TEACHERS OF ABUROAD

Dr.Arvind Kumar (PT)*, Darshana Patel **

ABSTRACT-

OBJECTIVE:

The objective of the study was to assess the effect of BMI on Musculoskeletal pain among teachers & its prevalence.

METHODS:

All Data were collected by a questionnaire. A questionnaire was distributed to all subjects, total 150 (75 males & 75 females), each subjects were passed to complete the self-administered questionnaire if they fulfil inclusion criteria.A standardized Nordic Musculoskeletal Questionnaire (NMQ general section) was used to collect data on Musculoskeletal symptoms (ache, pain, discomfort) from different regions of the body during last 12 months & the earlier seven days, as well as pain affecting work ability during the past 12 month.This was used as an assessment tool for Musculoskeletal pain in different body region. Also, reliability: 0.61 (Cronbach's, Alpha validity 0.71) Numerical Pain Rating Scale(NPRS) was used for the perception of pain intensity, which ranges 0-10 is applied,where 0 means no pain & 10 means 'the worst" unbearable pain.Numerical Pain rating Scale was widely used because it is easily administered & requires little to no training or equipment.

RESULTS:

A total 150 teachers (50% male & 50% female) selected in the study.The study showed significant relationship between the BMI & Musculoskeletal pain in mainly low back pain & knee joint, while other region like Neck, shoulder, Elbow, wrist, Upper back, hip & thigh & Ankle & feet did not show significant relationship with score.

Since the readings are in nominal scale, to find the relation,chi-square test is used. Any statistical test is said as significant if p-value is <0.05.The most reported musculoskeletal pain level showed prevalent of low back severe pain among teachers, followed by knee pain.

CONCLUSION:

This Study has shown that the most of the teachers were suffering from musculoskeletal pain & significant risk factors, & correlations were observed between BMI & Musculoskeletal pain symptoms in teachers.

Key Words: Work related musculoskeletal pain, Low back pain, WMSDs, BMI, Teachers.

INTRODUCTION

In many Countries the prevention of work-related musculoskeletal disorders has been considered as a national priority (1)

Several studies have been conducted on the prevalence of MSDs among teachers in many developed & developing countries of the world. These studies have identified teachers as one of the occupational groups that are at the risk of developing MSDs. (2)

Musculoskeletal disorder has a high impact for the individual as well as for society, the origin of MSDs

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is complex & Multi factorial. (3) Musculoskeletal disorders defined by the health & safety executive (HSE),The term musculoskeletal disorders (MSDs) includes any injury, damage or disorder of the joints or other tissues in the upper/lower limbs or the back.Uncomfortable working position, working too long without breaks and working in awkward posture. (4)

Musculoskeletal pain is defined as pain perceived related to musculoskeletal, when there is risk of tissue damage or when such damage has occurred, pain can signal that there is a need for recovery of tissues.(5)

Individual factors like age, sex, anthropocentric dimensions, muscle strength, physical fitness, mobility, psychological & social factors contribute to musculoskeletal disorders. (6)

Several studies have linked obesity with musculoskeletal disorders & repetitive work. (7) The epidemic of obesity has become pandemic defined as an epidemic occurring over a wide geographic area & affecting an exceptionally high proportion of populations. The risk in obesity rates was first noted in the United States, but has speed to other industrialized nation & it is even now being documented in developing countries, Indeed the global extent of obesity pandemic was formally recognized by the WHO in 1997, & worldwide obesity rates are increasing dramatically.(8)

Overweight & obesity are one of the world most challenging public health problems (WHO 2003). The prevalence of overweight has reached epidemic proportions in most western countries including Portugal. Overweight & obesity are high among employed adults & have shown a consistent increase over the past few decades. (7)

Obesity is defined as a physiological condition in which excess body fat has accumulated to an extent that can negatively affect health(8). Obesity occurs when energy intake exceed the energy expenditure. Humans expend energy through daily life, we can measure obesity by body mass index(BMI). (9)

Body mass index (BMI) is a ratio derived from the weight(Kg.) and height of a person(metres). The BMI is defined as the body mass divided by the square of the body height, and is expressed in units of kg/m2, resulting from mass in kilograms and height in metres, introduced as a Quetelet Index in 1830's several decades to estimate population trends in fat. (8)

A BMI value in the range of <18.5 kg/m2 is defined as underweight, 18.5 - 24.9 kg/m2 is defined as normal, 25 - 29.9 kg/m2 is overweight, 30-34.9 kg/m2 is obese class 1, 35 - 39.9 kg/m2 is obese class 2, & 40 > 49 kg/m2 is obese class 3/or morbidly obese..(8) High BMI is the independent risk factor for MSDs, for symptoms of neck shoulder upper & lower limbs, evidence was also found that high BMI is an independent risk factors for development of MSD's symptoms.(3)

Compared to normal weight patients, underweight patients & obese class two & three patients had higher odds of reporting moderate to severe pain. (11) According to public health prospective effective well documented initiatives for reducing weight improving physical capacity & reducing Musculoskeletal pain among health care workers are therefore needed.(7)

Some occupational factors have been associated with the development of work related musculoskeletal pain among many groups & these postures have great burden on their health & quality of life. Work-related musculoskeletal pain is the most common cause of chronic pain in general population, with estimated high lifetime prevalence of MSDs. (2)

Teachers have been identified as one of the occupational group that are at the risk of developing work related Musculoskeletal pain (WRMSP), this may due to the fact that teaching is one of most stressful jobs (2)& teaching profession is accompanied by occupational burden that arise from

the specific physiological demand of profession.(12)

College professors are exposed the numerous pressure sources which affect their quality of life & teaching activities. (13) Among these populations, college teachers who are having administrative activities, conciliating teaching research & extension are exposed to numerous pressure sources beyond those arising from changes in labour system, such as high work load, short pause for rest, intensive working place & requirements for beyond those arising from changes on labour & attraction. (13) When, such situations are associated to a high level of stress, quality of life of this category is considerable inspired including several health disorders such as Musculoskeletal problem which are prevalent among teachers.(13) Prolonged exposures to unfavourable working conditions during teaching become a health risk factors. Despite this the impact of muscular pain specifically has not been given sufficient attention in the literature. (14)

Not with standing studies discussing musculoskeletal disorder in this population are still scare in the literature. The incidence of work related Musculoskeletal disorders (WRMSDs) is increasing in recent years, due to organizational changes & work related requirement often leading to medical leaves & workers functional incapacity, so measuring WRMSDs reports is needed to collect data to quantify prevalence & to evaluate different affected populations.

Among tools to evaluate such symptoms, the Nordic Musculoskeletal questionnaire is a tool developed to standardize musculoskeletal pain & discomfort thus helping studies populations. There is much anecdotal evidence amongst education professionals about the aches & pains they experience at work & also from health care professionals (e.g. Physiotherapist, osteopaths, chiropractors) who treat them, (4) & it is worth stressing that these are few scientific studies related to Musculoskeletal risk factors among teachers & this deficit is even more severe with regard to college teachers since studies focus on teachers of other educational levels.

So, college teachers deserve attention on the potential health risk & problem related to their labour activity. (13)

AIM OF STUDY

To assess the effect of BMI on Musculoskeletal pain among teachers & its prevalence.

METHODOLOGY

Study design: Descriptive observational study

Study Setting: Abu Road

Population: Teachers of various school & colleges (Government & private) in Abu road.

Sample size: 170 subjects were being selected for this Study but 20 subjects were excluded from the study.

Sampling Techniques : Convenient sampling techniques.

Source of data collection: Teachers working in academic setup, Abu road (Rajasthan).

Method of data collection : Through the data available; contacts to the teachers working in academic field in Abu road & explain them about the study & procedure & those subject were willing to participate and meet inclusion & exclusion criteria. Then their written consent was being taken & collect their data.

Inclusion criteria:

- Teachers age group of 25 - 40 years.
- Both sex & gender are included.
- Minimum 2 years of job experience.
- Minimum 6 - 8 working hours /day, with minimum 3 lectures per day were accepted in this study.

Exclusion criteria:

- Teachers on leave.
- Part time teachers
- Chronic anomalies
- Any major surgery & other condition
- Any current fracture

Tools

1. Standardized Nordic Musculoskeletal questionnaire
2. Numerical pain rating scale

Material used for this study

1. Weight machine
2. Height measurement tape
3. Data collection form
4. Calculator

PROCEDURE

This Study was conducted at the Aburoad. Prior to the Study written consent was taken from all subjects & also explained about procedure & aim of the Study. Then subject was taken & collected the data, which covered

(1) Personal details (including Age, weight, height, job tenure, education, health, medical background)

(2) Musculoskeletal problem in different body regions

a) Measurement of BMI-

Height was measured in standing position without shoes, using a wall mounted height tape. Weight was measured when the subject was in light clothes, without shoes & empty pockets & then BMI was calculated as weight (kg)/height2 (m)

b). Musculoskeletal problem Assessment

All Data were collected by a questionnaire.

Questionnaire were distributed to all subjects total 150 (75male & 75 female), each subjects was passed to completed the self-administered questionnaire if they fulfil inclusion criteria.

Standardized Nordic questionnaire (NMQ general section) were used to collect data on Musculoskeletal symptoms (ache, pain, discomfort) from different regions of the body during last 12 month & the previous 7 days, as well as pain affecting work ability during the past 12 month. This was used as an assessment tool for musculoskeletal pain in different body region. Also reliability: 0.61(Cronbach's, Alpha validity 0.71) .

After that for the perception of pain intensity through the Numerical pain rating scale scored for 0-10 applied where 0 means no pain & 10 means worst unbearable pain & assessed it.

Numerical Pain rating Scale was widely use because it is easily administered & requires little to no training or equipment.

RESULTS:

Crosstab							
Count							
		LOWERBACK					Total
		4+	4++	0	1+	4+++	
BMI	Normal	20	18	32	1	3	74
	Obese	1	1	3	0	1	6
	Overweight	16	7	36	0	11	70
Total		37	26	71	1	15	150

Table 1:- Shows association between BMI and lower back, where $p \leqslant 0.05$.

Chi-Square Tests			
	Value	P-VALUE	RESULT
Pearson Chi-Square	11.390[a]	.052	P>0.05 NOT SIG

Table 2:- Therefore, we conclude that there is a significant association between BMI and lower back Pain.

Crosstab						
Count						
		KNEE				Total
		4+	4++	0	4+++	
BMI	Normal	19	3	49	3	74
	Obese	1	1	4	0	6
	Overweight	27	2	38	3	70
Total		47	6	91	6	150

Table 3:- The above table shows association between BMI and knee ($p \leqslant 0.05$)

Chi-Square Tests			
	VALUE	P-VALUE	RESULT
Pearson Chi-Square	6.110[a]	.071	P>0.05 NOT SIG

Table 4:-. Therefore from table 3 & 4, we conclude that there is a significant association between BMI and knee Pain.

DISCUSSION

This study analyzed correlation between prevalence of musculoskeletal pain & BMI. The high prevalence of Musculoskeletal disorders among school teachers was well documented (Erick & smith 2011, Durmus & llano 2012, Darkish & Al-unfair 2013, Abdulmonem et la 2014). (15) (16)

This study shows a high prevalence of musculoskeletal pain particularly low back pain & knee pain. According to this review the main risk supporting their causal relationship with low back & knee WMSDs were increase BMI. Similar finding were also reported on a systematic review conducted by the NRC/IOM. (17)

There, was however a paucity of literature MSDs amongst South African school teachers (kormas et al, 2011) this to determine the prevalence & association between BMI & Musculoskeletal symptoms. (4)

A recent study was founded that the causes of LBP to be associated with standing for a prolonged time, specific sitting habits a sudden change in posture & carrying heavy objects (Abolfotouch et al ,2015). This correlates with the current study in which highly significant relationships were founded between standing for a prolonged period of time & low back pain. (P = 0.05).

Standing for prolonged time was the second most common aggravating factors for low back pain & several epidemiological studies showed that the significant association among uncomfortable back support & LBP, & Mengestu & Zeke found the same result with low back pain. Prevalence of 57.5% & Abdulmonem A, Hunam A, Elaf A, Hammer T, Jehan A, also found the same result the prevalence of LBP 66.9% & more over study of Abdulmonem et al, also further confirmed these findings in teachers & concluded that Low back pain had the highest prevalence of all the Musculoskeletal regions in school teachers. (18)

Several study literatures showed that prolonged sitting may lead to acute low back pain (Anderson 1999) due to the compressive load on the spine & changed with in the passive structures. (Sheehan et all.2016). The predominance if Musculoskeletal pain & discomfort symptoms in lumbar spine of teachers was also found by carvalho & Alexander,who evaluated 2006, elementary school professors & have found a prevalence of 63.1% of Musculoskeletal symptoms in lumbar region. (19) (13)

After the low back pain, knee pain is the next most frequent site of musculoskeletal pain found in this study & same result found the previous similar study.

Several justifications presented in the literature for this high percentage among them, poor postures adopted during work, performing repetitive activities and lack of fitness (20) (13).Several study founded very high prevalence of Musculoskeletal pain among school teachers which is affecting their work by missing out working days & Eventually affecting the education system as a whole. (16)

The ministry of health points that preventing WRMSDs should be based on strategies improving worker's health in their workplaces, altering them about ergonomic & environmental risks including physiotherapeutic assistance to evaluate guide & if necessary treat possible disorders. (13)

CONCLUSION

This Study has shown that the most of teachers were suffering from musculoskeletal pain & significant risk factors, & correlations were observed between BMI & Musculoskeletal pain symptoms in teachers.

Based on the outcomes of this study the following conclusions are made:

There is a high prevalence BMI & low back pain & knee pain among teachers in Abu road.

This is needed to supply evidence for a global intervention for teachers, focus on preventing injuries linked to ergonomic strategies directed to movements, postures & the whole overload required during work, thus decreasing the prevalence of WRMSDs, improving teachers's quality of life & productivity.

Health is essential to efficiency of the highest attainable level in almost any line of work. It is peculiarity important for teachers, not only because of strenuous demand & energies but also because teacher's health is the corner stone of any effective school/college health program.

CONFLICT OF INTEREST:-None

SOURCE OF FUNDING:-Self

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THE EFFECTIVENESS OF ISOMETRIC EXRECISE AS COMPARED TO PNF IN MANAGEMENT OF NON SPECIFIC NECK PAIN

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BACKGROUND AND PURPOSE:

Mechanical neck pain is also known as nonspecific neck pain (1).It is also defined as generalized neck pain provoked by sustained neck posture, neck movement, pain on palpation of cervical musculature without pathologies. There is lack of literature comparing the isometric exercise with proprioceptive neuromuscular facilitation technique on chronic non-specific neck pain. Therefore, the purpose of present study is to compare that which of the two techniques i.e. isometric exercise and the proprioceptive neuromuscular facilitation technique is better to decrease pain, improve ROM and improve function in subjects with non-specific neck pain

OUTCOME MEASURES:

1. NDI: Neck disability index to test the functional improvement in neck pain.
2. VAS: Visual Analogue Scale to assess pain.

METHOD:

50 Participants were screened for inclusion and exclusion criteria. 30 were recruited for the study. Participants were divided into 2 groups. Group A: - PNF group and Group B: - Isometric exercises group. Samples were taken by simple random sampling method, consisting of 25 participants in each group. All the participants were assessed for outcome measures pre and post intervention. Both groups were treated for 4 weeks (4 days a week) and final analysis was done.

RESULTS:

Intragroup comparison of VAS and NDI showed significant improvement in both the groups. But in intergroup comparison VAS with p=0.000 and NDI with p=0.026, Group A showed significant improvement in improving function and reduction of pain in non specific neck pain.

CONCLUSION:

The final conclusion of the study is that, both the groups i.e., PNF and isometric group showed significant improvement in function and pain reduction but, when PNF exercise group was compared to isometric exercise group, the patients with non-specific neck pain showed more significant functional improvement and pain reduction in group A rather than group B. The study concludes that, PNF is more effective than isometric exercise in reducing pain and improving function.

Keywords: Proptioceptive neuromuscular facilitation, physical therapy, non specific neck pain, neck disability index, visual analogue scale, trans electrical nerve stiulation

INTRODUCTION:

Mechanical neck pain is also known as nonspecific neck pain (1).It is also defined as generalized neck pain provoked by sustained neck posture, neck movement, pain on palpation of cervical musculature without pathologies.

The annual prevalence of mechanical neck pain ranges in industrial countries from 27% to 48%.

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Prevalence is high in middle aged people.In the majority of cases, the pathologic basis for the neck pain is unclear and the complaints are labeled as "nonspecific or mechanical". Precise prognosis by clinical examination is problematic because signs and symptoms are frequently nonspecific.

Mechanical neck pain commonly seen in people involved in occupation like computer processing, clerical job, students and people with sedentary life style awkward occupational posture, heavy lifting and physically demanding work. In a wrong working position, neck extensor muscles would be excessively stretched during a long period of working with forward position of head and neck. The majority of cases of neck pain originate in mechanical factors: repetitive movements, lack of work breaks, static jobs and holding the head and arm position for long period of time.

The structures being deformed in mechanical neck pain may be the skin, subcutaneous tissue, capsule of synovial apophyseal joints, longitudinal ligaments, ligamentumflavum, interspinous ligament, and annulus fibrosus of intervertebral disc.

The symptoms of mechanical neck pain include neck pain with limited range of motion of the neck and a feeling of stiffness. Pain is aggravated by neck movements or sustained neck posturesand tenderness in neck and shoulder region.

Specific treatment for mechanical neck pain includes moist heat pack, cervical mobilization, cervical manipulation, strength training and postural re-education.Manual therapy is commonly used in the treatment of mechanical neck pain. Manual techniques include positional release technique, muscle energy technique, myofascial release technique, cyriax technique, NAGS and SNAGS, manual pressure release, proprioceptive neuromuscular facilitation and ischemiccompression.

PROPRIOCEPTIVE NEUROMUSCLULAR FACILITATION:

Proprioceptive Neuromuscular Facilitation (PNF) involves stretching, resisted movement, traction and approximation to ameliorate muscle decline, disharmony, atrophy and joint movement limitation.

It is very effective in improving flexibility, strength and range of motion.Recently, it has been used in orthopedic diseases of bones and PNF Technique is based on movement pattern to facilitate and correct sensory motor function it has been suggested that PNF correct the impaired impulses emerging from proprioceptive receptors in the muscle. Therefore, it decreases pain and desires to improve thestrength of muscles.

TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION:

Transcutaneous electric nerve stimulation (TENS) isa common therapeutic device used in different painfulsituations in the everyday clinical practice. It is noninvasive, inexpensive and reveals hardly any major side effects.

TENS can be easily self-administered bythe patients following a short training, and the intensityof electrical stimulation can be adjusted by the patientsthemselves according to need.Previous meta-analysisand reviews have reported about the effect of TENS in various painful conditions butbecause of thelimited or contradictory data, the effect of TENS wasoften evaluated as inconclusive.

ISOMETRIC EXERCISE:

Isometric exercise is a static form of exercise in which a muscle contracts and produces force without an appreciable change in the length of the muscle and without visible joint motion. Although there is no mechanical work done, a measurable amount of tension and force output are produced by the muscle.

Sources of resistance for isometric exercise include holding against a force applied manually, holding a weight in a particular position, maintaining a position against the resistance of body weight, or pushing or pulling an immoveable object.

USES OF ISOMETRIC EXERCISE:

- To minimize muscle atrophy when joint movement is not possible owing to external immobilization like casts, splints, skeletal traction.
- To activate muscles to begin to re-establish neuromuscular control but protect healing tissues when joint movement is not advisable after soft tissue injury or surgery.
- To develop postural or joint stability.
- To improve muscle strength when use of dynamic resistance exercise could compromise joint integrity or cause joint pain.

To develop static muscle strength at particular points in the ROM consistent with specific task-related needs.

NEED OF STUDY:

There is lack of literature comparing the isometric exercise with proprioceptive neuromuscular facilitation technique on chronic non-specific neck pain. Therefore, the purpose of present study is to compare that which of the two techniques i.e. isometric exercise and the proprioceptive neuromuscular facilitation technique is better to decrease pain, improve ROM and improve function in subjects with non-specific neck pain.

OBJECTIVE:

To compare the effectiveness proprioceptive neuromuscular facilitation technique versus isometric exercises on chronic non-specific neck pain and functional impairment.

MATERIALS AND METHOD:

SOURCE OF DATA: Physiotherapy OPD under PSAH

STUDY DESIGN: Experimental Design [Comparative study]

RESEARCH DESIGN: Convenient sampling method.

SAMPLE SIZE: The study was done on Thirty (n=30) subjects andthey were divided into two groups.

INCLUSION CRITERIA:

- Age between 30 to 50 years.
- Male and female both
- Patients with non specific neck pain with/without radiculopathy.
- Patients who can understand English or Gujarati or Hindi language.
- Decreased functional performance
- Tenderness around the neck region.

EXCLUSION CRITERIA:

- Patients with neck or upper back injury in last 6 months.
- Patients suffering from giddiness or vertigo
- Patients with neck surgeries.
- Patients suffering from neurological disorders.
- Mentally and physically disabled patients.
- Patients with radiological diagnosis of spondylolisthesis.

OUTCOME MEASURES:

- 1.Neck Disability Index for functional impairment.
- 2.Visual Analog Scale for pain.
- **PROCEDURE:**

The subjects for the study were selected from ParulSevashram Hospital Physiotherapy OPD's for the subjects with neck pain. 50 subjects were screened for neck pain. Out of these 50 subjects, 40 were falling into the inclusion criteria, remaining were excluded because some were under the inclusion age, some had injuries to the cervical spine, some had undergone surgeries following cervical fractures, some had vertigo and some had spondylolisthesis.

The ones falling into the inclusion were assessed for neck pain according to the assessment format.All the participants at the outset falling into the inclusion criteria were explained in detail about the study and their role and importance in the study. Out of 40, 10

patients refused to participate in the study as they were reluctant to undertake exercise routine and/ or home program. The 30 patients willing to participate were asked to give a written informed consent.

Once the consent was signed by the subjects, they were then alternately distributed into 2 groups. Group 1(experimental group/PNF) and group 2 (control group/exercise).

GROUP A:-

PNF techniquesmethods:

The following movement patterns were performed.

A.Head and neck flexion with rotation to right.

B.Head and neck extension with rotation to left.

C.Head and neck extension with rotation to right.

D.Head and neck extension with rotation to left.

GROUP B:-

Isometric exercises:

A. Isometric flexion.
B. Isometric extension.
C. Isometric rotation.
D. Isometric side-flexion.

Stretching exercises:

A. Neck extensor stretching.
B. Neck flexor stretching.
C. Neck side flexor stretching.
D. Neck rotators stretching.
E. Pectoralis stretching.
F. Trapezius self-stretching.

Shoulder girdle exercises:

A. Shoulder circumduction.

B. Isometric shoulder girdle exercises.

RESULT AND INTERPRETATION:

As already mentioned out of 50 patients only 40 were falling into inclusion criteria out of which only 30 patients were included for the study as the rest were not willing to participate in the study.

Therefore the result presented here are of 30 patients of whom 17 were females and only 13 were males. All of these patients were suffering from neck pain. Their main complain was pain on strenuous activities, pain during neck movements and also complained of difficulties in ADL's due to pain and restricted ROM.

For statistical analysis data was collected before and after 4 weeks of intervention. VAS and NDI both were assessed pre and post intervention.

- t test- was used for the comparison between the pre and post values of outcome measures within the groups.
- t test- was used for the comparison between the post- post values of outcome measures between the groups.

The significance level adopted for the statistical tests was <0.05 and CI was kept at 95%

All statistical tests were performed using SPSS Version 16 software.

INTRA GROUP ANALYSIS

REPRESENTS INTRA GROUP COMPARISION FOR VAS AND NDI FOR GROUP A [paired T-test]:

GROUP	OUTCOME	PRE		POST		T-VALUE	P-VALUE
		MEAN	SD	MEAN	SD		
GROUP A (PNF)	VAS	6	1.06	3.8	0.74	12.91	0.000
	NDI	26	4.47	18	3.29	14.96	0.000

VAS: Intra Group Analysis (Group A): the above table shows the intra-group comparison of VAS score for functional assessment in Group A. The comparison was done through paired t test. The p value of Group A comparing pre and post treatment score of VAS is 0.000. The p value is < 0.05 which shows that group A is significant in improving VAS score.

NDI: Intra Group Analysis (Group A): the above table shows the intra-group comparison of NDI score for functional assessment in Group A. The comparison was done through paired t test. The p value of Group A comparing pre and post treatment score of NDI is 0.000. The p value is < 0.05 which shows that group A is significant in improving NDI score.

