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Editor

Dr. Dinesh M. Sorani,
M.P.T. (Physical & Functional Diagnosis),
Senior lecturer,
Government Physiotherapy College, Jamnagar
Email:
editor@indianjournalofphysicaltherapy.com
Phone: +91-9426786167

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Editor's Desk



Dear Physios,

Greetings of the day,

It gives me immense pleasure to write this sixth note addressing readers of journal. With increasing positive reward from readers, our team is also getting motivated for their work. As our work is appreciated, our responsibility towards readers also increases to maintain trust and interest of readers for content of journal. On behalf of our team, I as an editor of journal promise to provide readers better content of research for uplift of Physiotherapy field. With publication of this issue, Indian Journal of Physical Therapy has completed three years. Thanks to all physiotherapists for their contribution by providing research articles. But this is not time for celebration for us but there is long way to go in the journey of research publications in Physiotherapy. Hoping for the best response from researchers and readers.

Dr Dinesh M Sorani
Editor
Indian Journal of Physical Therapy

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DIFFERENCE IN STATIC SCAPULAR POSITION IN TWO PLANES AMONG ROCK CLIMBERS AND NON ROCK CLIMBERS

Digvijay Pandey¹, Vishesh Singhal², Shahid Darr³, Bhawna Ghai⁴

1. MPT (Sports)
2. Assistant professor, Sai Institute of Paramedical and Allied Sciences
3. Assistant professor, Sai Institute of Paramedical and Allied Sciences
4. HOD, Sai Institute of Paramedical and Allied Sciences

ABSTRACT

Background & objective: Rock climbing is a unique sporting activity in that the role of upper limbs and the predominantly vertical motion distinguish it from all other land based movements. Climbing is physiologically unique in requiring sustained and intermittent isometric forearm muscle contraction for upward propulsion. Sports involving sustained overhead and end range movement and extreme positioning such as rock climbing place intense demands on the soft tissue surrounding the glenohumeral joint. Contribution from the scapula has long been considered essential for normal shoulder function. During climbing maneuvers the emphasis appears to be on shoulder protraction rather than elevation. Concomitant changes including increased protraction or decrease upward rotations have also been identified in the scapular motion of athletes. Observation of the scapular posture is one of the most important components of the physical examination in overhead athletes. As the scapular posture do play role in shoulder range of movement, it is necessary to check the range of motion in resting position of scapula i.e. 40 degree from the coronal plane anteriorly, and also to check the protraction both rock climbers and non-rock climbers.

Methods: A Descriptive study was done on sample of 30 rock climber and non-rock climber subjects who fulfilled the inclusion criteria were included in the study. After the collection of demographic data, a detailed scapular protraction was measured in three position of shoulder joint i.e. 0°, 45°, and 90° (hands on side, hands on hip, and abduction to 90°). The lateral part of caliper was placed on top of inferior angle and medial part of scapula was placed on corresponding spinous process. The scapular measurement for maximum abduction was measured with bubble inclinometer; the device was places in the root of the spine of scapula. This position was established so t (40° anterior to the frontal plane) while maintaining the contact with the guide pole. The measurement/reading is taken in the maximum elevation of the arm.

Results: After measurement of scapular abduction in scapular plane and protraction in three different angles. The mean of scapular abduction at 40° was 11.76 in rock climbers and 14.46 in non rock climbers having P value less than 0.005 that indicates significant decrease in scapular upward rotation in rock climbers than non rock climbers. The mean measurement of scapular protraction suggested at 0° having t-value 1.279 with P> 0.05, that indicates that there is no significant increase in the protraction at 0° in comparison between rock climbers and non-rock climbers, at 45°, P value is > 0.05 suggesting no difference at 45° protraction between the group, at 90° also there was no significant difference between the group.

Interpretation & Conclusion: Thus the study concluded that there was a significant decrease in the scapular upward rotation in rock climbers than non rock climbers, but there was no significant change in protraction when comparing between the groups.

KEYWORDS: scapular plane; scapular upward rotation; scapular protraction

INTRODUCTION

Rock climbing is the sport that emphasizes both physical and emotional challenges. Over the past 30 years, rock climbing has become a popular recreational and competitive sport on both natural rock and artificial walls¹. It is a unique sporting activity in that the role of upper limbs and the predominantly vertical motion distinguish it from all other land based movements².