REPRESENTS INTRA GROUP COMPARISION FOR VAS AND NDI FOR GROUP B [paired T-test]:-

GROUP	OUTCOME	PRE		POST		T-VALUE	P-VALUE
		MEAN	SD	MEAN	SD		
GROUP B (ISOMETRIC)	VAS	7	1.17	5.4	1.24	11.22	0.000
	NDI	26	2.88	20.9	3.51	14.664	0.000

VAS: Intra Group Analysis (Group B): the above table shows the intra-group comparison of VAS score for functional assessment in Group B. The comparison was done through paired t test. The p value of Group B comparing pre and post treatment scores of VAS is 0.000. The p value is < 0.05 which shows that group A is significant in improving VAS score.

NDI: Intra Group Analysis (Group B):the above table shows the intra-group comparison of NDI score for functional assessment in Group B. The comparison was done through paired t test. The p value of Group B comparing pre and post treatment score of NDI is 0.000. The p value is < 0.05 which shows that group B is significant in improving NDI score.

INTER GROUP ANALYSIS

REPRESENTS INTER GROUP COMPARISION FOR VAS AND NDI (INDEPENDENT T- TEST):

	GROUP	MEAN	SD	T-VALUE	P-VALUE
VAS	A	3.86	0.74	4.271	0.000
	B	6	1.24		
NDI	A	18	2.78	2.358	0.026
	B	20.9	3.51		

Inter-group Analysis: The above table shows the inter-group comparison of post treatment NDI scores for functional assessment of Group A and B. The analysis was carried out by unpaired t-test. At baseline, the p value is > 0.05. It shows that there is no significant difference between the pre-treatment scores of both groups. Hence it shows the groups are homogenous. The p value comparing the post treatment score for Group A and B is 0.026 which is suggestive of significant improvement between groups.

DISCUSSION:

This study is done to investigate that whether PNF exercises for neck muscles when combined with TENS and neck mobility exercises helps in improving pain and quality of life in patients with non-specific neck pain. Isometric exercises have recently received increased interest as an effective inexpensive and non-invasive treatment in non-specific neck pain due to its ability to reduce pain and improve muscle strength.

Women of working agehad more neck pain than older ones, a phenomenon notseen among men. Chronic neck pain, defined as continuouspain of more than 6 months' duration, was commoner in women (22%) than men (16%).In a study from Sweden,17% of the population reported chronic neckpainwhile Brattberg reported a prevalence of neck painexceeding 6 months' duration in 19%. Hasvoldin a Norwegian study found that 15%of males and 25% of females complained of neckache weekly. Despite these differences in studydesign, epidemiological studies during a 10-yearperiod show similar prevalence.

In my study pain was assessed using VAS scale and functional disability was assessed using Neck Disability Index (NDI) scale.

The PNF group and the isometric exercise group showed significant reductions of VAS over time (p=0.000). After 4 weeks of the intervention, thePNF group showed a more significantreduction of VAS than the isometric exercise group (p=0.00). The PNF group and the isometric exercise group also showed significant improvement in the NDI scores post intervention (p=0.000). But when both the groups were compared to each other post intervention PNF group showed more significant improvement in VAS and NDI scores than isometric group showed in VAS and NDI score (VAS p=0.000, NDI p=0.026).

Previous study found that PNF techniques when

used is effective in decreasing pain, increasing ROM and improving function in subjects with chronic neck pain and scapular instability. Since majority of middle aged people suffers from neck pain, further study should investigate the best intensity and the rate of progression of strengthening exercises for neck pain. Also which specific exercises should be avoided or modified to provide relief from neck pain.

CONCLUSION:

The final conclusion of the study is that, both the groups i.e., PNF and isometric group showed significant improvement in function and pain reduction but, when PNF exercise group was compared to isometric exercise group, the patients with non-specific neck pain showed more significant functional improvement and pain reduction in group A rather than group B. The study concludes that, PNF is more effective than isometric exercise in reducing pain and improving function.

LIMITATIONS AND FURTHER RECOMMENDATIONS:

Limitation of the study was that the number of subjects recruited for the study were very few (30), 15 subjects in each group. The duration of study was also very short to conclude that the PNF is more effective in reduction of pain and functional improvement than isometric exercise in patients with non-specific neck pain. Effectiveness of treatment and data collection methods may have affected the result of the study.

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A STUDY TO FIND OUT THE EFFECT OF JOB STRAIN AMONG BLUE COLLARS AND WHITE COLLARS EMPLOYEES ON RISK OF CARDIOVASCULAR SYSTEM

Dr. Divya Tiwari

ABSTRACT

Background

The study have been conducted with the aim to find out the Job Stress between Blue Collar and White Collars and its risk on Cardiovascular System.Cardiovascular diseases due to job strain is biggest cause of death worldwide, though over last two decades.The objective of this study is to determine the co-relation between risk of cardiovascular diseases due to job stress between blue collars and white collars.

Conclusion

The result had been interpreted and support the previous studies done in association with this study and it had been concluded as follows, the results of this study shows the significant association between risk of heart attack due to job stress.

Key words

Blue Collars, White Collars, Job Strain.

Background

The cardiovascular system includes the heart and two networks of blood vessels: pulmonary circulation, which moves deoxygenated blood from the heart to the lungs, and returns oxygenated blood back to the heart; and systemic circulation, which carries oxygenated blood from the heart to the body's tissues and returns oxygen-depleted blood back to the heart. Blood is that sticky, red fluid which circulates throughout the body in a complex network of veins and arteries, transporting nutrients and oxygen to the body's tissues and removing waste products for disposal. The heart's contractions work to move oxygen into the blood; it also gathers carbon dioxide from the blood so it can be expelled through the lungs. While the lungs play an important role in this process, each of the body's cells is involved. The cardiovascular system includes organs which take up space throughout the body, including the heart and all of the body's veins, arteries and capillaries. The cardiovascular system is basic to life and the beat of one's heart is an automatic function which is controlled by the brain.

Cardiovascular diseases remain the biggest cause of deaths worldwide, though over the last two decades, cardiovascular mortality rates have declined in many high-income countries

Cardiovascular system diseases are the conditions that affect the heart and the blood vessels, which are the main components of the system. These diseases are often linked with a wrong or unhealthy lifestyle.

The human cardiovascular system is composed of a heart, blood, and a network of blood vessels, and is concerned with the circulation of nutrients, gases and hormones throughout the body. Any disease that affects the heart and the blood vessels is termed as a cardiovascular disease, which has become a common health concern mainly in the developed countries. These rising incidence of these cardiovascular diseases are basically attributed to wrong eating habits and a sedentary lifestyle.

A blue-collar worker is a member of the working class who performs manual labor. Blue-collar work

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may involve skilled or unskilled, manufacturing, mining,construction, mechanical, maintenance, technical installation and many other types of physical work. Often something is physically being built or maintained.

In contrast, the white-collar worker typically performs work in an office environment and may involve sitting at a computer or desk. The term white-collar worker refers to a person who performs professional, managerial, or administrative work.

It is often said that the stress is a bigger killer than any of the disease known and rightly so. Stress is an important risk factor in the development of diseases like hypertension, heart diseases, psychological disorders and sexual disorders.

We generally use the word "stress" when we feel that everything seems to have become too much - we are overloaded and wonder whether we really can cope with the pressures placed upon us. Anything that poses a challenge or a threat to our well-being is a stress.

Stress is the body's reaction to any change that requires an adjustment or response. The body reacts to these changes with physical, mental, and emotional responses.

Stress is a normal part of life. Many events that happen to you and around you -- and many things that you do yourself -- put stress on your body. You can experience stress from your environment, your body, and your thoughts.

Job Stress

Small things can make you feel stressed, such as a copy machine that never seems to work when you need it or phones that won't quit ringing. Major stress comes from having too much or not enough work or doing work that doesn't satisfy you. Conflicts with your boss, co-workers, or customers are other major causes of stress.

It's normal to have some stress. Stress releases hormones that speed up your heart, make you breathe faster, and give you a burst of energy. Stress can be useful when you need to focus on or finish a big project. But too much stress or being under stress for too long isn't good for you. Constant stress can make you more likely to get sick more often. It can also lead to long-term health problems such as heart disease, high blood pressure, back problems, and depression.

Causes of Job Stress

Most of the time, it's the major sources of stress that lead to job burnout and health problems. Job stress can affect your home life too. Here are some common sources of major job stress, with examples of each:

Lack of control- Feeling as if you have no control over your work or job duties is the biggest cause of job stress. People who feel like they have no control at work are most likely to get stress-related illnesses.

Increased responsibility- Taking on extra duties in your job is stressful. You can get more stressed if you have too much work to do and you can't say no to new tasks.

Job satisfaction and performance- Do you take pride in your job? If your job isn't meaningful, you may find it stressful. Are you worried about doing well at work? Feeling insecure about job performance is a major source of stress for many people.

Poor communication- Tension on the job often comes from poor communication. Being unable to talk about your needs, concerns, and frustrations can create stress.

A new job with more responsibility and better pay just opened up in Jill's department. Jill knows she can do this job. And she's been with the company longer than anyone else on her team. She waits for her manager to ask if she is interested. But after several weeks, a coworker is promoted to the new job. Jill feels hurt and angry, but she doesn't say anything.

Lack of support- Lack of support from your boss or coworkers makes it harder to solve other problems at work that are causing stress for you.

Jeff works in a busy office answering customer complaint calls all day. It would be easier to handle all the calls if he could at least trade tips with his coworkers. But everyone else is busy too. His coworkers never make it out of their cubicles during the day, even to let off a little steam.

Poor working conditions- Unpleasant or dangerous physical conditions, such as crowding, noise, or ergonomic problems, can cause stress.

Objective

To find out the effect of Job Strain among Blue collars and White collars employees on risk of cardiovascular system.

Procedure

A comparative study had been conducted to examine the Job Strain among White Collars and Blue Collars Employees. 200 subjects are selected out of which 100 are White Collars - Doctors and nurses and office workers and 100 are Blue Collars –Labourers and Truck and bus Drivers and Fourth class labourers.Permission was obtained from the concerned person. Prior information about the study was given to the subjects. The purpose of study was explained to all subjects an informed consent was taken in their own understandable language from each truck drivers. The subjects were selected based on inclusion and exclusion criteria. A suitable time was set up with the participants. Each one of them was allowed to answer the set of questions separately.

Any doubts regarding the questionnaire had beendecleared at the same time. All questions were explained to each one of the participants in simple words and adequate time was given to them to answer each of the questions. It is completed by the participants in the presence of invigilator. The answered question are collected at the end of the session from each participant.

Data analysis

A group of 200 subjects who had satisfied the inclusion and exclusion criteria were selected.

This is a descriptive research study in which a survey was conducted among blue collar and white collar employees.

Appropriate statistical test is applied to the data for analysis.

Statistical Method

We are using here T–test to find the relationship between BMI, Stress Test, Risk of Heart Attack of both white and blue collar employees.

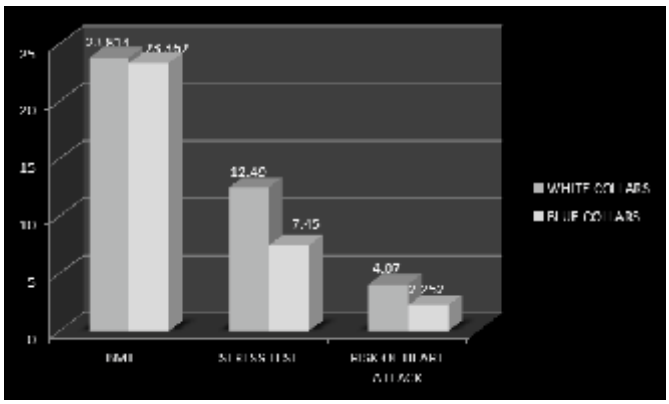
T test:

	BMI	Stressed test	Risk of HA
Mean white collar	23.814	12.49	4.07
SD White collar	2.586445633	3.927358071	1.037236032
Mean Blue collar	23.362	7.45	2.252525253
SD Blue collar	3.416944704	1.725477536	1.100495569

	BMI	Stressed test	Risk of HA
T	1.0596	11.756	12.039
df	198	198	198
Standard error of differences	0.428	0.429	0.151
P	0.2906	Less than0.0001	Less than0.0001

MEAN VALUE OF BMI, STRESS TEST, RISK OF HEART ATTACK

CATAGORY	BMI	STRESS TEST	RISK OF HEART ATTACK
WHITE COLLARS	23.814	12.49	4.07
BLUE COLLARS	23.362	7.45	2.252



This graph is showing Mean value of BMI, STRESS TEST, RISK of HEART ATTACK.

RESULT DISCUSSION

The result from the study furtherstrengthen the evidence that job strain has high risk of cardiovascular diseases.

The prevalence of job strain in this study was found more commonly among White Collars Employees.

Data from the similar studies based on Finnish Longitudinal Study on Municipal Employees showed high rate of Cardiovascular Diseases which caused death. (Mikaela B Von Bonsdorff 2012)

The wide variation in results may be due to many factors, including age, gender, high serum cholesterol level, high blood pressure and other factors like high job demand and high job control.

It is a known fact that excessive Job Stress can lead to Heart Diseases, Depression, Job Dissatisfaction. Stress is the body's reaction to any change that requires an adjustment or response. The body reacts to these changes with physical, mental, and emotional responses.

CONCLUSION

The main objective of this studyhas reached with the help of the methods, which had been used to conduct the study , statistical analysis and its interpretations. The result of this study gave the valuable suggestions in relation with job strain and risk of heart attack among the blue collar employees and white collar employees. In conclusion statistically significant associations were prevalence in job strain found more in white collar employees then blue collar employees.

The physiotherapists has therefore an important role in educating and preventing job stress in the employees. Scientific organisation of the work and stress regime is important. Perform other activities like exercises including breathing exercises, schedule time for fun, take good nutrition, stay positive, dorelaxation techniques - mediation, massage, or yogaetc should be encouraged.

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EFFECTIVENESS OF WILLIAM'S FLEXION EXERCISE VERSUS MULLIGAN'S TWO LEG ROTATION AND BENT LEG RAISE TECHNIQUE ON PAIN & DISABILITY IN INDIVIDUALS WITH MECHANICAL LOW BACK PAIN : A RANDOMIZED CONTROL TRIAL

Dr. Khyati Chavda*, Riya Parmar , Priyanka Halpati*****

ABSTRACT

INTRODUCTION:

Mechanical low back is the general term used to any type of back pain caused by strain on muscle of the vertebral column and abnormal stress. Williams explained to adhere to postural principles. The Mulligan bent leg raise technique has been described as a means of improving range of straight leg raise (SLR) in subjects with LBP and or referred thigh pain. The aim of this study is to compare the effectiveness of William's flexion exercise and Mulligan's two leg rotation and bent leg raise technique on patients with mechanical low back pain. This study has two outcome measures for evaluating pain and functional recovery in mechanical low back pain, Numeric Pain Rating Scale (NPRS) and Modified Oswestry Disability Index (MODI).

METHOD:

30 patients with mechanical low back pain, whose informed consents were obtained, were randomly assigned into 2 groups. Group A received William's flexion exercise and other Group B received Mulligan's technique 4 times in a week for 4 weeks. They were pre-tested using NPRS for pain intensity and MODI for functional disability.

RESULTS:

The results showed that there is statistically high significant difference($p<0.05$) showing improvement in means of NPRS and MODI for William's flexion exercise and Mulligan's technique before and after intervention in both the groups but group A showed more significant improvement in compared to group B.

CONCLUSION:

It has been concluded that William's flexion exercise and Mulligan's two leg rotation and bent leg raise technique both significantly improved the pain and disability in patients with mechanical low back pain but the group receiving William's flexion exercise improved more compared to Mulligan's technique.

KEY WORDS:

William's flexion exercise, Mulligan's two leg rotation, Mulligan's bent leg raise, mechanical low back pain.

INTRODUCTION

Low back pain (LBP) is a frequent complaint among adults with 70-85% having experienced at least one episode of LBP at some point in their lives.[1] In India, nearly 60% of people have significant back pain.[2] Low back pain is pain, muscle tension, or stiffness localized below the costal margin and above the inferior gluteal folds, with or without sciatica, and is defined as chronic when it persists for 12 weeks or more. Specific LBP is defined as symptoms caused by a specific pathophysiologic mechanism, such as herniated nuclei pulposus, infection, osteoporosis, rheumatoid arthritis,

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fracture, or tumour).[3] The remaining patients, who comprise the majority of patients, are commonly referred to as having “non-specific LBP” (NSLBP) or “axial LBP” (ALBP) or “Mechanical LBP.” [4] Mechanical low back is the general term used to any type of back pain caused by strain on muscle of the vertebral column and abnormal stress.[5] Because of related health costs, absenteeism and disability, low back pain is a substantial economic burden to society.[6,7]

Physical therapist use many exercise for back pain among these specific exercise, one is "Williams flexion exercise" also called lumbar flexion exercise. Williams flexion exercise program was developed in 1937 for patient with mechanical low back pain for men under 50 and female under 40 years who had exaggerated lumbosacral lordosis.[8] The solution, Williams explained, was to have the patient perform exercises and adhere to postural principles which serve to decrease the lumbar lordosis to a minimum, thereby reducing the pressure on the posterior elements of the lumbar spine.[9] Williams said: "The exercises outlined will accomplish a proper balance between the flexor and the extensor groups of postural muscles".[10] Williams suggested that a posterior pelvic-tilt position was necessary to obtain best results.[11]

Hamstrings muscle is a postural muscle and as it is biarticular, it has tendency to shorten even under normal circumstances.[12] This can give rise to number of postural problems and leave us open to muscle injury.[13] Prevalence and incidences of Hamstrings tightness in mechanical LBP individuals is high due to limited activity and lack of regular exercise.[14] Tight hamstring muscles limit anterior pelvic tilt of the pelvis in spinal flexion resulting in aggravated muscle and ligamentous tension in the lumbar region which leads to significantly higher compressive loads on the lumbar spine.[15] Anatomical causes of reduced muscle extensibility have been categorized as “muscle shortness” and “muscle stiffness”. Physiological cause of reduced muscle extensibility is related to the contractility of the muscle cell.[16] Mulligan BLR technique consist of gentle isometric stretching of hamstring in specific directions in progressively greater positions of the hip flexion, the expecting result are increased flexibility of hamstring muscle with increased ROM of active knee extension. Mulligan bent leg raise (BLR) technique has been described as a mean of improving range of straight leg raise (SLR) in subject with LBP and or referred thigh pain.[17]

There is lack of evidence revealing comparative effectiveness of William's Flexion Exercises in combination with Mulligan's two leg rotation and bent leg raise technique in patient with Mechanical LBP. Hence this study designed to find out the effect of William's Flexion Exercise as compared to Mulligan's two leg rotation and bent leg raise technique.

MATERIALAND METHODS

Thirty subjects fifteen in each group were taken from Parul Sevashram Hospital OPD and screened after finding their suitability as per inclusion and exclusion criteria. Subjects were randomly allocated in two groups with computer generated method. Group A was William's flexion exercise Group and Group B was Mulligan's technique Group. Treatment duration was 4 sessions per week for 4 weeks.

Individuals aged between 18 - 45 years and with complain of mechanical low back pain more than 3 months were included in the study. Individuals presenting symptoms of Sciatica, spinal tumors, low back pain due to road traffic accident, pregnancy, spinal stenosis, recent spinal fracture, lumbar spondylosis, abdominal surgery, back surgery, medication, muscle strain, spondylolisthesis were excluded from the study. All the study procedure was explained to the subjects prior to participation, and written in form concerned was obtained from all subjects. Initial evaluation of the patients having mechanical low back pain was done as per assessment format.

Pre - intervention outcome measures which were numerical pain rating scale and Modified Oswestry Disability Scale were assessed.

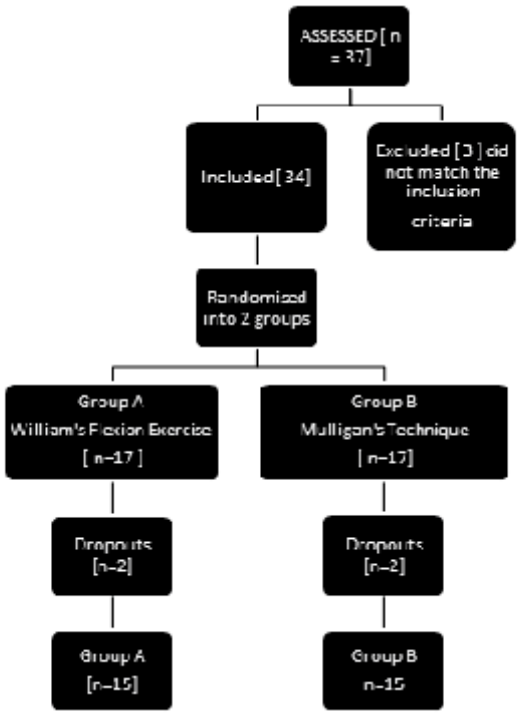


FIGURE 1: FLOWCHART OF SAMPLE RANDOMIZATION

Numeric pain rating scale (NPRS) is an 11-point scale ranging from 0-10. A 0 signifies "no pain" and a 10 indicates "the most intense pain imaginable". The scale continuum is as follows: 0 indicates "no pain", 5, "moderate pain" and 10, "the most intense pain imaginable". Participants verbally selected a value ranging from 0-10 that is most in line with the intensity of pain they currently experienced.[19]

The Modified Oswestry Disability Index (MODI)[18] is a self-administered questionnaire designed to evaluate level of function (disability) in activities of daily living for individuals rehabilitating for low back pain. The MODI consists of 10 sections with a scale ranging from 0 to 5, whereby the 5 represents the greatest disability. The total sum of the score is then multiplied with hundred and expressed as percentage. The MODI showed good construct validity at measuring disability cause by low back pain because it is consistent with other standard outcome measures which includes Low back outcome score, the Manniche Scale, the Aberdeen score, and The Curtin Scale. In addition, the test-retest reliability for the MODI is high with ranges r=0.83 to r=0.99 which vary based on the time interval between each measurements.The participants MODI scores were converted into percentage using the formula below:

Participants score / (50) x 100 = % The participants. (0 % to 20% - minimal disability, 21% to 40 % - moderate disability, 41% to 50% - severe disability, 61% to 80% - Crippled, 81% to 100% - bed-bound)

Table 1 - Treatment protocol performed by subjects in the Group A

PELVIC TILT	Lie on your back with knees bent, feet flat on floor. Flatten the small of your back against the floor, without pushing down with the legs. Hold for 5 to 10 seconds. 8-12 repetitions.
SINGLE KNEE TO CHEST	Lie on your back with knees bent and feet flat on the floor. Slowly pull your right knee toward your shoulder and hold 5 to 1seconds. Lower the knee and repeat with the other knee. 8-12 repetitions.
DOUBLE KNEE TO CHEST	Begin as in the previous exercise. After pulling right knee to chest, pull left knee to chest and hold both knees for 5 to 10 seconds. Slowly lower one leg at a time. 8-12 repetitions.
PARTIAL SIT UP	Do the pelvic tilt (exercise 1) and, while holding this position, slowly curl your head and shoulders off the floor. Hold briefly. Return slowly to the starting position. 8-12 repetitions.
HAMSTRING STRETCH	Start in long sitting with toes directed toward the ceiling and knees fully extended. Slowly lower the trunk forward over the legs, keeping knees extended, arms outstretched over the legs and eyes focus ahead.
HIP FLEXOR STRETCH	Place one foot in front of the other with the left (front) knee flexed and the right (back) knee held rigidly straight. Flex forward through the trunk until the left knee contacts the axillary fold (arm pit region). Repeat with right leg forward and left leg back.
SQUAT	Stand with both feet parallel, about shoulder's width apart. Attempting to maintain the trunk as perpendicular as possible to the floor, eyes focused ahead, and feet flat on the floor, the subject slowly lowers his body by flexing his knees. 8-12 repetitions.

Table 2 - Treatment protocol performed by subjects in the Group B	
Mulligan's Two Leg Rotation	Therapist stands at the limited hamstrings flexibility side of the supine subject on the plinth and grips the side of the plinth with the opposite side hand. Both legs will be flexed so that the feet are off the plinth. Keeping his (subject's) shoulders on the bed he takes hi s (subject's) legs slowly to the side of the limited hamstring muscle flexibility. When he (subject) reaches limit, the position is sustained for 30 seconds with over pressure applied by the therapist and then lower the legs to the plinth and repeat for 3 repetitions, and 1 minute rest between each stretch. And same procedure is done for the other side of limited hamstrings flexibility.
Mulligan's Bent Leg Raise	Therapist stands at the limited hamstrings flexibility side of the supine subject on the plinth. Therapist place the subject's flexed knee over his (therapist's) shoulder and now asks the subject to push the therapist with his leg and then relaxes. At this point therapist push his (subject's) bent knee up as far as possible in the direction of his (therapist's) shoulder on the same side. Sustain this stretch for 30 seconds and then lower the leg to the plinth and repeat for 3 repetitions, and 1 minute rest between each stretch. And same procedure is done for the other side of limited hamstrings flexibility.