For Correspondence:
Digvijay Pandey
129 Western Bazar,
Mastodge Gali Mugalsarai,
Chandauli pin 232101
Phone no: 8687323047
Email digvij.pandey@gmail.com

Rock climbing has increased in popularity as both a recreational physical activity and a competitive sport. Climbing is physiologically unique in requiring sustained and intermittent isometric forearm contraction for upward propulsion³. Rock climbing is both physiologically and a physically demanding aesthetic sport.

Only very small parts of the hands and feet are in contact with the climbing surface whether climbing vertically upwards or more horizontally on an overhanging route. Elite- level rock climbing places extreme forces on the upper body extremities, specifically digital and upper extremity strength⁴⁻⁶. The most talented climbers in the last decade have been relatively young, though age is not specified⁶. The elite adult competitive climbers are required to be

small in stature with low body fat and very low body mass and very low fat percentages. The association of high level climbing performance with small stature and low body fat percentage, and the possibility of improving strength/mass ratio through body mass reduction, has raised concern about the potential long term health effects on climbers⁷.

Sports involving sustained overhead and end range movement and extreme positioning such as rock climbing place intense demands on the soft tissue surrounding the glenohumeral joint. These circumstances have the potential to result in imbalances in muscle performance and soft tissue length and are a primary reason of shoulder injuries common among rock climbers⁸. Abnormal scapular motions and positions relative to the thorax have been linked with different shoulder pathologies, including tendonitis, impingement, rotator cuff tears and glenohumeral inferior stability⁹.

The shoulder joint enjoys mobility at the cost of stability with respect to bony articulations¹³. The shoulder complex is highly dependent upon soft tissue relationship to maintain joint congruency. The interaction of these muscular ligaments and capsular structure leads to coordinated movements between the glenohumeral and scapulothoracic articulation known as scapulothoracic rhythm⁸. During dynamic arm movement scapula must move synchronously with the humerus to provide optimal congruence between the glenoid and the humeral head⁹⁻¹¹.

Contribution from the scapula has long been considered essential for normal shoulder function¹² during climbing maneuvers the emphasis appears to be on shoulder protraction rather than the elevation¹³. Concomitant changes including increased protraction or decrease upward rotations have been identified in the scapular motion of athletes¹⁵.

A typical dysfunction pattern is when the scapula adopts a protracted and downwardly rotated position. This may increase tension and irritation on the upper limb neural system. It is also associated with an increased risk of impingement and increased laxity of the anterior glenohumeral structures¹⁶. Awareness of and clinical test for the position and motion of scapula should be incorporated into the routine examination of the painful shoulder¹⁷. Observation of the scapular posture is one of the most important components of the physical examinations in overhead athletes¹⁷.

The knowledge of scapular kinematic function and evaluation is growing and understanding the role of scapula in shoulder function and dysfunction is evolving¹⁸. Movement at the glenohumeral joint can take place in all directions: flexion and extension; abduction and adduction; internal and external rotation and circumduction.

Each movement is brought about by different groups of muscles. Rotation of the humerus is accomplished by a group of four muscles, subscapularis, supraspinatus, infraspinatus and teres minor collectively called the rotator cuff. These muscles originate on different parts of the scapula, insert like a cuff around the perimeter of the humeral head, where the tendons blend with the joint capsule. In addition to externally and internally rotating the humerus, the rotator cuff helps stabilize the joint during abduction by pulling the humeral head into the glenoid fossa.

Scapular rotation is accomplished by the trapezius and serratus anterior muscles. Trapezius originates on the cervical and the thoracic spine and inserts on the scapula. Serratus anterior originates on the anterior rib cage and inserts on the scapula. Scapular muscles for rock climbing are the middle and lower serratus anterior muscles produce scapular upward rotations, posterior tilting and external rotation. Upper trapezius assists in medial stabilization and prevention of excess superior translation of the humeral head, as well as production of glenohumeral external rotation during arm elevation. It is important to assess the difference in static scapular position among rock climbers and non rock climbers to better understand the exact biomechanical changes in sports like rock climbing.

In earlier study homogeneity and size of sample was not considered. The control group consists of mix sex while the majority of rock climbers are male young adult. It is yet to consider homogeneity, sample size and dimension of movement in rock climbers. During rock climber maneuver shoulder protractor are at constant isometric tension which was not given emphasis in the earlier study. The purpose of this study is to assess the shoulder protraction and upward rotation which is very necessary for rock climbers. The study was aimed (1) To assess the difference in static scapular position in two planes among rock climbers and non rock climbers. (2) To assess the difference in static scapular position in a homogenous sample groups i.e. male rock climbers. (3) To assess the difference in static scapular position in a homogenous sample groups i.e. male non rock climbers.

METHODOLOGY

It is a cross sectional descriptive study. Subjects are divided into two groups with age 18-30 years, height-1.62 to 1.78m, mass-50-68 kg rock climbers is the climber who is having an experience of 2 to 8 years, practicing frequency is 2.4 to 4.1 hrs per session, 7.5 to 13.5 hrs per week and for about 2-4 days per week and non-rock climbers is that person who has

no experience of rock climbing and Who has not undergoing any strength program. Those who has Cervical referred pain as indicated by a positive spur ling's test, History of any recent shoulder pathology, any upper limb fracture and any musculoskeletal injuries in upper limb were excluded from the study or On the basis of self reported pre-existing medical condition contraindicated to the study's testing regimen/or climbing trials. Subjects were divided into two groups (rock climber and non-rock climber). Group A: Scapular upward rotation and scapular protraction measurements were taken of rock climber athletes. Group B: Scapular upward rotation and scapular protraction measurements were taken of non athletes.

The measurement is to be conducted in rock climbers' and non-rock climbers' static scapular position (end range static scapular position). After a verbal description of the measurement procedure, the method of measurement is to be demonstrated to the subject. The measurement protocol utilized in this study for scapular upward rotation was based on the method of assessing the scapular upward rotation described by Johnson et al⁸³.

To measure a scapular upward rotation the root of the scapular spine will be identified and marked in rest. The left edge of the bubble inclinometer will be placed on this mark, and another mark will be placed where the right edge of the inclinometer rest on the scapula. These marks ensure that the bubble inclinometer rested on the same location on the scapula in repeated measures. Than the glenohumeral joint is elevated, a vertical guided pole will be secure to the plinth; the standing position of the subjects will be standardized by lines marked on the floor. This position will be established so that when subjects elevates his arm, their arm would raise in the scapular plane (40° anterior to the frontal plane) while maintaining the contact with the guide pole. The measurement/reading is taken in the maximum elevation of the arm. Scapular protraction measurements were taken with the participant standing with normal relaxed posture. The measurements were performed at 3 positions [0° (rest), 45° (hands on hips), and 90° of glenohumeral abduction with maximum IR]. First, the inferior angle of the scapula was palpated, and the lateral arm of the calliper was placed at the tip of the inferior angle. The medial arm of the calliper was positioned at the corresponding spinous process, and the measurement was recorded. This was repeated 3 times, and the average of the measurements was used.

RESULT

Statistics were performed by using SPSS 16. Results were calculated by using 0.05 level of significance.

TABLE 1: MEAN AND SD OF AGE FOR THE SUBJECTS OF GROUP A AND GROUP B

Demographic	GROUP A		GROUP B	
	Mean	SD	Mean	SD
Age	24.63	2.19	24.63	2.19

TABLE 2: MEAN AND SD OF SCAPULAR UPWARD ROTATION IN 40 DEGREES FOR THE SUBJECTS OF GROUP A AND GROUP B

Variable	GROUP A		GROUP B	
	Mean	SD	Mean	SD
Scapular Upward Rotation in 40°	11.76	2.37	14.46	2.52

TABLE 3: COMPARISON OF MEAN VALUE FOR SCAPULAR UPWARD ROTATION IN 40 DEGREES BETWEEN GROUP A AND GROUP B

Variable	GROUP A Vs GROUP B	
	t value	P value
Scapular Upward Rotation in 40°	-4.292	P < 0.05

TABLE 4: MEAN AND SD OF SCAPULAR PROTRACTION AT 0 DEGREES FOR THE SUBJECTS OF GROUP A AND GROUP B

Variable	GROUP A		GROUP B	
	Mean	SD	Mean	SD
Scapular Protraction at 0 degrees	7.60	0.45	7.45	0.41