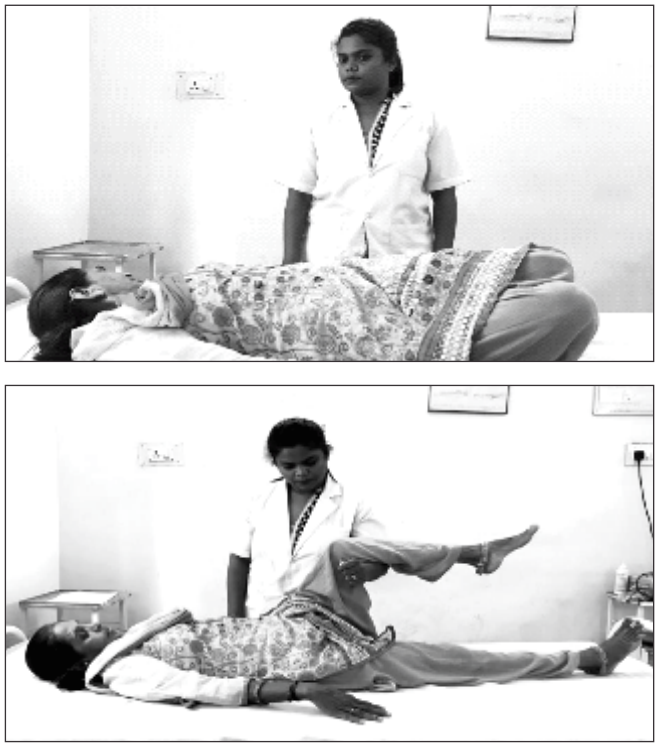


FIGURE – 3 Treatment protocol performed by subjects in the Group B

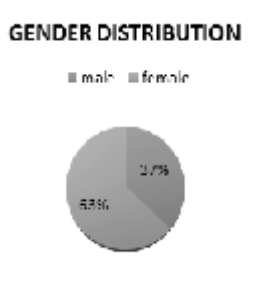
RESULT

Statistical Package for Social Sciences (SPSS) v20 was used for data analysis. Wilcoxon signed rank test were used to find the significance of parameters pre and post test. Mann-Whitney test were used to find the significance of difference between two groups. As the study included human subject ethical clearance was obtained from Parul University Institutional Ethics Committee for Human Research (PU – IECHR). Baseline characteristics and initial assessment of each outcome measure of the subjects were done. No meaningful differences existed between groups at baseline. In present study 34 subjects of age of 18 - 45 years were taken and divided into two groups. Group A (William's Flexion Exercise) and Group B (Mulligan's Technique). 30 individuals completed the study program without any complications. The data obtained in the groups are as follows.

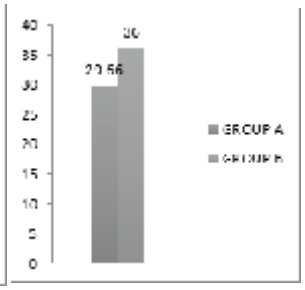
TABLE 1 : AVERAGE AGE OF BOTH GROUP

GROUP	No. of Patients	mean age
GROUP A	15	29.66
GROUP B	15	36
TOTAL	30	

GRAPH 3 GENDER DISTRIBUTION



GRAPH 1 AVERAGE AGE OF BOTH GROUP

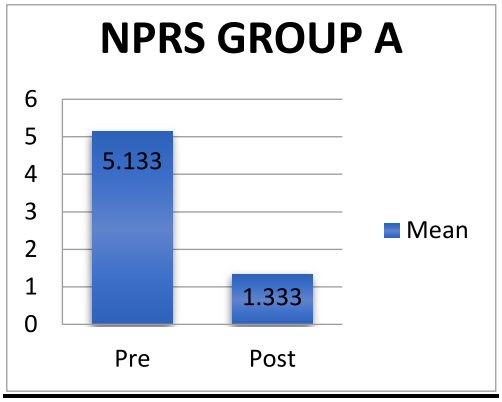


	Mean	SD	z - value	p - value
NPRS Group A				
Pre	**5.133**	**0.8338**	**3.460**	**0.001**
Post	**1.333**	**0.4879**		
NPRS Group B				
Pre	**5.466**	**0.7432**	**3.482**	**0.000**
Post	**3.266**	**1.0328**		
MODI Group A				
Pre	**37.466**	**7.57**	**3.415**	**0.001**
Post	**12.933**	**2.25**		
MODI Group B				
Pre	**23.60**	**7.45**	**3.424**	**0.001**
Post	**10.73**	**4.18**		

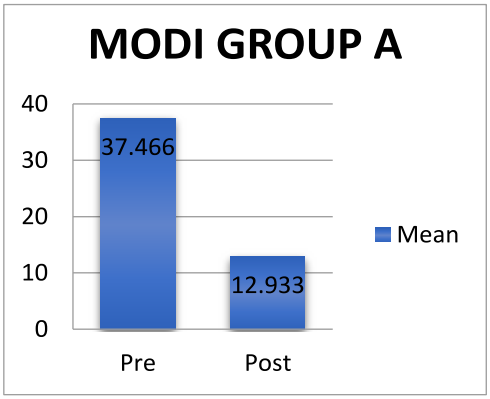
Table 3: Comparison of data pre and post treatment

	Mean difference	SD	z - value	p - value
Comparison of NPRS between Group A and B				
Group A	3.800	0.744	4.280	0.000
Group B	2.200	0.676		
Comparison of MODI between Group A and B				
Group A	24.53	7.229	4.025	0.000
Group B	12.86	4.845		

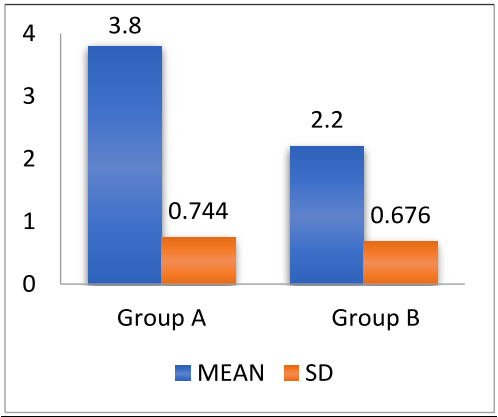
Table 4: Comparison of result between the groups after treatment



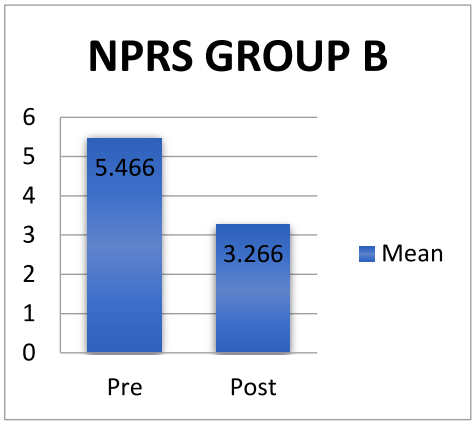
Comparison of pre and post data of NPRS in Group A



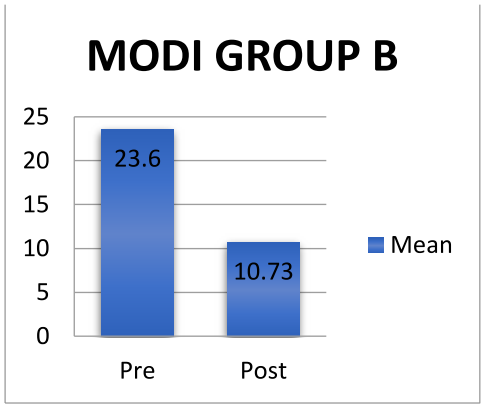
Comparison of pre and post data of MODI in Group A



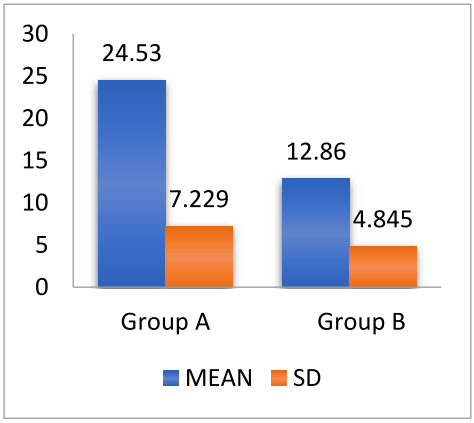
Graph 6: Comparison of NPRS in between Group A and Group B



Comparison of pre and post data of NPRS in Group B



Comparison of pre and post data of MODI in Group B



Comparison of MODI in between Group A and Group B

A summary of change scores and mean differences for each of the outcome measure are presented in table 2. Negative change scores on NPRS and MODI are indicative of improvement; A main effect for change over time was demonstrated as both groups significantly improved in all outcome measures by the end of 4 weeks. there is statistically high significant difference($p<0.05$) showing improvement in means of NPRS and MODI for William's flexion exercise and Mulligan's technique before and after intervention in both the groups but group A showed more significant improvement in compared to group B. The group B showed comparatively lower changes in any of the outcome measures, The mean of NPRS for Group A was 3.800 with the SD of 0.744. when it was compared with the mean of NPRS for Group B which was 2.200 after 4 weeks of intervention with the SD of 0.676, the obtained z-value was 4.280 . This finding had showed that there was a highly significant difference in NPRS for Group A and Group B. ($p<0.005$) Mean difference of Group A shows high significant improvement compared to mean difference of Group B after 4 weeks of intervention. The mean of MODI for Group A was 24.53 with the SD of 7.229. when it was compared with the mean of MODI for Group B which was 12.86 after 4 weeks of intervention with the SD of 4.845, the obtained z-value was 4.025 . This finding had showed that there was a highly significant difference in NPRS for Group A and Group B. ($p<0.005$) Mean difference of Group A shows high significant improvement compared to mean difference of Group B after 4 weeks of intervention.

DISCUSSION

The results of this study showed that the individual who participated in treatment program that included William's flexion exercise and the Mulligan's technique experienced greater improvements for pain and disability which has decreased mechanical low back pain to the individuals who participated in treatment program. Physical therapist use many exercise for back pain among this specific exercise William's flexion exercise has showed significant improvements. Mulligan's bent leg raise technique has been described as a means of improving range of straight leg raise (SLR) in subject of LBP. Williams flexion exercise reduces the pressure on the posterior element of lumbar spine and preventing recurrence of low back pain. These exercises restore functional strength of lower back is helpful for relieving symptoms of low back pain. Strengthening of abdominal and back muscle which maintain all structure align and prevent stress of lumbar spine. William flexion exercises using valsalva maneuver were particularly beneficial for patient with lumbar lordosis. It is effective to correct the faulty lumbar lordosis and decrease low back pain. During the sit-ups exercise the pelvis was found to be tilted and put the spine in hypertension before forward trunk displacement. [16]. posterior pelvic tilt requires moderate activity of internal and external oblique muscles their helps to generate the intra abdominal pressure. Curl ups exercise produce lumbar flexion and provided maximum activity of external and rectus abdominal muscle.

Pratik .A. Phansopkar, Vijay Kage demonstrated that both the treatment techniques that is Mulligan's Two Leg Rotation and Bent Leg Raise techniques are effective in increasing the hamstrings flexibility in subjects with acute non specific low back pain in terms of pain, range of motion and functional disability. Thus Mulligan's Two Leg Rotation can also be used commonly as other mulligan techniques in clinical practice for improving the hamstrings flexibility. [17]

Tight hamstring muscles limit anterior pelvic tilt of the pelvis in spinal flexion resulting in aggravated muscle and ligamentous tension in the lumbar region which leads to significantly higher compressive loads on the lumbar spine.[15] Anatomical causes of reduced muscle extensibility have been categorized as “muscle shortness” and “muscle stiffness”. Physiological cause of reduced muscle extensibility

is related to the contractility of the muscle cell.[18] Mulligan BLR technique consist of gentle isometric stretching of hamstring in specific directions in progressively greater positions of the hip flexion, the expecting result are increased flexibility of hamstring muscle with increased ROM of active knee extension. Mulligan bent leg raise (BLR) technique has been described as a mean of improving range of straight leg raise (SLR) in subject with LBP and or referred thigh pain.

CONCLUSION

It has been concluded that William's flexion exercise and Mulligan's two leg rotation and bent leg raise technique both significantly improved the pain and disability in patients with mechanical low back pain but the group receiving William's flexion exercise improved more compared to Mulligan's technique.

LIMITATIONS

Smaller number of subjects, lack of follow ups and long term effects can be included in limitations of this study.

FUTURE RECOMMENDATION

Future studies should be done on larger sample size and its effectiveness in various sample sizes.

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RANDOMISED CONTROL TRIAL TO EVALUATE EFFECT OF UTERUS MOBILIZATION WITH THERAPEUTIC TENS AS COMPARED WITH ONLY CONVENTIONAL TENS ON PRIMARY DYSMENORRHEA

Namita Chatwal* . Prof Maneesh R Arora , Dr Pooja Yadav*****

BACKGROUND: In India, prevalence of dysmenorrhea is 87.7%. Dysmenorrhea is a common problem among females. The purpose of this study was to examine the effect of Uterus Mobilization with TENS on primary dysmenorrhea and to compare it with only Transcutaneous Electrical Nerve Stimulation (TENS) in a randomized controlled trial study.

METHODOLOGY: Thirty female aged between 18-25 year randomly divided in two groups (Uterus Mobilization with TENS or only TENS). Participants' physical characteristics and menstrual history were recorded. Menstrual pain was measured by self-reported pain intensity using visual analog scale (VAS) before and just after treatment. Paired t-test and unpaired t-test was conducted to compare pain intensity between pre and post treatment within the group and between the two groups respectively.

RESULTS: The decrease in pain intensity after Uterus Mobilization with TENS and only TENS were both significant, (Experimental group: 8.67 ± 0.98 to 2.6 ± 2.06, $p<0.0001$; Control group: 7.27 ± 1.39 to 4.87 ± 2.2, $p<0.001$). However, pain intensity in experimental group was significantly decreased than the control group ($p=0.0001$).

Conclusions: This result supports that using Uterus Mobilization with TENS could be effective in pain reduction among females who suffered from primary dysmenorrhea.

Key Words: Transcutaneous Electrical Nerve Stimulation (TENS), Dysmenorrhea, Menstruation, Visceral Mobilization.

INTRODUCTION:

"Dysmenorrhea" is derived from Greek means difficult monthly flow but by usage refers to painful menstruation1. The pain of Dysmenorrhea includes cramping pain in lower abdominal area. The discomfort tends to remit as menstrual flow decreases. George and Bhaduri found Dysmenorrhea to be a common problem in India with prevalence of 87.7%4. Dysmenorrhea can feature different kinds of pain, including sharp, throbbing, dull, burning, or shooting pain. Dysmenorrhea may precede menstruation by several days or may accompany it, and it usually subsides as menstruation tapers off2, 3.

Dysmenorrhea can be classified into Primary and Secondary Dysmenorrhea. Primary Dysmenorrhea should be defined as painful period in which no macroscopically identifiable Pelvic Pathology is present. The prevalence of primary Dysmenorrhea decreases with increasing age and it is highest in between 20-24 years of age because of hyper contractility of uterus at menstruation in women with Primary Dysmenorrhea, blood now uterus is compromised and uterine ischemia occurs5. Thus, the pain is thought to be due three factors: increased abnormal uterine activity, uterine ischemia and sensitization of the nerve terminals to Prostaglandins6, 7.

"Visceral Mobilization" is organ specific fascial mobilization and is based on the premise that free movement within the body is vital, and thus any restriction will adversely affect health. Visceral mobilization treats functional and structural imbalances throughout the body. It evaluates and treats the dynamics of motion and suspension in

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relation to organs, membrane, fascia and ligaments and relieving symptoms of pain, dysfunction, and poor posture8.

Visceral mobilization returns physiologic motion to the tissues, thereby enhancing normal movement of the body, including the movement of visceral structures in relation to each other and the motion within each structure. It also increases communication within the body through improved functioning of nervous system, circulation, lymphatic, and respiratory systems by softening the fascia that surrounds each of these structures, thereby reducing pressure on them, as well as allowing better exchange of fluids. This improves breakdown and removal of waste products, reduces inflammation and pain, and improves the delivery of hormones and chemicals to the cells. Visceral Mobilization aims to find and resolves tensions in the tissue and thereby restore normal motion of the tissue. Visceral Mobilization is a hands-on manual therapy that only requires the skillful application of therapist's hand to evaluate and treat, along with an in-depth knowledge of anatomy. The treatment is through gentle compression, mobilization and elongation of the tissues.9

METHODOLOGY:

A total of 30 females aged between 18-25 years with dysmenorrhea pain participated in this study. All cases were diagnosed as primary dysmenorrhea on the basis of their menstrual history. Subjects were randomly assigned to experimental and control groups. All subjects were assessed and treated on 4 days before the day of their menstruation for experimental group and on the day of their menstruation for control group. The procedure was fully explained to the participants and they were required to sign the consent form. Subjects were not allowed to take any analgesics before this treatment. Intensity of menstrual pain was evaluated by a 0-10 visual analog scale (VAS), where "0" point indicated "no pain" and "10" indicated "unbearable pain." The VAS evaluations were performed before and just after treatment as the primary outcome.

In Control Group(group 1), a TENS device with a frequency of 0- 100/HZ and 90-100 pulse /seconds was applied for 20 minutes10, to increase circulation and to have pain relief at the first day of menstrual complaints without taking any analgesics. Patients lied in prone position with a thin pillow placed under their abdomen. Two electrodes were placed to the proximal margin of low back area, and two others were placed to the proximal of gluteal region laterally. The intensity of stimulation was increased up to the tolerated level without causing any contraction.

In Experimental Group(group 2), Uterus Mobilization was given 3 days before the first day of menses and TENS was given for 20 minutes on the first day of menses. The procedure for Uterus Mobilization is as follows:

Subject was asked to lie in supine position with both the knees flexed. Therapist placed his non dominant hand on the lumbosacral region and dominant hand over the bladder area for releasing the muscular tension and increasing the depth of the field which was palpated. It was begun by stretching the fundus from lateral to medial side and was holded for one minute and relaxed for one minute. The procedure was repeated 3 times per session for 3 days consecutively.

RESULTS:

Table 1 summarizes the mean average of VAS before and after the intervention. There was reduction in VAS by 2.4 which was found to be statistically very significant ($p < 0.001$).

	Mean ± SD	p value
Pre intervention	7.27 ± 1.39	<0.001 (Significant)
Post intervention	4.87 ±2.2	

Table showing Comparison of Mean & SD between pre and post value of Group 1

Table 2 summarizes the mean average of VAS before and after the intervention. There was reduction in VAS was 6.07 which was found statistically extremely significant.

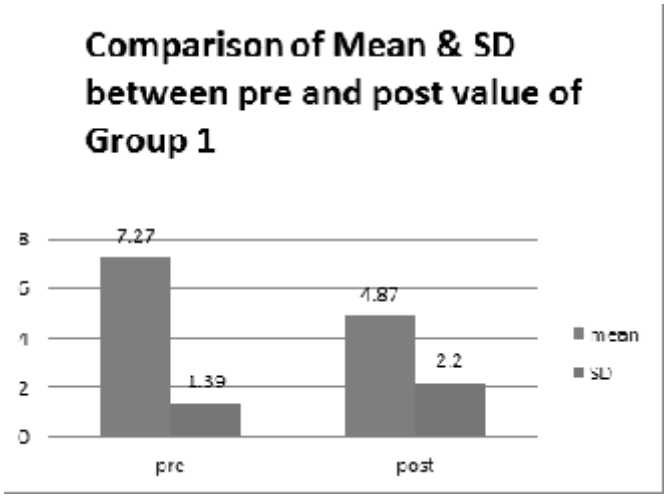
	Mean ± SD	p value
Pre intervention	8.67 ± 0.98	<0.0001 (Extremely Significant)
Post intervention	2.6 ± 2.06	

Table showing Comparison of Mean & SD between pre and post value of Group

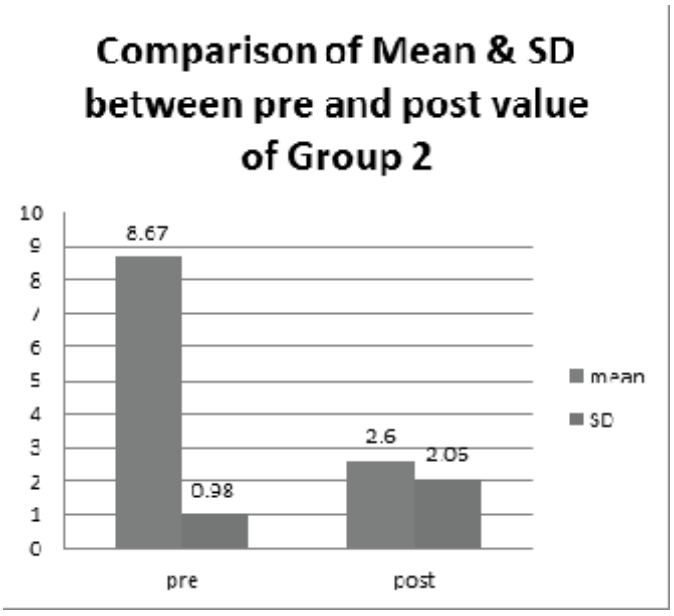
Table 3 summarizes the mean average of VAS of Group 1 and Group 2. There was reduction in VAS was 3.67 which was found statistically extremely significant.

	Mean ± SD	p value
Group 1	2.4 ± 2.35	=0.0001 (Significant)
Group 2	6.07 ± 2.12	

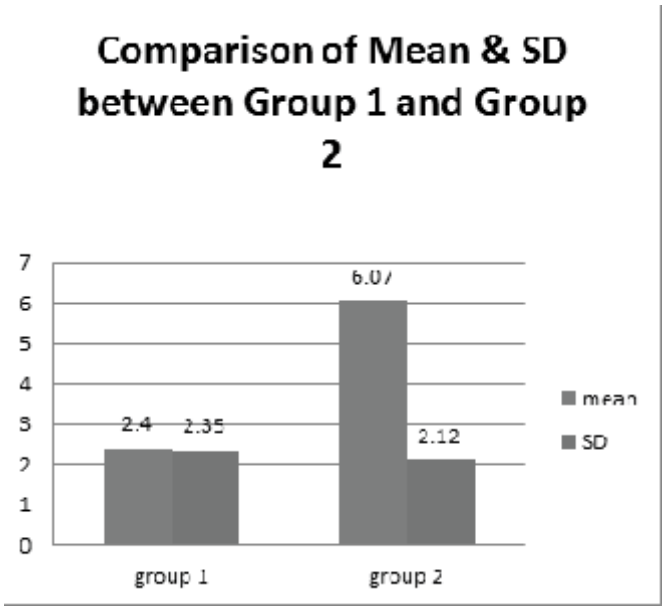
Table showing Comparison of Mean & SD between Group 1 and Group 2



Graph showing Comparison of Mean & SD between pre and post value of Group 1



Graph showing Comparison of Mean & SD between pre and post value of Group 2



Graph showing Comparison of Mean & SD between Group 1 and Group 2

DISCUSSION:

This study includes an experimental design consisting of two groups, Group 1 (conventional TENS), Group B (Uterus Mobilization with TENS). This study aims to compare the Effect of Uterus Mobilization with TENS and only TENS on pain in Young Females with Primary Dysmenorrhea.

After studying 30 subjects (15 Visceral mobilization with TENS, 15 TENS) and on the basis of hypothesis when mean difference in data was compared between group 1 and 2, we got significant improvements within the groups i.e. for uterus mobilization with TENS and only TENS. Therefore in this study, experimental hypothesis is accepted and there is significant difference in the VAS scores between Uterus Mobilization with TENS and only TENS and thus concludes by rejecting null hypothesis that there is no significant reduction in VAS scores between group 1 (conventional TENS) and group 2 (Uterus Mobilization with TENS). However, pain scores on VAS within the groups showed significant reduction in primary dysmenorrhea.

The primary findings of this study were a significant improvement from pretest to posttest variability of VAS scores after intervention with Uterus Mobilization with TENS ($p<0.0001$). The mean average of VAS before the treatment was 8.67 ± 0.98 and after the intervention was 2.6 ± 2.06. There was reduction in VAS was 6.07 which was found statistically extremely significant.

In previous study used a pragmatic design to assess the effect of osteopathic manipulative therapy (OMTh; manipulative care provided by foreign trained osteopaths) on women with diagnosed primary dysmenorrhea and the results were showed significant for reduction of pain intensity in the OMTh group, with mean (SD) NRS scores of 4.6 (1.2) before intervention and 1.9 (1.4) after intervention (P<.0005). The mean (SD) reported days of general pain was also significantly reduced in this group (4.5 [1.8] days before intervention to 2.2 [1.8] after intervention; P<.0005), as was reported duration of intense pain (2.2 [1.4] days before intervention to 0.2 [0.6] days after intervention; P<.0005). No changes in these measures were observed for the control group this study design produced dramatic reduction in the symptoms of primary dysmenorrhea, although it has not been used in many osteopathic research projects.11

In our study, Control group also shows significant improvement in VAS scores with Therapeutic TENS ($p \leqslant 0.001$). The mean average of VAS before the treatment was 7.27 ± 1.39 and after the intervention the VAS was 4.87 ± 2.2. There was reduction in VAS by 2.4 which was found to be statistically significant.

In one study which is done by Proctor ML et al (1994) who had compared the effectiveness of high and low frequency transcutaneous electrical nerve stimulation and acupuncture to each other, placebo, and no treatment, or medical treatment for primary dysmenorrhea and showed that high frequency TENS was more effective for pain relief than placebo TENS. Low frequency TENS was found to be no more effective in reducing pain than placebo TENS. Acupuncture is thought to excite receptors or nerve fibers which, through a complicated interaction with mediators such as serotonin and endorphins, blocks pain impulses.12

The result of current study is also supported by Deborah et al13(1989) who showed the effectiveness of acupuncture-like transcutaneous electrical nerve stimulation in treating primary dysmenorrhea and showed significant pain relief for the subjects receiving acupuncture-like TENS. Acupuncture-like TENS is believed to work via release of endorphins in the brain.14 Endorphins are a natural opiate that blocks the input of pain, possibly via the dorsolateral funiculus. These endorphins bind to receptors in the periaqueductal gray matter and lead to an antidromic inhibitory process that blocks the nocioceptive impulses from reaching the substantia gelatinosa. Another hypothesis was that the auricle has rich sensory innervations that have led investigators to believe that stimulation to the auricle may affect different areas of the body, depending on the area stimulated. Investigators have suggested that there is a link between sensory nerves of the auricle and the central nervous system that may produce analgesic effect.

Although the end results did exhibit statistical significant between the two groups of intervention ($p<0.05$), on the basis of mean difference between pre and post measurement of VAS scores. We found that Uterus mobilization with TENS was found to be more effective in reduction of pain scores in females suffering from primary dysmenorrhea than that of only therapeutic TENS treatment.

Limitation to the present study include the duration of treatment for experimental group was only 4 days as was hypothesized in that manner as there were no previous evidences in regard to that. The physiology of the Primary Dysmenorrhea pain can be multifactor. The difficulty in deferentially altering the techniques was not possible so the intervention was limited to a single protocol. Further studies should focus on conducted on larger sample size, Long duration of the study could have brought in more clarity in observed trends, It can also be done on different age groups.

Clinical implication of the study include that Dysmenorrhea is the most common Gynecological problem faced by the young females. It is a disease that refrains the females from physical activities like absence from work and college. Apart from this restriction of the physical activity, it also causes psychological, social and behavioral problems like Stress, Anxiety, Confusion, Social Fear, lack of Confidence, poor academic performances, disputes in Relationships etc. This study will be helpful in improving quality of life, decreasing the use of NSAID'S as they have numerous side effects and there are also very less treatment options available for this disease. So this study aims at use of Non-Pharmacological treatment and Non invasive treatment options which were found to be effective in decreasing the Pain in young females with Primary Dysmenorrhea and thus giving them the necessary options in avail. It can also be used in our OPD's as an adjunct to other treatment options available an additional option for prevention and control of dysmenorrhea.

CONCLUSION:

The present study concluded that 30 Females suffering from primary dysmenorrhea with increased VAS score were investigated and divided into two group i.e. Uterus mobilization with TENS and only TENS regime. The results showed significant improvement in VAS within the groups, but interestingly Uterus mobilization with TENS showed better improvement.

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The efficacy of two different frequencies NMES applications to gastrocnemius muscle on increase venous flow. A systematic review

Dr. Vinod Nair

Abstract

Introduction

Many individuals are at risk for developing deep vein thrombosis (DVT) or venous thrombo embolism (VTE), or both owing to immobilization, surgery, or trauma injury: venous stasis, endothelial damage or increased coagulation. There are 2 main types for preventing deep vein thrombosis: chemical and physical. Despite chemical prophylaxis being the preferred method, it has a high risk of bleeding and must be avoided in some patients. There is also increasing evidence supporting the use of mechanical devices as intermittent pneumatic compression (IPC) and compression stockings in surgical patients at high risk of developing deep vein thrombosis. These options can still have certain limitations such as patient discomfort, tissue injury, improper fitting or arterial insufficiencies in patients with peripheral arterial disease so alternative physical strategies like electrical stimulation (ES) are being investigated. Electrical stimulation has been shown to have an additive effect to compression stockings and to be at least as effective as intermittent pneumatic compression in terms of the venous hemodynamic response, and besides, to show some other advantages such as arterial and microcirculatory flux enhancement. In addition, electrical stimulation can also play a specific role by stimulating or replacing the neural supply to the veins, which has been proposed recently as the fourth factor in thrombus pathogenesis. Electrical stimulation may be even more necessary when early active motion is difficult or unavailable as in traumatology patients because of an immobilized extremity or muscle inhibition after surgery, and in critically ill patients. The primary objective of this study was to compare the effect of two frequency and electrode placement at the maximum tolerated intensity on hemodynamic popliteal venous flow and peak velocity (PV) using Doppler ultrasound in healthy volunteers. A further objective was to compare the participants' relative discomfort among the 2 applications using a visual analogue scale and verbal rating scoring index.

Methods :

Electrical stimulation devices neuromuscular electrical stimulation (NMES), have been used to enhance venous hemodynamics via skeletal muscles. NMES and TENS are different ES modalities, but there is confusion regarding the description of the Electrical stimulation forms among researchers and clinicians. As both Electrical stimulation modalities can be delivered by surface electrodes for stimulating muscles and nerves, the differences are related to their original purpose. TENS has been primarily developed for pain relief, whereas NMES has been primarily developed for the improvement of muscle strength eliciting smooth tetanic muscle contraction and relaxation, similar to an exercise therapy session. Therefore, an on-off time in seconds (duty-cycle) is necessary in NMES for minimizing muscular fatigue and discomfort.

Results :

Despite electrical stimulation having been experimentally proved to be effective in improving venous flow and velocity, the stimulation parameters vary greatly and it is necessary to clarify which parameters are optimal for venous return Frequencies from 1 to 10 Hz have been tested at muscle locations. To the best of the authors' knowledge, only one study has compared, but used different electrical stimulation frequencies and intensities for each placement.

Keywords :

(NMES) Neuromuscular electrical stimulation, (ES)electrical stimulation, deep vein thrombosis (DVT), venous thrombo embolism (VTE), immobilization, surgery, or trauma injury: venous stasis

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Abbreviations

BMI = body mass index, DVT = deep vein thrombosis, ES = electrical stimulation, FV = flow volume, IPC = intermittent pneumatic compression, NMES = neuromuscular electrical stimulation

Materials and methods

Design and sample

A large variation in hemodynamic response to electrical stimulation has been found in healthy population. Therefore, a within-subjects cross-over design was used to determine differences in hemodynamic effects and discomfort. A random assignment of the NMES was used to avoid possible systematic effects of order. The order of testing was introduced in opaque envelopes to be randomly selected by each participant, who was not aware of it. Study protocol was reviewed and approved by hospital. Informed consent was obtained from each subject before enrolment.

The optimal sample size was determined from a pilot sample of 12 subjects. The venous flow volume (FV), in ml per minute, was measured 3 times and the mean was considered, both basal and after the NMES protocol. The FV increment was computed relatively with respect to basal levels, and given as percentage. A 1-way analysis of variance with repeated-measures was used to compare the difference among the 3 electrical stimulation results. From the estimated correlation among repeated-measures of 0.7 and a standard deviation within each group of 90%, we obtained that, with a sample size of 24 subjects, the test would have a power of 0.8 to detect significant differences in the relative FV increments if they were 40%, 175%, and 150%, with a type I error of 0.05.

Participants

Students from the Faculty of Physical Therapy were initially invited to participate in a screening session. A university notice board was used to recruit the volunteers. The specific inclusion criteria were: healthy subjects aged between 18 and 39 years. Exclusion criteria included factors that might affect venous return or current flow: body mass index (BMI) <18 or >30 kg/m2, smokers, oral contraceptive use, recent surgery/trauma to lower limbs, any diagnosed disease that could affect hemodynamics, clinically significant varicose veins, or ulceration of the lower limbs. Among 30 volunteers assessed for eligibility, 4 women and 2 man were excluded for meeting some exclusion criteria. The pilot sample was included within the final sample of 24 subjects (12 men) selected for evaluation. All of them completed the experimental session.

Experimental procedure

All examinations were performed in the same room, in which the temperature was controlled

The subjects lay in the prone position 15 to 20 minutes before the experiment with their feet off the table and a soft cushion beneath the ankle. Stimulation electrodes sites were previously clipped of hairs. Three electrical stimulation protocols were applied using a 2-channel portable stimulator (NMES-BIOTECH) and matching self-adhesive electrodes. All the electrical stimulation protocols selected were delivered without a duty cycle (on-off time). Electrode placements on tibial nerve, and the motor points of the gastrocnemius muscle, where skin area was most responsive to electrical stimulation. A charge-balanced biphasic square wave with phase duration of 0.35 milliseconds was applied at 1 and 5 Hz over the muscle to obtain a twitch contraction. The frequency of 1 and 5 Hz was chosen instead of 10 Hz and 15 Hz, as 10 Hz and 15 Hz was felt uncomfortable and fatiguing because of the almost tetanic muscle response it originated without a resting time. Stimulation amplitude was increased gradually, 0.5 mA per second to find the pain threshold for each application in the random order assigned. The stimulation intensity was set 10% below the pain threshold, and the values (median, first–second quartiles) were 30.5 (22.1–43) mA, 20.0 (14.5–24.3) mA, when applying 1 Hz and 5 Hz on muscle site, respectively.

Primary outcome

A baseline duplex venous ultrasound scan was performed at least 5 minutes after the last pain threshold determination. The popliteal vein of the nondominant leg was examined with a 6 to 13 MHz linear transducer . It was placed at the back of the knee by a fixed-arm, once the optimal location was reached. Vein diameter was measured using B-mode. The venous FV (mm per minute) was calculated by the Doppler unit's software. The venous PV (centimeters per second) was recorded from the Doppler waveform. The electrical stimulation sequences were applied for 1 minute before recording echographic measures during stimulation. They were followed by a 5-minute recovery phase and a new baseline ultrasound was examined. Measurements were taken over a period of 16 seconds, to obtain several endogenous or ES-superimposed blood movement cycles. Three measurements were made for each condition and the mean of them was used for analysis. The same well-trained examiner with >6 years of experience performed all measurements and asked the subjects to remain stationary and maintain a stable breathing pattern during data collection.

Secondary outcome

Participants compared discomfort after the 2 TENS applications using a 100-mm visual analogue score (VAS). This scale was modified from traditional pain VAS with 0 mm denoting no sensation, and 100 mm indicating pain onset. Subjects' relative comfort perception was also assessed by a verbal rating score (VRS): 1, no sensation; 2, minimal discomfort; 3, mild discomfort; 4, moderate discomfort; and 5, severe discomfort.

Statistical analysis

Data are presented as mean ± standard deviation (SD); if the distribution is asymmetrical, median and first and third quartiles (Q1 and Q2) are also given. The Kolmogorov-Smirnov-Lilliefors test was used to test for normal distribution of the data. To compare the effects in hemodynamics and discomfort the 2 NMES applications, a 1-way ANOVA with repeated-measures, or Friedman test was carried out. To identify differences in the NMES results, post hoc pairwise comparisons were considered with Bonferroni correction. To ensure comparability, standardized effect sizes were calculated by the partial eta-squared η2p (partial variance explained in ANOVA). A P value <.05 was assumed to denote statistical significance. Statistical analyses were carried out using IBM SPSS for Windows, version 21.0 (IBM Corporation).

Results

Table1 presents the physical baseline characteristics of the participants. Typical Doppler waveforms of baseline and the 2 TENS protocols (1 and 5 Hz via muscle). The effect of the different NMES programs on both FV and PV was statistically significant. The increment of hemodynamics responses has been computed relatively from baseline and given as a percentage. The relative increments of the hemodynamic responses (in %) varied significantly with the NMES interventions for FV (P < .001) and PV (P < .001). FV was higher with NMES applications of 5 Hz than of 1 Hz (P<.001).

Table 1 : Subject physical characteristics.

	Male (n=12)	**Female (n=12)**
Age,Y	22.5±3.23	19.42±0.90
BMI, Kg/m2	24.17±2.41	22.17±1.90
Calf perimeter, cm	37.05±1.74	32.93±2.64

Table 2

	NMES	Baseline Median(Q1-Q2)	Stimulation Median(Q1-Q2)	Difference Mean	Effect Size	p
FV	1Hz	80.1 (65.3-100.6)	97.8 (73.9-153.1)	24.49 (9.08-39.91)	0.320	.003
	5Hz	75.1 (55.5-114.7)	174.0 (120.1-251.2)	115.26 (74.74-155.79)	0.601	<.001
PV	1Hz	13.4 (10.5-18.3)	55.1 (45.4-67.7)	39.93 (34.01-45.86)	0.894	<.001
	5Hz	13.1 (9.9-17.6)	48.9 (39.4-62.2)	34.61 (28.08-41.13)	0.839	<.001

Table 3: Comparison of the relative increment of FV and PV among the different protocols of electrical stimulation (n=24).

	1Hz	5Hz	Effect Size	p
FV(%)	32.6±46.1	146.8±115.9	0.482	<.001
PV(%)	291.9±136.2	258.6±126.8	0.585	<.001

Duplex Doppler ultrasound recordings used for blood flow analysis. Representative capture window measuring popliteal blood flow waveform in basal condition is displayed. The response to NMES stimulation at 1 Hz applied on gastrocnemius muscle is seen. The spikes reflect the altered flow pattern at the frequency delivered. Effect on waveform of NMES at 5 Hz on gastrocnemius muscle site. More spikes are seen as frequency is increased 5 times. The flow pattern obtained is different from previous electrical applications as the spikes are less pronounced and there is more regularity in the venous blood flow.

There were no adverse effects at the end of the intervention or reported afterwards by the subjects.

Discussion

This study compared the efficacy of 2 NMES applications. Increased FV and PV in the ipsilateral popliteal vein were seen in muscle stimulation, and using 1 and 5 Hz. This is concordant with the existing literature, despite NMES parameters' differences and missing data or discrepancies when reporting it. A review provided a range of 60% to 615% FV increasing from baseline and 25% to 650% for PV. The much higher values were from studies in operated on and healthy people at bed rest using NMES. This can be explained by 2 factors: bed rest causes a decline in venous blood flow, so a higher increase compared to resting values can be expected; in addition, in these researches only the NMES "on time" was compared to baseline, not considering off time where a subsequent cessation in blood flow might happen. Few studies have considered percentage of change, and lower range values have been reported stimulating common tibial nerve or different muscle locations, In healthy volunteers. In these studies a long-lasting hemodynamic recording of 15 seconds was used, as has been also recorded in the present study, to deal with cardiac and respiratory variations.

When looking for the differences among the 2 NMES protocols, NMES at 5 Hz (on muscle) obtained a higher FV than at 1 Hz on muscle site. The latter has not been shown in the previous study comparing nerve and muscle ES, but significantly lower VAS was achieved in nerve site. Likely, the discrepancies may be attributed to the distinctive current densities, muscle sites, and frequencies tested.

Current density is estimated as intensity per electrode area. Whereas in the mentioned study identical current densities were applied (same intensity and small sized electrodes for both locations), in the present study the highest tolerated intensity for each protocol was selected. Indeed, in consonance with ES-recommended parameters, greater electrode size was chosen on muscle. Tibial nerve was stimulated at a site where good accessibility is considered and small electrodes have been found more comfortable and selective for thin fat layers and superficial nerves.

Tibialis anterior was the chosen muscle site in Izumi et al's study, whereas gastrocnemius muscle was the stimulated muscle in the present research. When comparing tibialis anterior and soleus muscle, soleus muscle expelled higher volume and achieved lower peak velocities, which were on average 35% lower than tibialis anterior. In another study testing different muscles soleus was the only muscle where, besides an increased PV from baseline, a higher FV was detected. Explanations from the authors in both researches are in connection with the intimate relationship among the muscles and plexus of deep veins. The leg pump—located in the veins of the gastrocnemius which is the most important pump in the lower limb. The medial gastrocnemius veins play a major role pushing the blood column upwards and creating an aspiration effect in the popliteal roots below. These muscles are innervated from the tibial nerve. Stimulation of the tibial nerve produced nearly identical hemodynamics responses as voluntary contractions when controlling force, duty cycle, and active muscle mass.

Regarding the frequency, the previous study used

10 Hz on nerve and 50 Hz on muscle site, whereas in this study, 1Hz &5 Hz was used in muscle locations. Other studies have examined the effect of frequency on venous hemodynamics, with diverse results. Stimulating the tibial nerve (1–40 mA, 1–5 Hz), venous FV and PV have been enhanced, with both intensity and frequency showing moderate to strong positive correlations. In the present research, increased FV at higher frequency was also found, but the same relationship between frequency and PV was not. Different factors can be responsible for the differences. Likely, the most relevant is using the highest tolerated intensity, which was lower at 5 Hz than at 1 Hz, whereas the same intensities were selected by Izumi et al. Another study testing 0.13 to 2 Hz in a muscle location on the calf showed that different rates of stimulation had a different effect on PV and FV, as PV decreased and FV increased. Perhaps the effect of diminishing PV at increasing frequency is most patent when comparing to frequencies below 1 Hz, as seems to happen in the graphic data presented in this work.

ES at 5 Hz on gastrocnemius muscle rather than ES at 1 Hz on gastrocnemius muscle. First, 5 Hz on muscle site originated higher PV increment and it has been noted than an excessive increase in PV can be dangerous. NMES has obtained even higher PV than voluntary exercise when applied at high intensity and pulse duration. In IPC devices, a decline in blood flow velocity has been found in the first section of deflation phase. A negative pressure is generated in the inner vessel, and it pulls blood into the decompressed vessels. There is a possibility of a non desirable backward flow when a strong negative pressure—related to a high PV—is generated. This can be amplified when partial venous obstruction with stenosis or malfunctioning venous valves exists, as it creates the conditions for eddy blood flow. For this reason, other factors related to venous volume have been proposed to test the different applications. Second, when subjects compared the applications using VRS, 5 Hz on muscle was felt more comfortable (close to statistical significance). Discomfort assessment by VRS showed mild discomfort in 1 Hz muscle. This level of discomfort is in consonance with the application of 1 Hz TENS device at normal clinical use setting. Despite healthy subjects have been assessed in the present study, it would be useful for collecting normative data to help with better treatment choices in patient population.

Limitations

There are 2 main limitations to this study. First, although increasing venous flow is assumed to correlate with reduction of thrombosis risk, the data obtained from young healthy people might not be directly translated to patients with a vascular disease or at high risk of suffering it. Second, the medium- and long-term effects of NMES can differ from immediate-effects of a brief intervention investigated in this study.

Conclusions

In conclusion, when considering the highest venous FV increase, the lowest peak venous velocity change, and comparative tolerance, NMES at 5 Hz on gastrocnemius muscle is the most beneficial protocol. Future studies may investigate the electrical stimulation of tibial nerve and compare it to common peroneal nerve effects on hemodynamics. Furthermore, the influence of frequency and electrode location parameters on population at high risk from suffering DVT has to be established.

Footnotes

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PHYSIOTHERAPY & STRESS

Physiotherapy is the treatment of disease, injury, or deformity by physical methods such as massage, treatment by various modalities, and exercise rather than by drugs or surgery. It not only eases the song of one's stressful burden, but also stimulates both the mind and body to rebalance and usher in harmony and emotional poise.

Dr. Shailendra Mehta

Stress is your body's response to certain situations. It's subjective, so something that is stressful for you may not be stressful for someone else. There are many different kinds of stress and not all of them are bad. Stress can help you act quickly in an emergency or help you meet a deadline.

Stress can affect your physical and mental health, and your behavior. Your body responds to stress by producing chemicals and hormones to help you rise to the challenge. Your heart rate increases, your brain works faster, and you have a sudden burst of energy. This response is basic and natural and is what kept our ancestors from falling victim to hungry predators. But too much stress can have harmful effects. It's impossible to completely eliminate bad stress from your life, but you can learn to avoid and manage it.

Stress is an inevitable part of life and existence. It makes us ready for what is referred to as short term response, or 'fight-or-flight' response. Most of the biological changes that comeswith the stress response are designed to rally the body's fuel reserve-to convert them for immediate use. This includes providing extra oxygen required for the organs most likely to need it-for example, the brain and the muscles. Prolonged stress impacts the secretion of certain hormones, including the sex hormones,

Stress also acts as a go-between for one part of the nervous apparatus-called the sympathetic nervous system which deals with the body's maintenance functions under normal conditions. It is, therefore, well placed for rapidly re-adjusting our priorities.

CAUSES OF STRESS

Everyone has different stress triggers. Work stress tops the list, according to surveys. Causes of work stress include:

·Being unhappy in your job

- Having a heavy workload or too much responsibility
- Working long hours
- Having poor management, unclear expectations of your work, or no say in the decision-making process
- Physical illness
- Neglect by society or family
- Life stresses can also have a big impact. Examples of life stresses are:
- The death of a loved one
- Divorce
- Loss of a job
- Increase in financial obligations
- Getting married
- ·Moving to a new home

Sometimes the stress comes from inside, rather than outside. You can stress yourself out just by worrying about things. All of these factors can lead to stress:

Fear and uncertainty. When you regularly hear about the threat of terrorist attacks, global warming, and toxic chemicals on the news, it can cause you to feel stressed, especially because you feel like you have no control over those events.

What Are the Symptoms of Stress?

Stress can affect all aspects of your life, including your emotions, behaviors, thinking ability, and

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physical health. No part of the body is immune. But, because people handle stress differently, symptoms of stress can vary. Symptoms can be vague and may be the same as those caused by medical conditions. So it is important to discuss them with your doctor. You may experience any of the following symptoms of stress.

Emotional symptoms of stress include:

·Becoming easily agitated, frustrated, and moody

·Feeling overwhelmed, like you are losing control or need to take control

·Having difficulty relaxing and quieting your mind

·Feeling bad about yourself (low self-esteem), lonely, worthless, and depressed

- Avoiding others
- Physical symptoms of stress include:
- Low energy
- Headaches
- Upset stomach , including diarrhea, constipation, and nausea
- Aches, pains, and tense muscles
- Chest pain and rapid heartbeat
- Insomnia
- Frequent colds and infections
- Loss of sexual desire and/or ability
- Nervousness and shaking, ringing in the ear, cold or sweaty hands and feet
- Dry mouth and difficulty swallowing
- Clenched jaw and grinding teeth

Cognitive symptoms of stress include:

- Constant worrying
- Racing thoughts
- Forgetfulness and disorganization
- Inability to focus
- Poor judgment
- Being pessimistic or seeing only the negative side

Behavioral symptoms of stress include:

- Changes in appetite -- either not eating or eating too much
- Procrastinating and avoiding responsibilities
- Increased use of alcohol, drugs, or cigarettes
- Exhibiting more nervous behaviors, such as nail biting, fidgeting, and pacing

Types of stress

1. Acute stress

Acute stress is the most common type of stress. It's your body's immediate reaction to a new challenge, event, or demand, and it triggers your fight-or-flight response. As the pressures of a near-miss automobile accident, an argument with a family member, or a costly mistake at work sink in, your body turns on this biological response.

Acute stress isn't always negative. It's also the experience you have when riding a rollercoaster or having a person jump out at you in a haunted house. Isolated episodes of acute stress should not have any lingering health effects. In fact, they might actually be healthy for you, as these stressful situations give your body and brain practice in developing the best response to future stressful situations.

Severe acute stress such as stress suffered as the victim of a crime or life-threatening situation can lead to mental health problems, such as post-traumatic stress disorder or acute stress disorder.

2. Episodic acute stress

When acute stress happens frequently, it's called episodic acute stress. People who always seem to be having a crisis tend to have episodic acute stress. They are often short-tempered, irritable, and anxious. People who are “worry warts” or pessimistic or who tend to see the negative side of everything also tend to have episodic acute stress.

Negative health effects are persistent in people with episodic acute stress. It may be hard for people with this type of stress to change their lifestyle, as they accept stress as a part of life.

3. Chronic stress

If acute stress isn't resolved and begins to increase or lasts for long periods of time, it becomes chronic

stress. This stress is constant and doesn't go away. It can stem from such things as:

- poverty
- a dysfunctional family
- an unhappy marriage
- a bad job

Chronic stress can be detrimental to your health, as it can contribute to several serious diseases or health risks, such as:

- heart disease
- cancer
- lung disease
- accidents
- cirrhosis of the liver
- suicide

The Four Common Types of Stress

Dr Karl Albrecht, a management consultant and conference speaker based in California, is a pioneer in the development of stress-reduction training for businesspeople. He defined four common types of stress in his 1979 book, "Stress and the Manager."

Albrecht's four common types of stress are:

- Time stress.
- Anticipatory stress.
- Situational stress.
- Encounter stress.