TABLE 5: COMPARISON OF MEAN VALUE FOR SCAPULAR PROTRACTION AT 0 DEGREES BETWEEN GROUP A AND GROUP B

Variable	GROUP A Vs GROUP B	
	t value	P value
Scapular Protraction at 0 degrees	1.279	P > 0.05

TABLE 6: MEAN AND SD OF SCAPULAR PROTRACTION AT 45 DEGREES FOR THE SUBJECTS OF GROUP A AND GROUP B

Variable	GROUP A		GROUP B	
	Mean	SD	Mean	SD
Scapular Protraction at 45 degrees	7.73	0.50	7.60	0.52

TABLE 7: COMPARISON OF MEAN VALUE FOR SCAPULAR PROTRACTION AT 45 DEGREES BETWEEN GROUP A AND GROUP B

Variable	GROUP A Vs GROUP B	
	t value	P value
Scapular Protraction at 45 degrees	1.007	P > 0.05

TABLE 8: MEAN AND SD OF SCAPULAR PROTRACTION AT 90 DEGREES FOR THE SUBJECTS OF GROUP A AND GROUP B

Variable	GROUP A		GROUP B	
	Mean	SD	Mean	SD
Scapular Protraction at 90 degrees	8.75	0.61	8.56	0.58

TABLE 9: COMPARISON OF MEAN VALUE FOR SCAPULAR PROTRACTION AT 90 DEGREES BETWEEN GROUP A AND GROUP B

Variable	GROUP A Vs GROUP B	
	t value	P value
Scapular Protraction at 90 degrees	1.231	P > 0.05

DISCUSSION

Aimee Roseborrough et.al. did a differences in static scapular position between rock climbers and a non rock climber population. They found that in end range static scapular position, rock climbers had a significantly GH: ST ratio than non rock climbers.

In our study the difference in static position in two planes among rock climbers and non rock climbers, the total participants were 60 (30 rock climbers and 30 non rock climbers). The measurement of upward rotation was taken by bubble inclinometer at 40 degree scapular plane and protection at 0 degree 45 degree and 90 degree by using vernier caliper. The t value of upward rotation is -4.292, p<0.05, protection at 0 degree t value is -1.27, p>0.05, at 45 degree t value is 1.007, p>0.05 and at 90 degree t value is -1.231, p>0.05. Only upward rotation is statically significant and all other value is observably significant but statically not significant.

Kalheen et.al. measured a glenohumeral rotation and scapular position adaptation after a single high school female sports season they did multiple group pretest post test study participants were measured for glenohumeral internal rotation and external rotation with scapula stabilization. The glenohumeral range of motion was calculated as the sum of internal rotation and external rotation. Scapula upward rotation was measured at 0, 60, 90and 120 degree of glenohumeral abduction at the scapula plane and scapula protraction was measured at 0,45 and 90 degree of glenohumeral abduction which is similar to our study the only difference is sample population. In our study we found an increase in scapula upward rotation at 40 degree glenohumeral abduction in rock climbers as compare to non rock climbers similar result was found in the study conducted by Aimee Roseborrough. For production of scapula movement muscle strength plays a major role which we ignored. Three dimensions measurement will be more appropriate to fulfilled all the component of scapula

motion but we considered only two plane motion, compounding movement were neglected in our study.

The role of lower trapezius and serratus anterior muscle during rock climbing are also worthy of discussion. While this muscle may be active during rock climbing maneuvers, the extent to which the muscles are trained is likely within limited ranges and statics position. Scapular dyskinesis is commonly linked to glenohumeral joint disorders in overhead athletes. A decrease in scapular upward rotation is thought to decrease the subacromial space and possibly to cause subacromial impingement at higher degrees of glenohumeral abduction. Using digital inclinometer, several researchers recently have begun to objectively measure scapular upward rotation in overhead athletes. Scapular protraction is critical to overall performance in rock climbing sports. During the static and follow through phases of the rock climbing, the scapula must protract around the thoracic wall to help dissipate large forces that are placed on the glenohumeral joint. In an attempt to supply an objective measure to scapular protraction, Kibler developed the lateral scapular slide test. To date, this is the only reliable clinical assessment method to evaluate scapular stabilizing strength. Many Authors of more recent studies have demonstrated that increased scapular protraction causes a decrease in rotator cuff strength. This decrease occurs because the scapula is not acting as a stable base of support for the rotator cuff to function, which predisposes the glenohumeral joint to injury.