1. Time Stress

You experience time stress when you worry about time, or the lack thereof. You worry about the number of things that you have to do, and you fear that you'll fail to achieve something important. You might feel trapped, unhappy, or even hopeless.

Common examples of time stress include worrying about deadlines or rushing to avoid being late for a meeting.

2. Anticipatory Stress

Anticipatory stress describes stress that you experience concerning the future. Sometimes this stress can be focused on a specific event, such as an upcoming presentation that you're going to give. However, anticipatory stress can also be vague and undefined, such as an overall sense of dread about the future, or a worry that "something will go wrong."

3. Situational Stress

You experience situational stress when you're in a scary situation that you have no control over. This could be an emergency. More commonly, however, it's a situation that involves conflict, or a loss of status or acceptance in the eyes of your group. For instance, getting laid off or making a major mistake in front of your team are examples of events that can cause situational stress.

4. Encounter Stress

Encounter stress revolves around people. You experience encounter stress when you worry about interacting with a certain person or group of people – you may not like them, or you might think that they're unpredictable.

Encounter stress can also occur if your role involves a lot of personal interactions with customers or clients, especially if those groups are in distress. For instance, physicians and social workers have high rates of encounter stress, because the people they work with routinely don't feel well, or are deeply upset.

This type of stress also occurs from "contact overload": when you feel overwhelmed or drained from interacting with too many people.

STRESS RESPONSE

In the wake of stress, your pulse, blood pressure, and breathing rate increase-to help boost the supply of available energy. The heart beats faster under stress and pumps a greater quantity of blood than usual with each beat.

The bronchial tubes dilate to assist the passage for more air with each breath. The blood vessels supplying the muscles expand just as well. The palms of the hands and the soles of the feet begin to

perspire, primarily because a damp surface provides a much better grip of things.

The pupils of your eyes dialate to let in more light and perk up your vision. Likewise, your mental alertness and reaction time are also speeded up.

During a stressful episode, long-term energy reserves such as stored fat are also broken down into fatty acids and glycerol to be metabolized right away. Likewise, carbohydrates stored in the liver are metabolised and converted into glucose, as blood is shunted from the extremities towards the heart, muscles and brain.

When stress goes far beyond one's control, the situation becomes terrifying for other part of the nervous system-the parasympathetic mechanism. This leads to involuntary urination [rushing to the washroom] and also stools.

What also happens is that your peripheral blood vessels constrict- you get cold hands and develop cold feet, a famed literary expresiion, in anticipation of an unpleasant event. This in effect, leads to the shutting down of energy consumption processes, including salivation. The result is a parched mouth, loss of appetite and troubled bowels. Put simply, these are nothing but physiological responses of our nervous system.

FACT-FILE

1.Stress has psychological causes as also psychological outcomes. It changes the way we perceive the world, our senses, memory, judgemet and also behavior.

2.During a stressful episode, your network of cells provides the boost to your general level of arousal and awareness-to make you more responsive to signals from your sensory organs and less receptive to information that is of no immediate significance. For example, in times of severe stress, an itchy or runny nose will not divert your attention.

3.It is not infrequent for people with severe stress to be subject to frequent colds and infections, or allergies, thanks to reduced immune system reaction time, or function. As a matter of fact, stress can set off skin condition such as itching and rashes, including atopic dermatitis [eczema] and psoriasis.

4.Panic [stress] attacks are characteristically distinct and intense. They have an abrupt onset with symptoms peaking in intensity within minutes of onset. Symptoms include feeling of terror and a fear of dying.

GOOD & BAD

The stress response is entirely normal. We have evolved to respond to stressors over the ages.it drives us to reach our goals faster. Yet, it is not surprising to find threats to our health and well-being unpleasant; so, we have the urge to avoid them. However, it is a totally different thing if stress is triggered several times a day, under unusual circumstances, or for long periods. This can lead to adjustment difficulties and also illness.

HORMONAL CHANGES IN STRESS

ADRENALINE

Commonly known as the fight or flight hormone, it is produced by the adrenal glands after receiving a message from the brain that a stressful situation has presented itself.

What It Does: Adrenaline, along with norepinephrine (more on that below), is largely responsible for the immediate reactions we feel when stressed. Imagine you're trying to change lanes in your car, says Amit Sood, M.D., director of research at the Complementary and Integrative Medicine and chair of Mayo Mind Body Initiative at Mayo Clinic. Suddenly, from your blind spot, comes a car racing at 100 miles per hour. You return to your original lane and your heart is pounding. Your muscles are tense, you're breathing faster, you may start sweating. That's adrenaline.

Along with the increase in heart rate, adrenaline also gives you a surge of energy -- which you might need to run away from a dangerous situation -- and also focuses your attention.

NOREPINEPHRINE

A hormone similar to adrenaline, released from the adrenal glands and also from the brain, says Sood.

What It Does: The primary role of norepinephrine, like adrenaline, is arousal, says Sood. "When you are stressed, you become more aware, awake, focused," he says. "You are just generally more responsive." It also helps to shift blood flow away from areas where it might not be so crucial, like the skin, and toward more essential areas at the time, like the muscles, so you can flee the stressful scene.

Although norepinephrine might seem redundant given adrenaline (which is also sometimes called epinephrine), Sood imagines we have both hormones as a type of backup system. "Say your adrenal glands are not working well," he says. "I still want something to save me from acute catastrophe."

Depending on the long-term impact of whatever's stressing you out -- and how you personally handle stress -- it could take anywhere from half an hour to a couple of days to return to your normal resting state, says Sood.

CORTISOL

A high cortisol- the stress chemical- level is a characteristic feature of stress. This is followed by a reduction in sensory acuity. When someone has high cortisol level, they will not be able to decode the presence of a weak resonance, but they will be able to tell 2-3 somewhat different sounds apart, because of the heightened state of sensitive-receptivity aroused by stress.

Whatever the nature of our evolutionalry origins, a readjustment in our sensory abilities makes good biological sense. It is established that a hormone released during the stress response- noradrenaline- also enhances the signal-processing capability of our sensory system. It must be remembered too that several parts of the brain plays a key role in processing information.

When your brain decides-consciously or unconsciously- that all is not well, the hypothalamus is activated. The hypothalamus is the seat of many electrical and chemical signals which trigger stress responses in our body. The hypothalamus also regulates functions such as eating, drinking and sensual pleasures.

During the preliminary phase of a stress response, the hypothalamus, as touched upon earlier, stimulus the nerve endingsin the sympathetic nervous system and the adrenal glands- this causes them to release the two hormones, adrenaline and noradrenaline. A slightly stressful activity, such as public speaking, may generally bring forth a 50 percent rise in noradrenaline. People having chronic stress or anxiety tend to have persistently raised levels of adrenaline and noradrenaline.

The Effects of Stress on Your Body

You're sitting in traffic, late for an important meeting, watching the minutes tick away. Your hypothalamus, a tiny control tower in your brain, decides to send out the order: Send in the stress hormones! These stress hormones are the same ones that trigger your body's “fight or flight” response. Your heart races, your breath quickens, and your muscles ready for action. This response was designed to protect your body in an emergency by preparing you to react quickly. But when the stress response keeps firing, day after day, it could put your health at serious risk.

Stress is a natural physical and mental reaction to life experiences. Everyone expresses stress from time to time. Anything from everyday responsibilities like work and family to serious life events such as a new diagnosis, war, or the death of a loved one can trigger stress. For immediate, short-term situations, stress can be beneficial to your health. It can help you cope with potentially serious situations. Your body responds to stress by releasing hormones that increase your heart and breathing rates and ready your muscles to respond.

Yet if your stress response doesn't stop firing, and these stress levels stay elevated far longer than is necessary for survival, it can take a toll on your

health. Chronic stress can cause a variety of symptoms and affect your overall well-being. Symptoms of chronic stress include:

- irritability
- anxiety
- depression
- headaches
- insomnia

Central nervous and endocrine systems

Your central nervous system (CNS) is in charge of your "fight or flight" response. In your brain, the hypothalamus gets the ball rolling, telling your adrenal glands to release the stress hormones adrenaline and cortisol. These hormones rev up your heartbeat and send blood rushing to the areas that need it most in an emergency, such as your muscles, heart, and other important organs.

When the perceived fear is gone, the hypothalamus should tell all systems to go back to normal. If the CNS fails to return to normal, or if the stressor doesn't go away, the response will continue.

Chronic stress is also a factor in behaviors such as overeating or not eating enough, alcohol or drug abuse, and social withdrawal.

Respiratory and cardiovascular systems

Stress hormones affect your respiratory and cardiovascular systems. During the stress response, you breathe faster in an effort to quickly distribute oxygen-rich blood to your body. If you already have a breathing problem like asthma or emphysema, stress can make it even harder to breathe.

Under stress, your heart also pumps faster. Stress hormones cause your blood vessels to constrict and divert more oxygen to your muscles so you'll have more strength to take action. But this also raises your blood pressure.

As a result, frequent or chronic stress will make your heart work too hard for too long. When your blood pressure rises, so do your risks for having a stroke or heart attack.

Digestive system

Under stress, your liver produces extra blood sugar (glucose) to give you a boost of energy. If you're under chronic stress, your body may not be able to keep up with this extra glucose surge. Chronic stress may increase your risk of developing type 2 diabetes.

The rush of hormones, rapid breathing, and increased heart rate can also upset your digestive system. You're more likely to have heartburn or acid reflux thanks to an increase in stomach acid. Stress doesn't cause ulcers (a bacterium called H. pylori often does), but it can increase your risk for them and cause existing ulcers to act up.

Stress can also affect the way food moves through your body, leading to diarrhea or constipation. You might also experience nausea, vomiting, or a stomachache.

Muscular system

Your muscles tense up to protect themselves from injury when you're stressed. They tend to release again once you relax, but if you're constantly under stress, your muscles may not get the chance to relax. Tight muscles cause headaches, back and shoulder pain, and body aches. Over time, this can set off an unhealthy cycle as you stop exercising and turn to pain medication for relief.

Sexuality and reproductive system

Stress is exhausting for both the body and mind. It's not unusual to lose your desire when you're under constant stress. While short-term stress may cause men to produce more of the male hormone testosterone, this effect doesn't last.

If stress continues for a long time, a man's testosterone levels can begin to drop. This can interfere with sperm production and cause erectile dysfunction or impotence. Chronic stress may also increase risk of infection for male reproductive organs like the prostate and testes.

For women, stress can affect the menstrual cycle. It

can lead to irregular, heavier, or more painful periods. Chronic stress can also magnify the physical symptoms of menopause.

Immune system

Stress stimulates the immune system, which can be a plus for immediate situations. This stimulation can help you avoid infections and heal wounds. But over time, stress hormones will weaken your immune system and reduce your body's response to foreign invaders. People under chronic stress are more susceptible to viral illnesses like the flu and the common cold, as well as other infections. Stress can also increase the time it takes you to recover from an illness or injury.

Stress-related illness

Prolonged stress puts your body in a continuous state readiness for physical action. When your body has no time to re-establish equilibrium, it becomes overworked and your immune system weakens, making you susceptible to sickness. Many essential bodily processes are disrupted and your risk of health problems increases.

Some common effects include:

- memory impairment
- depression
- skin conditions, such as eczema
- difficulty sleeping
- obesity
- heart disease
- digestive problems
- autoimmune diseases

10 Health Problems Related to Stress

- **Heart disease:** Researchers have long suspected that the stressed-out, type A personality has a higher risk of high blood pressure and heart problems. We don't know why, exactly. Stress can directly increase heart rate and blood flow, and causes the release of cholesterol and triglycerides into the blood stream. It's also possible that stress is related to other problems -- an increased likelihood of smoking or obesity -- that indirectly increase the heart risks.Doctors do know that sudden emotional stress can be a trigger for serious cardiac problems, including heart attacks. People who have chronic heart problems need to avoid acute stress -- and learn how to successfully manage life's unavoidable stresses -- as much as they can.
- **Asthma:** Many studies have shown that stress can worsen asthma. Some evidence suggests that a parent's chronic stress might even increase the risk of developing asthma in their children. One study looked at how parental stress affected the asthma rates of young children who were also exposed to air pollution or whose mothers smoked during pregnancy. The kids with stressed out parents had a substantially higher risk of developing asthma.
- **Obesity:** Excess fat in the belly seems to pose greater health risks than fat on the legs or hips -- and unfortunately, that's just where people with high stress seem to store it. "Stress causes higher levels of the hormone cortisol," says Winner, "and that seems to increase the amount of fat that's deposited in the abdomen."
- **Diabetes:** Stress can worsen diabetes in two ways. First, it increases the likelihood of bad behaviours, such as unhealthy eating and excessive drinking. Second, stress seems to raise the glucose levels of people with type 2 diabetes directly.
- **Headaches:** Stress is considered one of the most common triggers for headaches -- not just tension headaches, but migraines as well.
- **Depression and anxiety:** It's probably no surprise that chronic stress is connected with higher rates of depression and anxiety. One survey of recent studies found that people who had stress related to their jobs -- like demanding work with few rewards -- had an 80% higher risk of developing depression within a few years than people with lower stress.

- **Gastrointestinal problems:** Here's one thing that stress doesn't do -- it doesn't cause ulcers. However, it can make them worse. Stress is also a common factor in many other GI conditions, such as chronic heartburn (or gastroesophageal reflux disease, GERD) and irritable bowel syndrome (IBS), Winner says.
- **Alzheimer's disease:** One animal study found that stress might worsen Alzheimer's disease, causing its brain lesions to form more quickly. Some researchers speculate that reducing stress has the potential to slow down the progression of the disease.
- **Accelerated aging:** There's actually evidence that stress can affect how you age. One study compared the DNA of mothers who were under high stress -- they were caring for a chronically ill child -- with women who were not. Researchers found that a particular region of the chromosomes showed the effects of accelerated aging. Stress seemed to accelerate aging about 9 to 17 additional years.
- **Premature death:** A study looked at the health effects of stress by studying elderly caregivers looking after their spouses -- people who are naturally under a great deal of stress. It found that caregivers had a 63% higher rate of death than people their age who were not caregivers.

Effects of Stress on Your Health

When you are in a stressful situation, your body launches a physical response. Your nervous system springs into action, releasing hormones that prepare you to either fight or take off. It's called the "fight or flight" response, and it's why, when you're in a stressful situation, you may notice that your heartbeat speeds up, your breathing gets faster, your muscles tense, and you start to sweat. This kind of stress is short-term and temporary (acute stress), and your body usually recovers quickly from it.

But if your stress system stays activated over a long period of time (chronic stress), it can lead to or aggravate more serious health problems. The constant rush of stress hormones can put a lot of wear and tear on your body, causing it to age more quickly and making it more prone to illness.

If you've been stressed out for a short period of time, you may start to notice some of these physical signs:

- Headache
- Fatigue
- Difficulty sleeping
- Difficulty concentrating
- Upset stomach
- Irritability

When stress becomes long-term and is not properly addressed, it can lead to a number of more serious health conditions, including:

- Depression
- High blood pressure
- Abnormal heartbeat (arrhythmia)
- Hardening of the arteries (atherosclerosis)
- Heart disease
- Heart attack
- Heartburn, ulcers, irritable bowel syndrome

Stress Fantasies vs. Stress Realities

Stress Fantasy: Overwhelmed by the relentless p_a_c_e of it all, I decide to abandon the Internet and live a simpler life founded on principles of health and self-sufficiency. I move to an organic farm and learn to make my own yogurt.

Reality: I cannot boil water, let alone handle live cultures. I become incredibly sick after eating the yogurt and blog about it before I die.

Stress Fantasy: After a series of increasingly terrible interactions with garbage humans, I swear off all sexual relations forever. Untouched, my skin takes on the radiant glow of the Virgin Mary. My hair grows long because no man's hands ever get tangled up in it. Increasingly brilliant thoughts fire at a rapidfire rate in my pure, smooth brain.

Stress Reality: I buy a vibrator and halfheartedly text inappropriate people until I develop a new crush.

Stress Fantasy: I move to Montreal, where everyone is young and beautiful even when they're not, and all my friends live for their art and make their own brunch because they have the time for happiness.

Stress Reality: I find myself desperately trying to befriend 21-year-olds because everyone my age either lives with their partner and infant child in NDG or does not speak English. A 21-year-old feels bad for me and takes me to parties, where I stand around with a Maudite beer trying to talk to 21-year-olds; eventually I give up and try desperately to befriend a 48-year-old in a contemporary flute ensemble. I splurge on a beautiful Mile End one-bedroom that resembles a beautiful New York one-bedroom for four times the price, but run out of money because it's still a beautiful Mile End one-bedroom. I never once make my own brunch.

Stress Fantasy: I take a month off to read every book I've ever said I would read. I read every book I didn't read because I dropped out of university; I read every book every friend has ever recommend. I read every book referenced in the books written by my favorite authors. I never check my phone. Behind my eyes, a bottomless pool of hard-won knowledge becomes visible.

Stress Reality: I abandon this project ten minutes in because lol oh my god I can't believe he retweeted me.

Stress Fantasy: I give up on trying to make rent in the city and move to Dartmouth and buy a husky for companionship.

Stress Reality: I realize I've never even been to Dartmouth, I just like that the houses are painted pretty colors and the rent seems sustainable on a savings budget, but more people get the same idea and the rent rises and soon I'm priced out of my sweet Dartmouth apartment (are there sweet Dartmouth apartments?) and into a cabin somewhere. I also realize that a "mild dog allergy" is a major dog allergy in a cabin full of airborne dog fur and I'm a million miles from all my friends but I can't afford an Internet connection.

Stress Fantasy: I become an itinerant hippie. Living on the road, I never have to worry about domestic business. I make friends all over the world and their love follows me wherever I go.

Stress Reality: I plan the first leg of my journey very poorly and spend most of my time at the hostel. I hate everyone I meet and want to go home.

Stress Fantasy: I learn code and make a shit ton of money through very little effort. The money funds my "work."

Stress Reality: I am incapable of learning code, make no money, and spend my free time napping.

Stress Fantasy: I kill myself.

Stress Reality: I die.

Self-treatment

In some cases, a person can treat an anxiety disorder at home without clinical supervision. However, this may not be effective for severe or long-term anxiety disorders.

There are several exercises and actions to help a person cope with milder, more focused, or shorter-term anxiety disorders, including:

- **Stress management:** Learning to manage stress can help limit potential triggers. Organize any upcoming pressures and deadlines, compile lists to make daunting tasks more manageable, and commit to taking time off from study or work.
- **Relaxation techniques:** Simple activities can help soothe the mental and physical signs of anxiety. These techniques include meditation, deep breathing exercises, long baths, resting in the dark, and yoga.
- **Exercises to replace negative thoughts with positive ones:** Make a list of the negative thoughts that might be cycling as a result of anxiety, and write down another list next to it containing positive, believable thoughts to replace them. Creating a mental image of

successfully facing and conquering a specific fear can also provide benefits if anxiety symptoms relate to a specific cause, such as in a phobia.

- **Support network:** Talk with familiar people who are supportive, such as a family member or friend. Support group services may also be available in the local area and online.
- **Exercise:** Physical exertion can improve self-image and release chemicals in the brain that trigger positive feelings.

Stress Management

Stress and its management in the community is a growing issue for many health practitioners.

Physiotherapists offer a number of stress management techniques and treatments which can help to improve a patient's health and well-being, whether it be specially designed stress management programs, exercise programs, massage, muscle relaxation or general fitness advice.

Role of physiotherapy

Physiotherapists use an initial assessment to clarify the nature of the problem and develop strategies and treatment which are acceptable to the individual.

Treatment can take the form of individual consultation, group relaxation classes, relaxation audio tapes or information sessions for the general public. As part of the treatment program, physiotherapists offer close professional follow up with the patient to ensure a positive treatment outcome.

Physiotherapists with a special interest in stress management can offer many different types of relaxation therapy including guided imagery, progressive muscle relaxation, breathing techniques, thought stopping, stretching, massage and general fitness advice.

Benefits of physiotherapy

Research continues to indicate a positive correlation between a person's ability to cope with stressors and the likelihood of disease during their lifetime. **Physiotherapy can assist by:**

- reducing muscle tension;
- increasing vitality and decreasing reported tiredness;
- improving concentration span;
- improving feeling of general well-being;
- decreasing blood pressure;
- reducing risk of cardiovascular disease;
- improving attitude to work and leisure activity;
- reducing pain states such as headache, chronic pain syndromes and work related anxiety;
- Possibly decreasing dosage of psycho-active medication.

OBESITY STIGMA IN ONLINE NEWS: A VISUAL CONTENT ANALYSIS

Dr. Satya Bhushan Nagar,

ABSTRACT : This study conducted a content analysis to examine the types of images that accompany online news stories about obesity and to determine how obese people are portrayed in news photographs. Images were selected from news articles about obesity obtained from 5 major news Web sites, during 2011-2018. Images accompanying news stories about obesity 859 were systematically coded. Of 441 individuals identified in news photographs, 65% were overweight / obese and 27% were non overweight. Overall, 72% of images that depicted an overweight or obese person were portrayed in a negative, stigmatizing manner. Overweight/obese individuals were significantly more likely to have their heads cut out of the photos, to be portrayed showing only their abdomens or lower bodies, and to be shown eating or drinking than were non overweight individuals. Overweight/obese individuals were significantly less likely to be shown fully clothed, wearing professional clothing, or exercising than were non overweight individuals. Obese individuals are frequently stigmatized in online news photographs; this phenomenon has important implications for public perceptions of obese persons and may reinforce pervasive prejudice and discrimination. The study revealed that as a result of social weight stigma, overweight individuals are vulnerable to serious health complications, and they face disadvantages in health care, employment, education, and beyond. Just as the news media have the power to perpetuate these disparities, they may also play a vital role in correcting them.

Key words: obesity stigma, Overweight, portrayed

As obesity presents a major public health challenge, stigma against obese individuals threatens to undermine efforts to confront this challenge (Puhl & Heuer, 2010). Obese people are highly stigmatized in our society in important domains of living, including education, employment, and health care (Puhl & Brownell, 2001; Puhl & Heuer, 2009). The mass media is an especially compelling example of the social acceptability of weight stigma. Weight stigmatization is common in several forms of popular media (Puhl & Heuer, 2009). Overweight and obese persons are frequently ridiculed and stereotyped in popular television shows and movies (Fouts

Address correspondence to Rebecca M. Puhl, Rudd Center for Food Policy and Obesity, Yale University, 309 Edwards Street, New Haven, CT 06511, USA. E-mail: rebecca.puhl@ yale.edu & Burggraf, 1999, 2000; Fouts & Vaughan, 2002; Greenberg, Eastin, Hofshire, Lachlan, & Brownell, 2003; Herbozo, Tantleff-Dunn, Gokee-Larose, & Thompson, 2004; Himes & Thompson, 2007; Klein & Shiffman, 2005, 2006; Robinson, Callister, & Jankoski, 2008), and the news media often takes a victim-blaming approach in their coverage of obesity (Boero, 2007; Bonfiglioli, Smith, King, Chapman, & Holding, 2007; Kim & Willis, 2007; Lawrence, 2004; Rich & Evans, 2005). Research demonstrates that the news media disproportionately frames obesity in terms of personal responsibility, focusing on individual-level causes and solutions while ignoring important societal and environmental contributors (Bonfiglioli et al., 2007; Kim & Willis, 2007; Lawrence, 2004). As the news media tends to cast blame on obese persons, weight stigmatization can be perpetuated (Crandall & Reser, 2005; Weiner, Perry, & Magnusson, 1988). To date, research in this area has primarily analyzed written content of news reports about obesity.

These studies are guided by Goffman's (1974) frame

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analysis theory, which provides the theoretical foundation for the stereotyping process. Framing theory explains the process by which a source (e.g., a news story) defines a particular social issue and outlines the fundamental problems and considerations relevant to that issue (Nelson, Oxley, & Clawson, 1997). Framing theory has often been used in media studies as a basis for studying how a communication source (e.g., a news organization) constructs social or political problems (Nelson et al., 1997).

Visual framing, or pictorial framing, of an issue is also of particular importance because viewers tend to accept visual images as reality while being unaware of the influence of visual framing (Messaris & Abraham, 2001). According to Messaris and Abraham, "Pictorial framing is worthy of investigation not only because images are capable of conveying unverbalized meanings, but also because awareness of those meanings may be particularly elusive." Furthermore, news photos may be noticed even when the accompanying story is not read, and photographs help readers interpret news stories (Messaris & Abraham).

Studies guided by framing theory have used visual content analysis techniques and demonstrated that news photographs can communicate stereotypes (Fahmy, 2004) and racial, gender, and age biases (Entman, 1992; Martindale, 1990; Rodgers & Thorson, 2000).

To our knowledge, no study has investigated the ways in which obese individuals are visually depicted in the news. Thus, this study aimed to conduct a content analysis to examine the types of images that accompany online news stories about obesity and to determine how obese people are portrayed in news photographs.

Methods

Sample

We selected photographs by searching five major news Web sites for articles about obesity: MSNBC.com, CNN.com, ABCnews.com, CBSnews.com, and FOXnews.com. We also considered Web sites of major online newspapers (e.g., NYTimes.com, WashingtonPost.com), but subsequently excluded them because we discovered that these sites often did not include images with their archived news stories. In addition, recent research reveals that the majority of Americans are more likely to get their news from online sources, as opposed to print sources (Pew Research Center Publications, 2009).

Therefore, we chose to analyze photographs that were featured with online news articles in order to obtain a sample of images that may have a high level of exposure to a greater number of viewers. After testing several search terms (e.g., fat, obese, weight, overweight) and examining the types of articles produced by each Web site, we determined that the search term obesity produced the most news articles relevant to this study.

After typing obesity into the search box of each Web site, thousands of results were produced, which were automatically sorted by each Web site according to their relevance to the topic of obesity. We conducted searches on each of the five Web sites during a 2-week period in September of 2009. Because the goal of the present study was to examine visual images accompanying articles about obesity, every article produced by our search results was screened to determine whether the primary topic (or a major topic) of the article was about obesity. For some articles, the word obesity appeared in the headline, but for many articles' obesity was prominently discussed in the text of the article. Thus, each article was read by coders in order to determine whether the main focus of the article was obesity.

Articles were selected for inclusion in the content analysis if they met the following criteria:

1. The main topic or a major topic in the article was obesity (e.g., health care spending on obesity, obesity treatment, health consequences of obesity).
2. The article was accompanied by an image.

Because of the high volume of articles produced by each Web site search (e.g., 78,200 articles about obesity were retrieved on MSNBC.com), only the first 500 results on each Web site were included as potential sources of images for this study. After reviewing the first 500 results on each Web site, exclusions were made if the online report was not accompanied by an image or photograph (which was the primary reason for exclusion), and if after reading the article it became apparent that obesity was not a primary focus of the content. Using this exclusion process, 859 images were ultimately retrieved to be included in the content analysis (170 images from MSNBC.com, 367 images from CBSnews.com, 209 images from ABCnews.com, 65 images from CNN.com, and 48 images from FOXnews.com).

Measurement

The unit of analysis in this study was individual images accompanying news stories about obesity (N¼549). To conduct a content analysis, a comprehensive coding tool was developed with specific variables that were chosen to document demographic characteristics and describe the portrayals of obese persons in the photographs. Variables were also chosen to capture ways in which images may be stigmatizing or stereotypical. Variables included the following:

1. News source of the image 2. Date the article was published 3. Story topic 4. Image credit (Associated Press, a stock image, or credited to the news source itself) 5. Demographic characteristics of the person in the image (gender, age, and race) 6. Body weight (underweight, normal weight, overweight, obese, very obese, or pregnant) 7. How the body was portrayed in the image (most of the body, head=face, abdomen, or lower body) 8. Whether the head was cut out of the image 9. Whether the person in the image was clothed (fully clothed, partially clothed, or mostly unclothed) 10. Clothing style (professional, casual, or exercise) 11. Fit of clothes (appropriate or inappropriate; coded as inappropriate only if an obese individual's clothing was distinctly too tight) Images were also coded according to the main role or activity of the person(s) portrayed in the image.

These included the following:

1. Eating and=or drinking 2. Selling, shopping for, serving, and=or cooking food 3. Exercising 4. Being an expert, researcher, advocate, or journalist 5. Being a patient 6. Being a health professional 7. Being the feature of a weight loss success story 8. Being shown as an isolated body part (e.g., only the abdomen is shown) 9. Walking down the street 10. Engaging in sedentary behavior (e.g., watching television, playing a video game) 11. Being featured in a personal interest story (e.g., a photograph of a couple who were denied adoption because of their obesity) 12. Other activities

If there was food or drink present in the photograph, it was coded as either healthy (e.g., fruit, vegetables, water) or unhealthy (e.g., potato chips, fast food, soda). All images were systematically coded by a team of four trained coders. We assessed interrater reliability by having each of the four coders independently code 25% of articles in the sample (n¼137). Because the coded variables were nominal, we calculated reliability using Cohen's kappa for multiple raters. This calculation corrected for chance agreement among coders. Reliability scores in this study ranged from 0.72 (lowest) to 1.0 (highest), which indicates a high level of agreement among all four coders. The lowest score was for the variable assessing the story topic of the news article. Before coding the remaining 75% of the articles, all four coders arbitrated in order to resolve any outstanding coding inconsistencies.

Results

Sample Characteristics

Of the total sample of 859 images, 188 (22%) were excluded from analysis because they did not contain people (these were mostly images of food or other health-related graphics). This exclusion left 671

images published in online news articles about obesity from 2002 to 2009. Among these articles, 15 different categories of story topics were identified. The most prevalent story topics were about the health consequences of obesity (13%), community or government initiatives to prevent obesity (10%), obesity prevalence (9%), and weight loss surgery or drugs (9%). The majority of the images accompanying these reports were credited to the Associated Press (54%). When more than one person was depicted in an image, each person was coded separately, resulting in 441 individual people in the final sample.

Table 1 shows the demographic characteristics of individuals in our sample. Overall, 56% of the sample was male, and 44% was female. The majority of individuals were White (79%), and 18% were racial=ethnic minorities (e.g., Black, Latino, Asian). In addition, 70% were adults and 29% were youths. Sixty-five percent of the sample was overweight=obese, and 27% were nonoverweight. The original weight categories of "overweight," "obese," and "very obese" were collapsed into one "overweight=obese" category, because of relatively small percentages of individuals who were coded as "overweight" or "very obese." The remaining 8% were either pregnant or their weight category could not be determined; thus, they were subsequently excluded from further analysis. All subsequent analyses compare nonoverweight with overweight= obese persons.

Portrayals of Overweight/Obese Persons

Table 2 compares the percentage of overweight=obese persons versus nonoverweight persons who were portrayed with specific characteristics of interest. We performed chi-square tests to determine significant differences between portrayals of overweight=obese people and nonoverweight people. In addition, we calculated odds ratios to maximize the interpretability of the chi-square results. Although there were no differences in gender or race among overweight=obese persons versus nonoverweight persons, several other significant findings emerged. Youths depicted in images were twice as likely to be overweight=obese than were adults who were portrayed in images, v2(1, N¼400) ¼6.75, p¼.009. There were several significant differences in how individuals' bodies were portrayed in the photographs. More than half of overweight=obese people (52%) were portrayed in images with only their abdomens or lower bodies shown, whereas nonoverweight people were never portrayed in this way, v2(1, N¼404) ¼98.44, p<.001. Overweight=obese individuals were 23.3 times more likely to have their heads cut out of the photos than were nonoverweight individuals, v2(1, N¼404)¼97.16, p<.001.

Overweight=obese individuals were also more likely to be photographed from the side and rear view (rather than from the front) than nonoverweight individuals, odds ratio¼2.61, v2(1, N¼403)¼14.26, p<.001. Overweight=obese people were less likely to be appear fully clothed, odds ratio¼0.32, v2(1, N¼400)¼5.73, p¼.02, and were less likely to appear in professional clothing compared with nonoverweight persons, odds ratio¼0.13, v2(1, N¼370)¼65.80, p<.001. Overweight=obese and nonoverweight persons also differed in the types of activities in which they were portrayed in photographs. Overweight=obese individuals were 3.5 times more likely to be shown consuming food compared with nonoverweight persons, v2(1, N¼404)¼4.66, p¼.03. Conversely, nonoverweight individuals were 3.9 times more likely to be shown exercising compared with overweight=obese individuals v2(1, N¼404)¼16.91, p<.001. Nonoverweight individuals were 50 times more likely to be shown as experts, advocates, or journalists than were overweight=obese individuals, v2(1, N¼404)¼90.99, p<.001, and were also more likely than overweight=obese persons to be shown as healthcare providers, odds ratio¼7.69, v2(1,

N¼404)¼34.95, p<.001. There were no significant

Table 1. Demographic characteristics of individuals portrayed in online news images (N¼441) Online news source

Variable	MSNBC (N¼70)	CBS (N¼202)	ABC (N¼103)	CNN (N¼42)	FOX (N¼24)	Total Sample (N¼441)
Weight						
Nonoverweight	39%	24%	33%	61%	71%	33%
Overweight/ Obese	19%	45%	27%	71%	45%	65%
Could not be determined	0%	8%	4%	10%	29%	7%
Sex						
Male	69%	55%	47%	61%	54%	56%
Female	31%	45%	52%	46%	44%	39%
Age						
Youth	30%	26%	34%	19%	29%	8%

differences for being shown in the role of a patient or engaging in sedentary behaviors between overweight=obese and nonoverweight persons.

Characteristics of Individual News Source

Because the sample included images from five distinct news sources, we conducted analyses to determine whether significant differences emerged between each news source for demographic characteristics.

The Breslow-Day Test determined whether there was homogeneity in the odds ratio between news sources, with the criterion for significance set with an alpha of .10.

First, analyses revealed that there were differences between the news sources regarding gender and weight: Breslow-Day v2(4)¼16.55, p¼.002. Specifically, within CBSnews.com, men were 4.2 times more likely to be overweight=obese than were women, v2(1, N¼182)¼14.74, p<.001. There were no significant differences for gender among the other news sources. Second, there were also differences between sources for weight and age of images portrayed: Breslow-Day v2(4)¼8.03, p¼.09. Specifically, within CBSnews.com, the odds of a youth being overweight=obese were 3.6 times greater than the odds of adults being overweight=obese, v2(1, N¼181)¼7.86, p¼.005. There were no significant differences for age among the other sources.

Stigmatizing Portrayals Images were also analyzed to determine whether the portrayals of overweight=obese individuals were stigmatizing. An image was considered stigmatizing if it met one or more of the following criteria:

1. Disproportionately emphasized an overweight=obese person's abdomen or lower body 2. Portrayed an overweight=obese person's abdomen without clothes 3. Featured an overweight=obese person with their head cut out of the image

Table 2. Comparison of portrayals for overweight=obese persons versus nonoverweight persons in online news reports about obesity

Overweight=obese (N¼287)

Nonoverweight (N¼119)

Negative characteristic "Headless" 59% 6% Shown from side or rear angle 40% 20% Only abdomen or lower body shown 52% 0% Shown without clothes or bare midriff 12% 4% Inappropriate fitting clothing 6% 0% Shown eating and=or drinking 8% 3% Engaged in sedentary activity 5% 3% Positive characteristic Wearing professional clothing 11% 50% Shown exercising 6% 20% Portrayed as expert or advocate 1% 33% Portrayed as health care provider 4% 22%

4. Portrayed an overweight=obese person with inappropriately fitting clothing (e.g., a shirt that is distinctly too tight) 5. Portrayed an overweight=obese person eating=drinking an unhealthy food=drink 6. Portrayed an overweight=obese person engaging in a sedentary activity

Overall, 72% of images that portrayed an overweight or obese person met at least one of the aforementioned criteria. Overweight=obese men were slightly more likely than overweight=obese women to be portrayed in a stigmatizing way, odds ratio¼1.6, v2(1, N¼437) ¼5.95, p¼.02. In addition, overweight=obese White individuals were twice as

likely to be portrayed in stigmatizing ways than overweight= obese minorities, v2(1, N¼426) ¼7.85, p¼.005. There were no significant differences by age. Among all the images in the sample for each news source, CBSnews.com had the highest percentage of stigmatizing images (43%), followed by ABCnews.com (35%), MSNBC.com (26%), CNN.com (19%), and FOXnews.com (18%).

Among photos credited to the Associated Press, 46% were stigmatizing. Among the stock photos, 33% were stigmatizing, and 19% of images that were credited to the individual news sources were stigmatizing. Last, news stories about the genetic causes of obesity contained the highest percentage of stigmatizing images (70%), followed by health care spending (63%), and prevalence of obesity (58%). The lowest percentages of stigmatizing images were paired with stories on food=diet (5%) and exercise (8%). There were no significant differences in stigmatizing portrayals by the year of an article's publication.

Discussion

This study demonstrates that the majority (72%) of overweight and obese individuals depicted in online news photographs were stigmatized. Overweight and obese individuals were more likely to have their heads cut out of photos, to be shown from the side or the rear, to be portrayed with only their abdomens or lower bodies shown, and to be partially clothed (e.g., bare stomachs showing) than nonoverweight individuals. These findings confirm the phenomenon of the "headless stomach," which is the tendency for news reports to show obese people with their heads cut out of images. This phenomenon has been fervently discussed by writers in online communities (Cooper, 2007), but it has never been empirically studied. Some may argue that obese individuals' heads and faces are omitted from news photos to protect their privacy. However, images that place unnecessary emphasis on particular body parts seem to intentionally evoke a sense of disgust, rather than merely portray a obese person with their identity concealed. This is especially apparent when news articles are accompanied by stock images that show unclothed obese people (e.g., with no shirt). By isolating certain body parts and emphasizing unflattering portrayals of excess weight, news photographs degrade and dehumanize obese individuals. Consequently, obese people are reduced to being symbols of the epidemic, rather than valued members of society who deserve compassion and respect. In addition to the abundance of negative images of overweight individuals observed in the present study, there was also a considerable lack of positive portrayals. Overweight and obese individuals were less likely to be shown wearing professional-looking clothing, and were far less likely to be portrayed as experts,

advocates, journalists, or healthcare providers than those who were not overweight. In addition, overweight persons were less likely to be shown exercising and more likely to be portrayed eating or drinking than were nonoverweight persons. Such portrayals perpetuate negative weight-based stereotypes about obese persons. Millions of Americans rely on the Internet for their news (Pew Research Center Publications, 2009). Thus, the number of Americans who are exposed to these stigmatizing portrayals of obese persons is vast, which may affect the pervasive stigma and discrimination directed toward obese individuals. Experimental research shows that people who read a news story about obesity that is paired with a stigmatizing photograph subsequently express higher levels of weight bias than do those who read the same news story about obesity paired with a nonstigmatizing photograph (McClure et al., 2011).

As these negative images of obese people have become commonplace, they help to shape societal beliefs about obese persons. In addition to perpetuating societal stigma, negative news images of obese persons may also contribute to the physical and emotional health consequences suffered by persons who experience weight stigma. An

accumulation of research demonstrates that obesity stigma poses a significant threat to psychological and physical health, including increasing vulnerability for depression, anxiety, low self-esteem, disordered eating, lower levels of physical activity, and weight gain (Ashmore, Friedman, Rechmann, & Musante, 2008; Carels et al., 2009; Puhl & Brownell, 2006; Puhl & Heuer, 2009; Puhl, Moss-Racusin, & Schwartz, 2007; Vartanian, Herman, & Polivy, 2005; Vartanian & Shaprow, 2008). Obese individuals who view these stigmatizing images in the news may be vulnerable to internalizing negative weight-based stereotypes, which can, in turn, lead to emotional and physical health consequences (Puhl et al., 2007). Considering both the pervasiveness of negative visual content in the news, and the prevalence of overweight and obesity in American children and adults, the public health impact of these stigmatizing portrayals may be substantial.

Some critics may argue that the use of "positive" (e.g., nonstigmatizing) images of obese persons could potentially normalize obesity in a way that reduces motivation to maintain a healthy weight. However, scientific evidence suggests that weight stigma is not a beneficial tool for motivating weight loss. Weight stigma is counterproductive for public health and increases the likelihood for unhealthy eating behaviors, avoidance of physical activity, impaired weight loss efforts, and decreased use of preventive health services (Amy, Aalborg, Lyons, & Keranen, 2006; Ashmore et al., 2008; Carels et al., 2009; Puhl & Brownell, 2006; Puhl & Heuer, 2010). In contrast, studies suggest that communicating acceptance and providing support, rather than instilling stigma and shame, are more appropriate and effective strategies to promote healthy lifestyle behaviors in obese persons (Lillis, Hayes, Bunting, & Masuda, 2009). The present findings also have potential implications for public health policy. The news media have tremendous power to shape the public's perception of social issues, and, in doing so, can influence the agenda of policymakers (McCombs & Shaw, 1972). To the extent that news images stigmatize obese individuals, they reinforce blame on obese persons (Crandall & Reser, 2005). The media's attribution of obesity as a problem with obese individuals themselves (rather than a more complex societal and public health issue) is underscored by the inclusion of stigmatizing images. When obese individuals are blamed, the need for government involvement and public policy efforts to address obesity is curtailed.

Thus, negative visualframing of obese persons in the news could adversely influence public policy efforts to address obesity. At the same time, the news media can play an important role in reducing societal stigma toward obese individuals by changing the visual content of their news reports about obesity. It is not uncommon for media outlets to establish ethical guidelines that advise journalists against stereotyping and bias.

For example, the Society of Professional Journalists' Code of Ethics states, "Journalists should avoid stereotyping by race, gender, age, religion, ethnicity, geography, sexual orientation, disability, physical appearance or social status" (Society of Professional Journalists, 2010) The Code of Ethics for the National Press Photographers Association states that visual journalists should "avoid stereotyping individuals and groups" (National Press Photographers Association, 2010).

Therefore, it is reasonable to expect the news media to make a concerted effort to correct bias in their visual content when it is exposed. In the present study, more than half of images were credited to the Associated Press, and 46% of these images were found to be stigmatizing. According to the Associated Press Statement of News Values and Principles, "Always and in all media, we insist on the highest standards of integrity and ethical behavior when we gather and deliver the news....

That means we abhor inaccuracies, carelessness, bias or distortions" (Associated Press, 2010). Thus,

in keeping with their stated values and standards, it would be consistent and appropriate for the Associated Press to improve their photographic depictions of obese individuals, as should other mainstream online news outlets. There are several limitations of the present study. First, the sample consisted of Web-based news reports and therefore it is unknown whether images that accompany print articles (e.g., newspapers, magazines) about obesity differ from images used in online news. Additional research is needed to establish the generalizability of these findings to other media sources. Second, it would be useful to obtain larger and more diverse samples of images from online news sources to more closely examine potential differences in portrayals of obese persons related to issues of race, age, sexual orientation, and other characteristics that were beyond the scope of this study. Last, the sample of images selected for this study focused on online news coverage of obesity-related topics. It would be informative for future research to examine whether portrayals of obese and nonobese persons documented in the present study are similar in news stories on topics unrelated to body weight.

Obesity stigma in the mass media contributes to the social acceptability of weight prejudice and its consequences for those who are affected (Puhl & Heuer, 2009). News images of obese persons may be a particularly powerful and insidious source of obesity stigma, especially given that these images are prevalent and rarely challenged.

Our study revealed that the prevalence of stigmatizing images accompanying news stories about obesity remained consistent throughout a 7-year period from 2011to 2018. As this problem persists, efforts are clearly needed to address the visual portrayals of obese persons in the media to help reduce stigma. Photographers, journalists, and editors must be mindful of the power of their photographic content to communicate biases to their readers. As a result of societal weight stigma, overweight individuals are vulnerable to serious health complications, and they face disadvantages in health care, employment, education, and beyond. Just as the news media have the power to perpetuate these disparities, they may also play a vital role in correcting them. Further research is needed to examine the effect of a shift toward positive portrayals of obese individuals in obesity news on public attitudes and approaches to address obesity.

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IMMEDIATE EFFECTS OF COST-EFFECTIVE STRAP ON Q-ANGLE AND KNEE FUNCTIONAL PERFORMANCE FOR NON-ATHLETIC UNIVERSITY STUDENTS WITH ANTERIOR KNEE PAIN

Dr. Manash Kanti Chakraborty

ABSTRACT

Objective: To find out immediate effects of cost-effective strap on Q-angle and knee functional performance for non-athletic university students with anterior knee pain. Methods: A quasi experimental single group pre and post study was designed with convenient sampling of 110 non-athletic university students with anterior knee pain. The study has been conducted in SRM University, Kattankulathur campus, Chennai. The Q- angle and Visual analog scale was measured followed by collection of Kujala Patellofemoral pain syndrome scoring sheet and Werner functional knee score for anterior knee pain. The score was tabulated as pre-test measurement .The cost-effective strap which was influenced by the use of Theratogs, was applied over the mid-thigh region with 50% resistance anteroposterior and medial to lateral direction. Then the measurement of Q-angle, visual analog score with Kujala Patellofemoral pain syndrome score and Werner functional knee score were repeatedly taken from the subjects and compared with pre-test measurement score. Results: The statistical analysis of paired t-test showed significant reduction on the measurement of Q- angle($p=0.000$) and visual analog scale($p=0.000$).The study also showed significant improvement on Kujala Patellofemoral scoring sheet($p=0.000$) and Werner functional knee score for anterior knee pain($p=0.000$) at 95% C.I. Conclusion: The study showed significant reduction on Q-angle and improvement of functional knee performance immediately after applying over the subjects with anterior knee pain. So it could concluded that the strap can be used as a conservative physiotherapy management for subjects with anterior knee pain which is also cost effective while comparing with Theratogs.

Key pints: Anterior knee pain, Cost-effective strap, functional knee performance.

INTRODUCTION

The term anterior knee pain is used to describe all symptoms of pain around the front of the knee, which may be caused by a number of conditions such as patellar tendinopathy and patellofemoral pain syndrome.1 Anterior knee pain, diagnosed as Patellofemoral Pain Syndrome (PFPS), is one of the most common musculoskeletal disorders .28

Anterior knee pain and Patellofemoral pain syndrome (PFPS) accounted for 34% of knee injuries as one of the most common orthopedic conditions, particularly in active, young females,8,9 while anterior knee pain is of high socioeconomic relevance as it occurs most frequently in young and active patients. The rate is around 15-33% in active adult population and 21-45% of adolescents.23 The main activities associated with anterior knee pain are sporting, stair climbing and walking which are common in student.8,9They frequently experience pain with prolonged sitting (watching a movie, riding on an airplane) and feel that they have to occasionally straighten their legs out to decrease discomfort.

The onset of symptoms is frequently associated with the start of a new activity or increase in level of intensity of a pre-existing activity. The pain is usually exacerbated by squatting and kneeling. It is generally an aching pain, but can become sharp in nature and even be associated with a burning sensation. This occurs particularly when going down

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the stairs. With knee flexion and extension, the patella glides through a groove in the distal femur. When the bones in the lower leg are not lined up ideally, it can cause the gliding between the patella and femur to become abnormal. Shortening of the quadriceps muscles, hamstrings and iliotibial band, and relative weakness of the quadriceps muscles are probably the most common causes.

Alignment of the hip, knee and ankle is thought to play a key role in the load distribution at the knee so biomechanical changes resulting from abnormal alignment may influence joint loads, mechanical efficiency of muscles, and proprioceptive orientation and feedback from the hip and knee, resulting in altered neuromuscular function and control of the lower extremities.2, 3

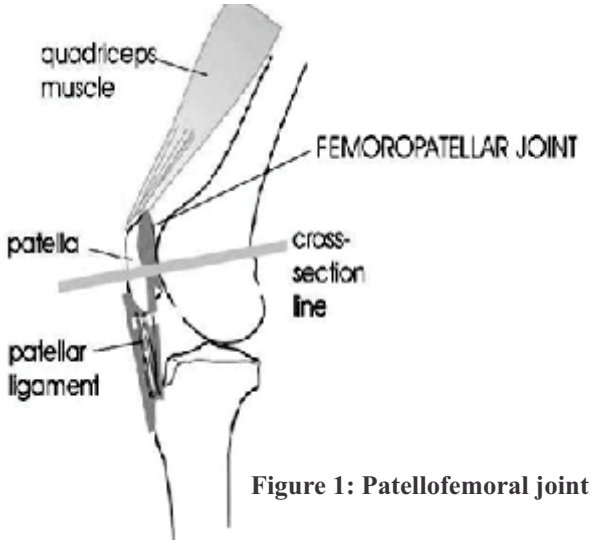


Figure 1: Patellofemoral joint

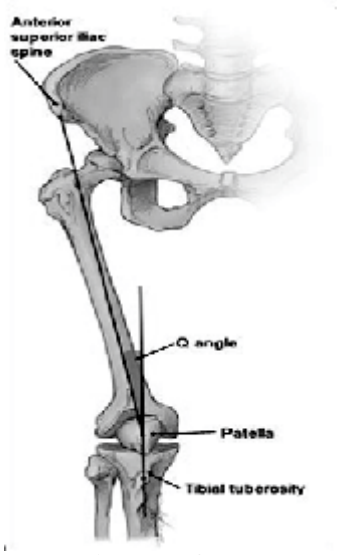


Figure 2: Q- angle

Among these lower extremity alignment variables, the quadriceps angle (Q -Angle) has been frequently studied, which is defined as the angle formed by a line from the anterior superior iliac spine to the patella center and a line from the patella center to the tibial tuberosity.4Q angle is a composite measure of pelvic position, hip rotation, tibial torsion, patella position and foot position.7, 11

As Q angle represents the direction of the quadriceps muscle force vector in the frontal plane, excessive angulation is thought to predispose individuals to injuries caused by abnormal quadriceps forces acting at the patellofemoral joints.5, 6

Altered foot and ankle kinematics may contribute to hip and knee joint mechanics thought to increase patellofemoral joint stress.10,11 The patellofemoral joint reaction force, a measurement of patellar compression against the femur, is influenced by the knee angle as well as the quadriceps force.

This study was aimed to find out the immediate efficacy of a cost effective strap in anterior knee pain which is a custom made elastic material, self-administrative and which can be used under garments easily is mechanically similar with THERATOGS.

THERATOGS is an orthotic undergarment and strapping system that gives clients with sensorimotor impairment a new modality for improving postural alignment and stability, movement skill and precision and joint stability. THERATOGS were designed and developed by Beverly Cusick, PT, MS and provide a Latex free, breathable, comfortable, Velcro sensitive “external skin” for clinicians engaged in sensorimotor training of clients with developmental disabilities, and for clients in rehabilitation after brain injury, stroke, orthopedic surgery, or neurosurgery.

The materials of the strap is not containing any chemicals so that it can be used for longer duration comparing to crepe bandage or other therapeutic

device which are used for conservative pain reducing management without any skin irritation.

Method: The study was designed as a quasi-experimental single group pre and post-test. The study was performed at SRM University, Kattankulathur campus with subjects who were recruited based on the following criteria: 18- 30 years non atheletic male and female participants with diagnosed Anterior Knee Pain or Petellofemoral Pain Syndrome scoring less than 85/100 on Kujala Patellofemoral Pain Syndrome (KPFPS) score-sheet, whose pain intensity was in between 3-7 on Visual analog scale (VAS) and scoring 0-30 on Werner Functional Knee Score (WFKS) for anterior knee pain scoring sheet. The subjects were excluded by presence with any cardiopulmonary disease, any other knee pathology, recent fracture of lower extremities, taking physiotherapy treatment for knee, any inflammatory or degenerative disease for lower extremity or recently undergone for any surgery for lower extremity.

Pre and post measurement of Q- angle with universal goniometer, pre and post score of Visual Analog scale, pre and post score of Kujala Ptellofemoral Pain Syndrome scoring sheet,pre and post score of Werner functional knee score for anterior knee pain were used as the out-come measure for this study.

Procedure: 110 subjects were selected based on the inclusion and exclusion criteria. The purpose of the study was explained to the subjects and signed printed informed consent form was taken. Before performing the main study a small pilot study was performed with 10 samples to identify the complications may occur during the main study. Pre-test measurement of Q -angle in standing position with 50 flexion of knee, Visual analog score, Kujala Patellofemoral pain syndrome score and Werner functional knee score for anterior knee pain was recorded individually for analysis.

The cost effective customized strap was applied over thigh region started the first wrap by rotating the thigh in external rotation with 50% resistant and wrap around the thigh in antero-posterior and medial to lateral direction and finished at below the knee joint. Subjects were asked to perform short-walk, kneeling, stair-climbing up and down, sitting in a chair with 900 knee flexion for 5 minutes to identifying any uneasiness existing or not.

Figure 6: Q-angle performed in standing

Figure 7: Anterior view

Figure 8: Posterior view

Post-test measurement of Q –angle and VAS was measured immediately and subjects were asked to continue some functional activities which were needed as a part of examination of Kujala Patellofemoral pain syndrome score and Werner functional knee score for anterior knee pain by wearing the strap under the garments. The subjects were asked repeatedly for any kind of uncomforting while performing the functional activities such as walking 2 km, climbing steps (up-down), sitting in chair for 30 minutes, etc. All the scoring sheets were kept securely for analysis.

After furnishing of valuable scoring, the subjects were asked to untie the strap and the applied area was examined thoroughly for any skin rash.

	Mean	Std. Deviation	Std. Error Mean	t	df	Sig-(2 -tailed)
Q-angle pre – Q-angle post	5.54545	1.39880	.13337	41.579	109	.000*

Data analysis: The recorded data were tabulated. The data was analyzed using statistical package for social science (SPSS) to present the finding of the immediate effects of cost-effective strap on q-angle and knee functional performance for non-athletic university students with anterior knee pain. Data analysis was done with SPSS Software version 20.0. "p" value was set at less than 0.05 as significance for all analysis, "paired t" test was done.

Table 1: Comparison of pre and post-test measurement of Q-angle in patient with anterior knee pain following strapping

	Mean	Std. Deviation	Std. Error Mean	t	df	Sig-(2 -tailed)
Visual analog pre - Visual analog post	2.56364	.68439	.06525	39.287	109	.000*

*p<0.05

The table shows that there is a significant difference in Q-angle between the pre-test and post-test in patients with anterior knee pain. This indicates that there was a significant reduction in Q-angle following strapping in patient with anterior knee pain. (p<0.05)

Table 2: Comparison of pre and post-test measurement of Visual analog scale in patient with anterior knee pain following strapping *p<0.05

The table shows that there is a significant difference in Visual analog scale between the pre- test and post-test in patients with anterior knee pain. This indicates that there was a significant reduction in Visual analog scale following strapping in patient with anterior knee pain. (p<0.05)

	Mean	Std. Deviation	Std. Error Mean	t	df	Sig-(2 -tailed)
Werner functional knee score pre - Werner functional knee score post	-18.41818	3.42249	.32632	-56.442	109	.000*

Table 3: Comparison of pre and post-test measurement of Kujala Patellofemoral pain syndrome score in patient with anterior knee pain following strapping

*p<0.05

	Mean	Std. Deviation	Std. Error Mean	t	df	Sig-(2 -tailed)
Kujala Patellofemoral pain syndrome score pre – Kujala Patellofemoral pain syndrome score post	-21.01818	3.45610	.32953	-63.783	109	.000*

The table shows that there is a significant difference in Kujala Patellofemoral pain syndrome score between the pre-test and post-test in patients with anterior knee pain. This indicates that there was a significant improvement in Kujala Patellofemoral pain syndrome score following strapping in patient with anterior knee pain. (p<0.05)

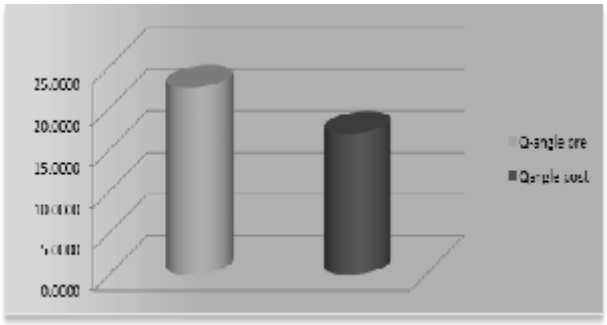
Table 4: Comparison of pre and post-test measurement of Werner functional knee score in patient with anterior knee pain following strapping

*P<0.05

The table shows that there is a significant difference in Werner functional knee score between the pre-test and post-test in patients with anterior knee pain. This indicates that there was a significant improvement in Werner functional knee score pain syndrome score following strapping in patient with anterior knee pain.(p<0.05)

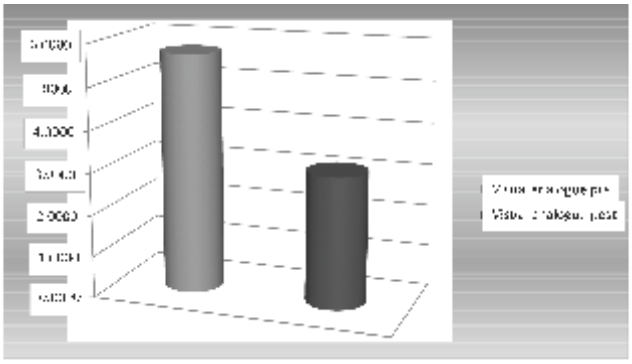
Results: According to TABLE –1 there is a significant difference in Q-angle between the pre-test and post-test in patients with anterior knee pain. This indicates that there was a significant reduction in Q-angle following strapping in patient with anterior knee pain. (p<0.05)

Graph 1: Comparison of pre and post-test measurement of Q-angle in patient with anterior knee pain following strapping



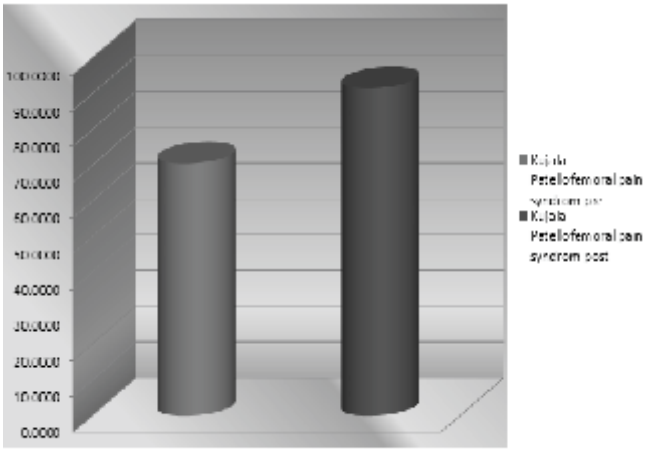
According to TABLE -2 there is a significant difference in Visual analog scale between the pre-test and post-test in patients with anterior knee pain. This indicates that there was a significant reduction in Visual analog scale following strapping in patient with anterior knee pain. (p<0.05)

Graph 2: Comparison of pre and post-test measurement of visual analog scale in patient with anterior knee pain following strapping



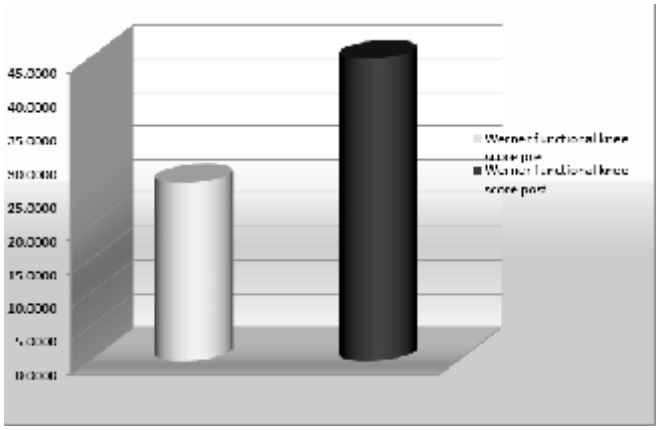
According to TABLE -3 there is a significant difference in Kujala Patellofemoral pain syndrome score between the pre-test and post-test in patients with anterior knee pain. This indicates that there was a significant improvement in Kujala Patellofemoral pain syndrome score following strapping in patient with anterior knee pain. (p<0.05)

Graph 3: Comparison of pre and post-test measurement of Kujala Patellofemoral pain syndrome score in patient with anterior knee pain following strapping



According to **TABLE-4** there is a significant difference in Werner functional knee score between the pre-test and post-test in patients with anterior knee pain. This indicates that there was a significant improvement in Werner functional knee score pain syndrome score following strapping in patient with anterior knee pain.($p<0.05$)

Graph 4: Comparison of pre and post-test measurement of Werner functional knee score in patient with anterior knee pain following strapping



Discussion: The aim of the study was to find out the immediate effect of cost effective strap on Q- angle and knee functional performance on non-athletic university students with anterior knee pain. Total 110 subjects (35 females, 75 males) were selected for the study. The statistical result showed that there was a significant effect on Q-angle and knee functional performance immediately after applying of cost effective strap for the non-athletic university students with anterior knee pain.

There are many researches done over the anterior knee pain to identify the cause, prevalence, effective conservative treatments etc. Arlene M. Goodman, Jon G. Divine et al (2009) concluded that the prevalence of anterior knee pain is as high as 1 in 4 females and females are two times more likely to demonstrate anterior knee pain symptoms than male in general population .64In this study Q-angle was measured with a universal goniometer and only in standing position with 50 knee flexion.

The statistical analysis of this study shows that the cost effective strap helped in reduction of the Q-angle which is increased in subjects with anterior knee pain. Mark S. Juhn (1999) reported that, increased Q-angle was one of the four causes for anterior knee pain.50 As the Q-angle reduced, the pain also reduced and the functional performance of knee improved for those subjects.John P. Fulkerson (2002) concluded that non- operative treatment is effective in most subjects. Prone hamstring muscle stretches, static quadriceps strengthening, friction massages, manual therapy techniques, and effective bracing helped most of the subjects with anterior knee pain.43Based on the statistical analysis, there was significant reduction on the Q- angle. The Q-angle measurement is an important integral part for the subject with anterior knee pain. Large Q-angle is thought to create excessive lateral force on the patella that may predispose to pathological changes. An excessively large Q-angle (>200) is usually an indicator of structural malalignment. Increased Q-angle may promote a greater lateral force to deviate the medial femoral torsion. The strap wrapped over the thigh region produced resistance on quadriceps muscles and adductor compartment which reduced the femoral anteversion, this in turn decreased the lateral tilting of patella and similarly in the measurement of Q-angle.

The pain intensity measured with visual analog scale also showed significant reduction in the study. As the strap wrapped over quadriceps muscles indirectly attributes to the strength of hip external rotators and abductors so, during the weight bearing activities the compressive forces on the patellofemoral joint is reduced and it passively reduced the knee pain.

Furthermore, the reduction of the Q-angle and knee pain showed significant improvement of knee functional performance on Kujala Patallofemoral pain syndrome score as well as Werner functional knee score for anterior knee pain.Further research should be done to find out its efficacy in other orthopaedic conditions.

As the THERATOGS is comparatively costly so the customized cost-effective strap was used in the study which is easy to administer,. This study examined only the unilateral problem; future study should be performed with bilateral knee problems and on other knee pathology.

The statistical analysis of this study shows that cost effective strap has a high influence on Q-angle and thereby reducing pain and improving the functional performance of knee in subjects with anterior knee pain. Due to its advantage of user guidelines and cost effectiveness, it can be widely used in the practice of physiotherapy management for improving the functional performance in patients with anterior knee pain.

Conclusion: The study found that the cost effective strap showed immediate effect on reduction of Q-angle and improvement on knee functional performance for the subjects so it concluded that the strap should be used as a conservative treatment for anterior knee pain.

Limitations and recommendations: Limited numbers of samples within the age groups of 18 – 30 years non athletic university students were included for whom immediate effects were only examined in the study so it recommend that The subjects of different age group can be studied, among different institutions, other interventions may compared, long term effect can be compared, bilateral comparison can be studied. Even BMI effect can be observed and Q- angle should measure in every possible position such as supine lying, at 100, 200 and 240 knee flexion.

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COMPARISON OF PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION (PNF) STRETCHING VERSUS NEURAL MOBILIZATION BY USING H- REFLEX ON LOW BACK PAIN

Dr. Dharmendra Kumar Sharma

AIM:-

- To compare the effect of PNF stretching versus Neural-mobilization by using H-reflex in low back pain.

Objectives:-

- To study the effect of PNF stretching by using H-reflex in low back pain.
- To study the effects of Neural-mobilization by using H-reflex in low back pain.
- Compare the effects of PNF stretching & neural mobilization by using H-reflex in low back pain.

Design:- Comparative Study.

Setting:- Dr.D.Y.Patil Physiotherapy (OPD) & Department of Neuro-physiotherapy

Participants:- Low back pain patients with radiating unilateral or bilateral, and SLR 2 +ve.

Intervention:- All the patients were randomly assigned to group A (PNF hold relax stretching hamstring) and group B (Neural mobilization tibial nerve) after signing of consent form. Assessment of LBP with radiculopathy by using SLR test & NPRS scale for severity of pain. And check H- reflex. PT sessions included hamstring stretching to group A & Neural mobilization to group B. After the treatment recheck H-reflex and NPRS score.

Results:- Both the group are effective in reducing low back pain, but group B (Neural Mobilization $p < .0001$) more effective than group A (PNF stretching($p < .0001$). Both groups are equally effective to reducing H latency, M Latency & increase H amplitude. But mean of group B is 1.9415 and Group A is 0.5535 shows that there is more reduction in H Latency in group B than group A, and mean difference of group A is 0.3345 & group B is 0.3445 shows that Group B more increase in H amplitude than group A. Conclusion-The study concludes that Neural Mobilization leads to better improvement in reducing pain, H-latency, & M-latency & increasing H-amplitude as compared to PNF Hamstring stretching in low back pain.

INTRODUCTION

Low back pain is a very common condition, with about 80% of people suffering from it. Most frequently in people between the age of 20 to 50 years.According to Len Kvaritz, "Low back pain is the pain in the low back area related to problems with lumbar spine, the disc between the vertebra, the ligaments around the spine, the spinal cord, the nerve roots, muscles of the low back, internal organs of pelvis and abdomen or the skin covering the lumbar area" Low back pain can refer to pain, which remains centered in the low back region, as well as, pain, which radiates from the low back to the buttocks and/or legs.

Depending on the presence or absence of neurologic symptoms and signs LBP can be divided into: Radicular &non-radicular low back pain. Radicular LBP is radiated along the dermatome of a nerve root (radiculopathy) at its connections to the spinal column. A common form of radiculitis is sciatica, or

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radicular pain radiates along the sciatic nerve. It radiates up to thighs, calf &foot. Non-Radicular LBP is not associated with neurologic symptoms or sign or not associated with spinal nerve root compression. Pain is localized to the spine and paraspinal regions and does not radiate into the leg.

Proprioceptive Neuromuscular Facilitation (PNF) is a more advanced form of flexibility training that involves both the stretching and contraction of the muscle group being targeted. PNF stretching was originally developed as a form of rehabilitation. While there are several variations of PNF stretching, they all have one thing in common; they facilitate muscular inhibition. Various PNF stretching techniques based on Kabat's concept are: Hold Relax, Contract Relax, and Contract Relax Antagonist Contract (CRAC) etc. The Hold Relax (HR) technique involves an isometric contraction of the shortened muscle against maximum resistance followed by relaxation phase

Neural mobilization is used for treatment of low back pain. Neural mobilization techniques are passive or active movements that focus on restoring the ability of the nervous system to tolerate the normal compressive, friction and tensile forces associated with daily and sport activities. It is hypothesized that these therapeutic movements can have a positive impact on symptoms by improving intraneural circulation, axoplasmic flow and neural connective tissue viscoelasticity and by reducing sensitivity of abnormal impulse generating sites.(10)

METHODS

Subjects were selected according to inclusion criteria. 40 patients were randomly allocated in two different groups. Written informed consent was taken & whole study was explained to them prior to treatment. Pre- treatment and Post–treatment H-latency, H-amplitude, M- latency, & pain score on NPRS was recorded.

Group A received PNF Hold relax stretching (hams)

Group B received neural mobilization. (Tibial nerve)

Position of The Patient During Recording –

The H-reflex latency was recorded while the patient will lie down comfortably in prone lying position on bed in a quiet room. The head maintained in mid position to control the possible effects of asymmetrical tonic reflex. The examined leg was placed mid-way between abduction and adduction at hip joint. The knee was slightly flexed by placing a small cushion under the ankle to relax the gastrocnemius to reduce any depressive influence on the H-reflex and ankle was freely positioned in planter flexion outside the plinth.

Stimulation - The H-reflex was elicited by stimulation of the posterior tibial nerve at the popliteal fossa little bit to lateral aspect by stimulating electrode as shown in.

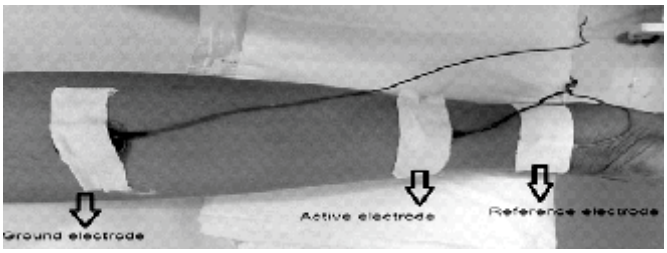


FIG.1ELECTRODE PLACEMENT FOR H-REFLEX

After recording the H-reflex

GROUP A RECEIVED PNF- HOLD RELAX STRETCHING.

PROCEDURE-The subjects were in supine position with their lower extremity strapped down the table. Pre-determined time intervals for stretching, contracting and relaxing was used to standardize the method. For each stretch, the investigator stretched the hamstring muscle by passively flexing the hip with knee fully extended, allowing no hip rotation. The lower leg was rest on the investigators right shoulder. The hamstring muscle was stretched until the subject first reported a mild stretch sensation; this position was held for 7 sec. Next, the subject then isometrically contracted

the hamstring muscle for 3 sec by attempting to push his leg down towards the table against the resistance of the investigator. Following this, the subject was asking to relax for 5 sec. The investigator then passively stretched the muscleuntil a mild stretch sensation is reported. This stretch was maintained for 7sec. This sequence was repeated 5 times.

FIG.2PNF- HOLD RELAX STRETCHING FOR HAMSTRING MUSCLE

GROUP B- RECEIVED NEURAL MOBILIZATION.

PROCEDURE– Patient in supine, the leg was supported so that the hip was in approximately 45° flexion and the leg is in horizontal position. The foot was held so that the therapist's fingers can control the ankle, forefoot and toes. Dorsiflexion/Eversion of the ankle and forefoot and dorsiflexion of the toes are the first movements and these should be taken as far as practicable into the range. Then knee extension was the next and while stabilizing the ankle joint and the rest of the limb, release of dorsiflexion of the forefoot and toes will the final movement to release distal tension from the digital nerves and allowed the tibial part to displace in a proximal direction. Again the hip was flexed to approximately 45° and the leg held horizontal as the starting position. This will release proximal tension and allow distal sliding. The foot and toes will move into dorsiflexion/eversion and the toes into dorsiflexion to move the nerve distally in its tunnel. The same procedure was repeated again and again for approximately 10 repetitions for 3 times for the one session of neural mobilization

DATA ANALYSIS

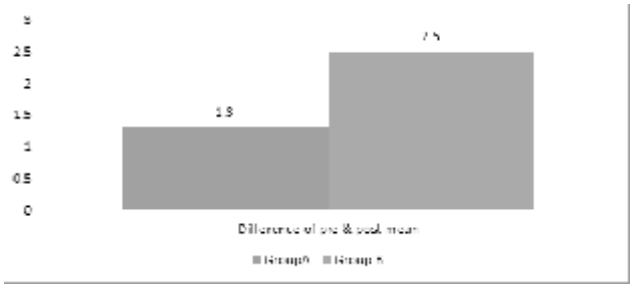
TABLE 1: COMPARISON OF PRE & POST MEANS DIFFERENCE OF NPRS BETWEEN GROUP A & B

Group	Pre & post Mean Difference	Pre & post S.D. Difference	D.B.M	t	D.F	p-value	Level of significance
A	1.3000	0.8013	1.2000	3.40	38	0.002	Significant
B	2.5000	1.3572					

* D.B.M.-Difference between mean..

*** D.F.-Degree of freedom

GRAPH 1



Inference:- Pre & post mean difference of group A was 1.30 (0.8013) & group B was 2.50 (1.3572).

Difference of pre & post mean difference of group A & B was 1.20 & p value is 0.002 which is statistically significant.

Showing that both the groups are effective in reducing low back pain.But group B more effective than group A.

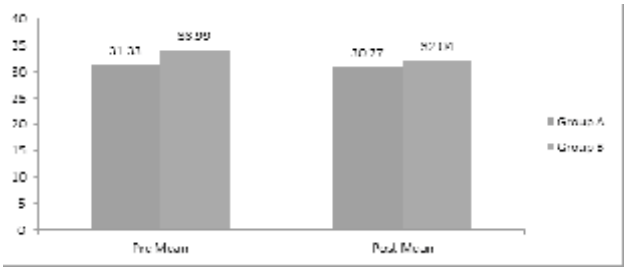
TABLE2: COMPARISON OF PRE& POST MEAN DIFFERENCE OF H-LATENCYBETWEEN GROUP A & B

Group	Pre Mean	S.D.	Post mean	S.D.	D.B.M	t	D.F	p-value	Level of significance
A	31.3325	2.9508	30.7790	2.8680	*0.9101	1.798	37	0.080	Not Significant
B	33.9900	4.1732	32.0485	3.7062					

* D.B.M.-Difference between mean.

**D.S.D.-Difference of Standard deviation.

*** D.F.-Degree of freedom



Inference:- Group A pre H-latency mean score of was 31.33 (2.95) & post H-latency score was 30.77(2.86) Group B pre H-latency mean Score of was 33.99 (4.173) & post H-latency score was 32.04 (3.706)

P value was 0.080 which is statistically not significant.

Showing that both groups are equally effective to reducing H latency in Low back pain.

**ANCOVA using pre value as covariant.

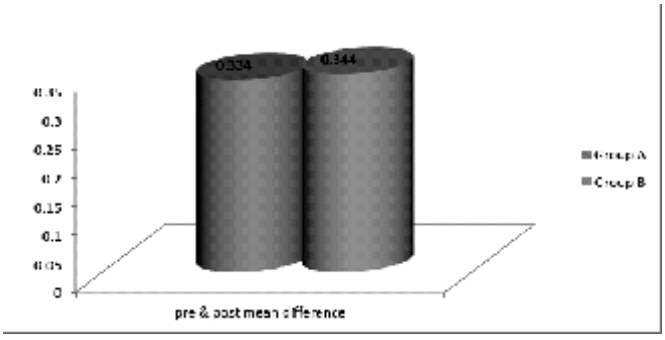
TABLE 3: COMPARISON OF PRE& POST MEAN DIFFERENCE OF H-AMPLITUDE BETWEEN GROUP A& B

Group	Pre & post Mean Difference	Pre & post S.D. Difference	D.B.M	t	D.F	p-value	Level of significance
A	0.3345	0.3163	0.0100	0.10	38	0.925	Not Significant
B	0.3445	0.3481					

* D.B.M.-Difference between mean.

*** D.F.-Degree of freedom

GRAPH 3



Inference:- Pre & post mean difference of group A was 0.3345 (0.3163) & group B was 0.3445(0.3481).

Difference of pre & post mean difference of group A & B was 0.0100 & p value is 0.925 which is statistically not significant.

Showing that both the groups are equally effective to increasing H amplitude in Low back pain.

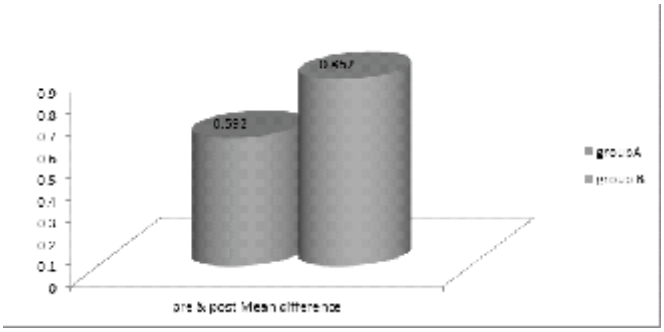
TABLE 4: COMPARISON OF DIFFERENCE OF PRE & POST M-LATENCY BETWEEN GROUP A& B

Group	Pre & post Mean Difference	Pre & post S.D. Difference	D.B.M	t	D.F	p-value	Level of significance
A	0.5920	0.8191	0.2700	0.91	38	0.369	Not Significant
B	0.8620	1.0455					

* D.B.M.-Difference between mean.

**D.F.-Degree of freedom.

GRAPH 4



Inference:- Pre & post mean difference of group A was 0.5920 (0.8191) & group B was 0.8620(1.0455).

Difference of pre & post mean difference of group A & B was 0.2700 & p value is 0.369 which is statistically not significant.

Showing that both the groups are equally effective to reduce M-Latency in Low back pain.

DISCUSSION

The results of this study showed that interventions in form of hamstring stretching, neural mobilization of Tibial Nerve were effective for pain relief and reduce in H latency, M latency & increase in H amplitude in Low Back pain with radiculopathy. But overall improvement with group B that received Neural Mobilization was greater as compared to Group A that received Hamstring stretching.

Pain relief: Pain relief was measured with numerical scale. The reported reliability of NPRS is ICC= 0.85(12) and validity is r = 0.847(13).

The reduction in the pain in the Hamstring stretching group(A) was highly significant ($p<0.01$) when calculated.

In the Neural Mobilization treatment method the reduction of pain was also highly significant ($p<0.01$). The results of study confirm hypothesis

that straight leg raising (SLR) stretching may be beneficial in the management of patients with LBP. SLR stretching was beneficial in improving pain, and promoting centralization of symptoms in this group of patients. Centralization of symptoms in patients with LBP indicates a favorable prognosis and is typically used to guide treatment in patients with low back and lower extremity symptoms.

The result shows that patient with low back pain had increase in H- latency decrease in H-amplitude & increase in M-latency. After the PNF hamstring stretching & neural mobilization reduce H-latency, increase in H- amplitude and decrease in M-latency.

Our results showed H-reflex amplitude asymmetry was more evident than latency changes in patients with radiculopathy. This was represented in the smaller value of the H-reflex where as the latency differences were not always evident. We also noticed that changes in amplitude and latency were associated with chronic low back pain with radiculopathy.(31)

Changes in the amplitude of the reflex can be explained by at least three possibilities: first is alteration in the excitability of the motor neurons, second is variation in the amount of neurotransmitter released by the afferent terminals and third is variation in the intrinsic properties of the motoneurons.

The normal value of H-latency is 30.3 +1.7 (MS) & H-Amplitude is 9.8+-6.1(MV)

But in our result the mean of Group A H latency was 31.3325 & group B 30.7790 which is Normal but the Mean of H amplitude of group A 0.778 & group B 0.620 So it indicate that H-reflex amplitude, compared to latency, may be an earlier indicator of S1 nerve root involvement.

CONCLUSION

The study concludes that Neural Mobilization leads to better improvement in reducing pain, H-latency, & M-latency & increasing H-amplitude as compared to PNF Hamstring stretching in low back pain.

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Sahar M. Adel Efficacy of Neural Mobilization in Treatment of Low Back Dysfunctions. Journal **of American Science - 2011;7(4):566-573**

"EFFICACY OF PHYSIOTHERAPY IN BEHAVIOURAL PROBLEMS OF PEDIATRIC NEUROLOGY PATIENTS AND CAREGIVERS."

Dr. Prexa Mistry*, Dr. Ramakrishnan.K.S*, Dr. Advita Neville*, Dr. Swati Patel****

Background and Purpose: Neurological condition leads to mental, physical, psychological and cognitive disabilities or a combination of all. A person may be physically independent but many have various psychological problems. Psychological problems are common complications following cerebral palsy and have an impact on all aspects of recovery. To study the effect of physiotherapy treatment on the behavioural changes of pediatric patients and caregivers of patients with neurological condition.

Subjects: 30 subjects with pediatric patients of neurological condition.

Method: A semi structured questionnaire including the Psychological General Well-being Index (PGWBI) and Gross motor function classification scale (GMFCS) will be used to collect information about Physiotherapy in behavioural problems of neurological condition of pediatric patients and their caregivers.

Result: The final sample was compose of 30 subjects, having mean age of 5.29 years old. (+3.85 SD) physiotherapy interventions were effective in reducing some of the behavioural disturbances ($Z=-4.78$, $p<0.00001$) in patients as well as their caregivers.

Conclusion: Our result indicates physiotherapy treatment may be effective in reducing the behavioural disorders and subjective burden among caregivers.

Keywords: Behavioural problems, Pediatric neurology patient, Caregivers, Physiotherapy

1.INTRODUCTION[1,2]

Cerebral palsy is primarily a disorder of movement and posture. It is defined as an "umbrella term covering a group of non-progressive, but often changing, motor impairment syndromes secondary to lesions or anomalies of the brain arising in the early stages of its development".

Motor sequelae in the cerebral palsy are commonly followed by disorders in the sensation, perception, cognition, communication, and behaviour by epilepsy and secondary muscle skeletal problems.Therefore, brain changes present in the person suffering from cerebral palsy are a biological limitation that may hinder the typical brain development, causing intellectual impairment or specific cognitive disorders.

It may be stated as a static encephalopathy in which, even though the primary lesion, anomaly or injury is static, the clinical pattern of presentation may change with time due to growth and developmental plasticity and maturation of the central nervous system.

1.1 Incidence: The cause of CP to birth trauma and this view has persisted for several decades. Recent advances in neonatal management and obstetric care have not shown a decline in the incidence of CP. On the contrary ,with a decline in infant mortality rate, there has actually been an increase in the incidence and severity of CP. The incidence in premature babies is much higher than in term babies. For the vast majority of term infants who develop CP, birth asphyxia or obstetric complications cannot be ascribed as the cause.

1.2 Classification: CP may be classified by the type of movement disorder, anatomical location of the

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child's impaired motor function, and scope of motor dysfunction. The type of movement Disorders can be described as spastic, hypotonic, dyskinetic, or ataxic.

1.3 Spastic: Spasticity occurs in approximately 75% of all children with CP. It is the most common neurologic abnormality seen in children with CP, including those with diplegia, hemiplegia, and quadriplegia. Spasticity is a complex motor abnormality, often difficult to describe, but a common definition is "hypertonia in which resistance to passive movement increases with increasing velocity of movement."

1.4 Diplegia: Diplegia is the most common form of spastic CP. A white matter infarct in the periventricular areas caused by hypoxia can lead to spastic diplegic CP. It primarily affects bilateral LEs, resulting in issues with gait, balance, and coordination. In standing, children with diplegia often present with an increased lumbar spine lordosis, anterior pelvic tilt, bilateral hip internal rotation, bilateral knee flexion, intoeing, and equinovalgus foot position.

1.5 Hemiplegia: Hemiplegia is a subtype of spastic CP in which the child's upper and lower extremity on the same side of the body are affected. Four main types of brain lesions result in hemiplegic CP. Periventricular white matter abnormalities have been reported as the most common diagnostic finding in children with hemiplegic CP. Cervical–subcortical lesions, brain malformations, and nonprogressive postnatal injuries have also been identified as the main causes of hemiplegia. The UE is typically more affected than the LE, and both tend to have more distal involvement than proximal involvement. Muscle spasticity on the affected side decreases muscle and bone growth, resulting in decreased range of motion (ROM). Therefore, children with hemiplegia often present with contractures and limb-length discrepancies on the involved side. The affected side of the child with hemiplegia often presents with shoulder protraction, elbow flexion, wrist flexion and ulnar deviation, pelvic retraction, hip internal rotation and flexion, knee flexion, and forefoot contact only due to plantar flexed foot. Children with hemiplegia tend to achieve all gross and fine motor milestones but not within the typical time frame.

1.6 Quadriplegic: Quadriplegia is a subtype of CP in which volitional muscle control of all four extremities is severely impaired. This subtype is also often accompanied by neck and trunk involvement. Like diplegic CP, periventricular white matter lesions are the most frequently observed neuroimaging finding in children with quadriplegic CP. Extensive lesions affecting the basal ganglia or occipital area often lead to visual impairments and seizures, both commonly seen in children with this subtype of CP.Cognition can vary from normal to severely impaired and is unique to each child with quadriplegia. It is important to note thatchildren with quadriplegia who are unable to speak are often regarded as being cognitively impaired. However, once provided a means of effective communication, some are able to express their level of understanding and critical thinking.

1.7 Dyskinetic: Dyskinesia and movement disorders result in generally uncontrolled and involuntary movement that includes athetosis, rigidity, tremor, dystonia, ballismus, and Choreoathetosis. Common abnormalities found in imaging include deep gray matter lesions and, to a lesser extent, periventricular white matter lesions.Athetosis always has involuntary movements that are slow and writhing; abnormal in timing, direction, and spatial characteristics; and are usually large motions of the more proximal joints. Athetosis is rare as a primary movement disorder and is most often found in combination with chorea. Rigidity is muchless common and is felt as resistance to both active and passive movement and is not velocity dependent. Tremor, a rhythmic movement of small magnitude, usually of the

smaller joints, rarely occurs as an isolated disorder in CP but rather in combination with athetosis or ataxia. Dystonia is a slow motion with a torsional element that may involve one limb or the entire body and in which the pattern itself may change over time. Ballismusis the most rare movement disorder and involves random motion in large,fast patterns usually of a single limb. Choreoathetosis involves jerky movement, commonly of the digits and varying in the ROM.

1.8 Ataxic: Ataxic CP is primarily a disorder of balance and control in the timing of coordinated movements along with weakness, incoordination, a wide-based gait, and a noted tremor. This type of CP results from deficits in the cerebellum and often occurs in combination with spasticity and athetosis.The cerebellum is a major sensory processing center, and when impaired, ataxia will result.

1.9 Hypotonic: Hypotonia in a child with CP can be permanent but is more often transient in the evolution of athetosis or spasticity and might not represent a specific type of cp.

2.AIMS & OBJECTIVES:

2.1 AIMS:

- To evaluate efficacy of physiotherapy in behavioural problems of pediatric neurology patients and caregivers.

2.2 OBJECTIVES:

- To know efficacy of physiotherapy in behavioural problems of pediatric neurology patients and caregivers.
- To determine the efficacy of physiotherapy in behavioural problems of pediatric neurology patients and caregivers.

3. MATERIAL USED:

1. Informed consent form
2. Questionnaire/ Scales
3. Google forms
4. Mobile
5. Paper/ Pencil/pen

4. METHODOLOGY:

- **SOURCES OF DATA:**

  Parul Sevashram Hospital

  Kashiben Govardhandas Patel children's Hospital

- **STUDY DESIGN:** This is aConvenience sampling.
- **STUDY TYPE:** This is a pre & post survey.
- **SAMPLE SIZE:** In this 30 (n=30) Pediatric patient with neurological condition & Caregivers of patients are taken.
- **STUDY POPULATION:** Pediatric patients (with neurological Condition) & Caregivers of patients.

5. RESULT:

Table-1: Gender distribution of subjects:

Gender	No. of Subjects	Percentage
Female	9	30%
Male	21	70%
Total	3	100%

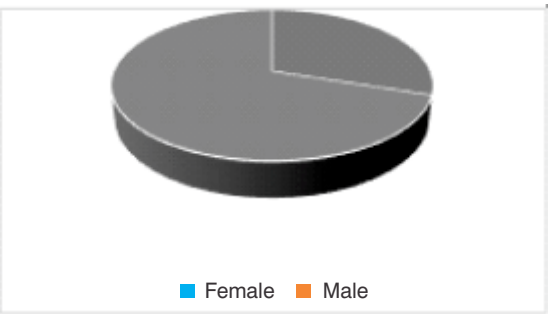

Figure 1. Gender distribution of subjects.

Inference: The above pie graph shows 70% of males and 21% of females are affected with neurological conditions.

5.2 Table-2: Age distribution of subjects studied.

Age in years	No. of subjects
0-2	9
2-4	4
4-6	9
6-8	1
8-10	3
10-12	2
12-14	2
14-16	0

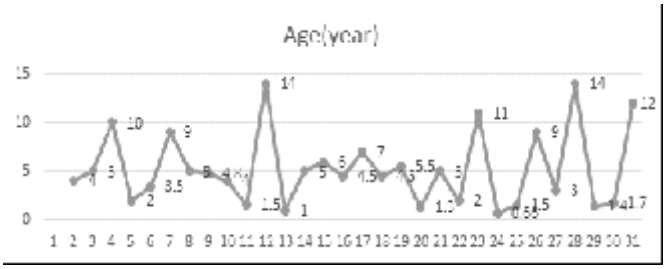

Figure 2. Age distribution of subjects studied

Inference: The age group of 0-2, 2-4, 4-6 years are commonly affected.

5.3 Table-3: Analysis of Psychological General Well-being Index (PGWBI)

Parameters	Pre	Post
Mean	44.3333	85.1333
SD	7.94955	10.1565
Z value	-4.7821	
p value	<.00001	

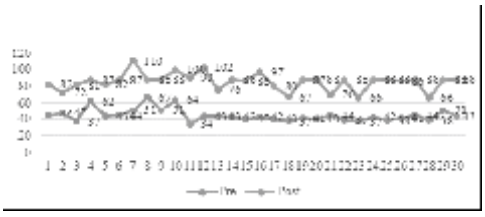

Figure 3. Analysis of psychological well-being index

Inference: The above line graph shows the difference in the mean score and individual score of the applied scale.

5.4 Table-4: Analysis of Gross motor function classification scale (GMFCS).

Parameters	Pre	Post
Mean	2.03333	3.1
SD	0.76489	0.643268
Z value	-4.7821	
p value	<.00001	

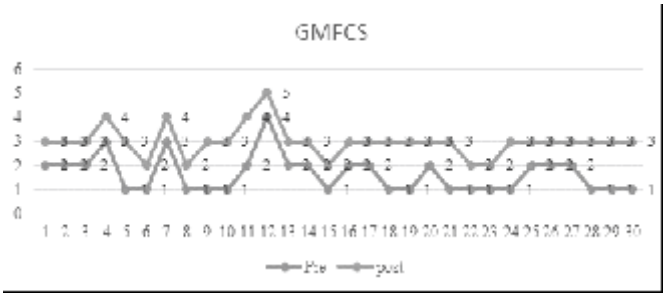

Figure 4. Analysis of gross motor function classification scale

Inference: The graph indicates difference in the change of motor function improvement after physiotherapy treatment.

Interpretation of scales:

Psychological General Well-being Scale: The instrument has qualities that make it suitable also for monitoring well-being during interventions for stress-related exhaustion/clinical burnout.

Gross motor Functional Classification of Scale: The Gross Motor Function Classification System (GMFCS) for cerebral palsy is based on self-initiated movement, with emphasis on sitting, transfers, and mobility.

6. Discussionand Conclusion:

Cerebral palsy leads to mental, physical, psychological and cognitive disabilities or a combination of all. A person may be physically independent but many have various psychological problems.

Psychological problems are common complications following cerebral palsy and have an impact on all aspects of recovery. Children with CP are at increased risk of behavioural and emotional problems, with 1 in 4 developing a behavioural disorder.

Studies investigating behaviour in children with cerebral palsy have found that these children are more likely than there non-disabled peers to struggle with behavioural disorders. The rate of diagnosed disorders in the cerebral palsy population is higher than in the general population of children. As much as 25 to 30 percent of children with cerebral palsy also struggle with a behaviour disorder. It is harder to pinpoint exactly why children with cerebral palsy are more likely to have behavioural challenges. Some risk factors seem to be having learning disabilities, having a seizure disorder, being male, having multiple disabilities, and having communication difficulties. Outside factors may also contribute, including lack of proper care or stress and an inability to cope in the parents. Difficulty with communication seems to be a major factor in challenging behaviours. If a child with cerebral palsy is unable to communicate effectively, he or she may act out to get her needs met. The psychological symptoms were slightly less intense and less frequent in the follow up after a period of six weeks of physiotherapy treatment. Parents and other caregivers of children with cerebral palsy must be aware of the signs of a behavioural disorder so that the child can be evaluated and treated by experts. Living with behavioural challenges is difficult for everyone, for parents and caregivers, for the child with cerebral palsy, and for family members. Recognizing and addressing the problem behaviours early is crucial for helping a child cope and learn new and more appropriate behaviours.

There are several behavioural disorders that have been named and can be diagnosed, including attention deficit hyperactivity disorder, autism, and oppositional defiant disorder, but what is more important for parents and caregivers is to be able to recognize specific behaviours that are frequent, persistent, and problematic. The behavioural problems include Self-injury, Harming other people, Threatening others, Destroying property, Lying, Stealing, Disobedience, Hyperactivity, Impulsivity, These are just some of the potentially problematic behaviours that could indicate a behavioural disorder in a child with cerebral palsy. The general rule is that any behaviour that is inappropriate for a child's developmental age, such as tantrums in a ten year old, is problematic. Problematic behaviours that persist for six months or more may indicate a behavioural disorder.

6.1 The analysis of the data collected showed:

The average score for sample subjects post PT treatment had increased which determined the improvement in the personal wellbeing of the patients as compared to pre PT treatment. (Refer graph 3) During the study it was found that more of males were affected than females. (Refer graph 1). Most of the patients affected by CP were in the age group of 0-2 years, 2-4 years and 4-6years. (Refer graph 2). The difference in the individual scores shows an improvement in the post PT treated patients than the pre PT treated. (Refer graph 4). The rate of improvement in the satisfaction of life as a whole is more in the CP patients post the PT treatment then the pre PT treatment. (Refer graph 4, 5). There is an increase in the standard of living post the PT treatment than the pre PT treatment. (Refer graph 4). Post PT treatment shows increase in the health improvement in CP patients than in the patients before the PT treatment. (Refer graph 4,5) The graph shows an increase improvement in the personal relationships post the PT treatment than in the patient's pre PT treatment. (Refer graph4,5). The feeling of one's safety in CP in more post the PT treatment than in pre PT treated patients. (Refer graph 5). The satisfaction of feeling a part of the community is slightly more in the post PT treated patients than pretreated. (Refer graph 4,5) The study shows that patients post PT treated are more satisfied with their future security than they were pre PT treatment. (Refer graph 4,5)

Parents and other caregivers that believe a child with cerebral palsy is struggling with problem behaviours should consult with professionals who can evaluate the child, make a diagnosis, and help develop a treatment plan. As a parent, you may want to start

with your child's school. A school psychologist or social worker may be able to do an evaluation or direct you to an appropriate professional. For a younger child, a pediatrician is a good place to start. A Pediatric Physiotherapist & behavioural health expert can evaluate your child through a series of observations and tests. Even if your child doesn't meet the criteria for a diagnosis, an expert can still guide you to the appropriate resources or professionals that can help. Any challenging behaviours, even those not labeled as a disorder, are disruptive and should be evaluated and addressed, both for the child and the child's family.

Positive parent-child relationship, encouraging desirable behaviour, teaching new skills and behaviours, managing misbehaviour, and managing high-risk situations. Parents made specific goals for change and were supported in enacting plans for managing challenging parenting situations. This illustrates the urgent need for clinical services to address behavioural and emotional problems in children with CP, as well as the good fit between this clinical need and the efficacy of parenting intervention. Parenting interventions, are ideally translatable. Pediatric Physiotherapy is designed for population-level dissemination, easily implemented within health or educational services, deliverable in high- and low-resource areas, and available in 25 countries.

Anyone may struggle with behavioural conditions or disorders, with challenging behaviours like aggression, impulsiveness, self-harm, and others. Children with cerebral palsy may be more vulnerable to these struggles because of the challenges that the physical disability presents or even because of the underlying brain damage that led to cerebral palsy.

Exactly what causes behaviour disorders is not fully understood, but it is important for parents and other adults to look out for signs of problematic behaviours in children living with cerebral palsy. Experts in behaviour and mental health can help parents and their children cope with and learn to change problem behaviours so that a child living with cerebral palsy can also learn to live with the best quality of life possible.

6.2 Behaviour and Cerebral Palsy:

Studies investigating behaviour in children with cerebral palsy have found that these children are more likely than there non-disabled peers to struggle with behavioural disorders. The rate of diagnosed disorders in the cerebral palsy population is higher than in the general population of children. As much as 25 to 30 percent of children with cerebral palsy also struggle with a behaviour disorder.

It is harder to pinpoint exactly why children with cerebral palsy are more likely to have behavioural challenges. Some risk factors seem to be having learning disabilities, having a seizure disorder, being male, having multiple disabilities, and having communication difficulties. Outside factors may also contribute, including lack of proper care or stress and an inability to cope in the parents. Difficulty with communication seems to be a major factor in challenging behaviours. If a child with cerebral palsy is unable to communicate effectively, he or she may act out to get her needs met.

Parents and other caregivers of children with cerebral palsy must be aware of the signs of a behavioural disorder so that the child can be evaluated and treated by experts. Living with behavioural challenges is difficult for everyone, for parents and caregivers, for the child with cerebral palsy, and for family members. Recognizing and addressing the problem behaviours early is crucial for helping a child cope and learn new and more appropriate behaviours.

There are several behavioural disorders that have been named and can be diagnosed, including attention deficit hyperactivity disorder, autism, and oppositional defiant disorder, but what is more important for parents and caregivers is to be able to recognize specific behaviours that are frequent, persistent, and problematic. These may include:

These are just some of the potentially problematic behaviours that could indicate a behavioural disorder in a child with cerebral palsy. The general rule is that any behaviour that is inappropriate for a child's developmental age, such as tantrums in a ten year old, is problematic. Problematic behaviours that persist for six months or more may indicate a behavioural disorder.

6.3Diagnosis and Treatment :

Parents and other caregivers that believe a child with cerebral palsy is struggling with problem behaviours should consult with professionals who can evaluate the child, make a diagnosis, and help develop a treatment plan. As a parent, you may want to start with your child's school. A school psychologist or social worker may be able to do an evaluation or direct you to an appropriate professional. For a younger child, a pediatrician is a good place to start.

A behavioural health expert can evaluate your child through a series of observations and tests. Even if your child doesn't meet the criteria for a diagnosis, an expert can still guide you to the appropriate resources or professionals that can help. Any challenging behaviours, even those not labeled as a disorder, are disruptive and should be evaluated and addressed, both for the child and the child's family.

Pediatric Physiotherapy & Cognitive behavioural therapy is a typical type of treatment or intervention for behavioural disorders. It is a type of therapy that helps patients become more aware of their behaviours, realize that they are problematic, and learn to change those behaviours by targeting troubling thoughts and emotions. It is an effective type of treatment that helps many people, adults and children, learn to change negative behaviours and replace them with those that are positive and productive.

Recognizing and getting treatment for a child struggling with cerebral palsy-associated behavioural disorders is crucial. These are the first steps toward helping a child learn to cope with negative emotions and other challenges that have led to problematic behaviours. Parents, family, friends, and caregivers of the child must also participate in supporting the treatment and encourage positive changes

Factors that support a child learning to change behaviours include providing all adequate care for cerebral palsy. A child that is not receiving the care he needs will continue to struggle with problematic behaviours. A stress-free home environment is also important. Some studies have shown that a parent's stress level can impact a child's behaviour in a negative way. A calm and caring environment can help support a child as he learns to make positive changes.

Conclusion:

Our result indicates physiotherapy treatment may be effective in reducing the behavioural disorders and subjective burden among caregivers.

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