In our study, protraction at all positions of abduction in rock climbers were slightly increase as compare to non rock climber. This indicates that the scapula moved into a more protected position in rock climbers, which is beneficial for rock climbing maneuvers because it enables optimal function.

Bourdin et.al. demonstrated that under highly challenging circumstances, climbers tended to increase the velocity of upper extremity movement. In this resting position, the passive restraints of the upper extremity are supporting the rock climber rather than the contractile tissues. Thus when active the lower trapezius functions primarily is an isometric function, rather than contractile tissue which facilities coordinates scapula motion.

This concept is supported by 'watt' state that rock climbing is characterized by repeated bouts of isometrics contraction. The potentials for altered scapula mechanics and shoulder injury in rock climbers is relevant to clinicians due to the nature and increasing popularity of the sports over the past decades indoor rock climbing games have proliferated and equipment in US but it's still to come in India .with gaining popularity of rock climbing it is

necessary to develop skills and resource to established international standard in India.

In this group of climbers, the data demonstrate the greatest differences with respect to scapular upward rotation, with the climbers having significantly less mobility in this plane. One etiology of decreased upward scapular rotation is the presences of imbalances in the shoulder girdle musculature strength and length. For efficient upward rotation of the scapula, the serratus anterior and lower trapezius must be strong and at their optimum length-tension relationship. Also, pectoralis minor must be sufficiently flexible otherwise passive insufficiency may occur, restricting full upward scapular movement. The following hypothesis for altered scapular mechanics in the climber group. Decreased upward rotation of scapula in rock climbers may occur due muscle imbalance in the strength and flexibility secondary to the intense tissue stresses associated with frequent participation in this sport. As stated by Rooks. Furthermore, strength is developed in a position of scapular protraction, where the pectoral muscles are in shortened position. This scenario enhance by potential of adaptive shortening of the pectoralis minor.

LIMITATION

Hand function is as important as shoulder function in rock climber but hand function is not assessed in this study.

Neck extensor is also in a constant isometric contraction along with protectors of shoulder. The study would be more significant if we would have considered neck movement along with shoulder movement.

FUTURE RESEARCH

Present study assess only scapula joint range of motion in future the study can be modified in a numbers of ways like assessment of scapula muscle strength along with shoulder upward rotation and scapula protraction .

CONCLUSION

There is significant difference in scapular upward rotation at 40° , $p<0.05$.

There is no significant difference in scapular protraction at 0° , 45° and 90° , $p>0.05$.

CLINICAL SIGNIFICANCE

This study will give the estimate of scapula upward rotation and protection of scapula to the

physical therapist dealing with rock climbing sports, so that the chances of injuries due to the repeated climbing in rock climbers may be prevented to a certain extent. Appreciating the unique range of motion patterns in competitive climbers may assist sports medicine professionals when developing injury prevention strength training programs and rehabilitation strategies for the injured climbers.

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EFFECTS OF PARAPLEGIA CAUSED BY SPINAL CORD INJURIES ON AN INDIVIDUAL'S FUNCTIONAL INDEPENDENCY AMONG PATIENTS ADMITTED TO REHABILITATION HOSPITAL RAGAMA AND NATIONAL HOSPITAL OF SRI LANKA

Hewa Haputhanthirige Nadeesha Kalyani¹, Upul Senarath², Suranga Dassanayake³

1. Allied Health Sciences Unit, Faculty of Medicine University of Colombo, Sri Lanka

2. Department of Community Medicine, Faculty of Medicine, University of Colombo, Sri Lanka

3. Allied Health Sciences Unit, Faculty of Medicine University of Colombo, Sri Lanka

ABSTRACT

Objective: To describe functional independency of paraplegia caused by spinal cord injuries (SCI) and to describe the causes of paraplegia.

Setting: The study was carried out at the National Hospital of Sri Lanka and Rehabilitation Hospital Ragama.

Participants: 100 traumatic paraplegic patients who were in the age range of 18 to 65 years.

Outcome Measures: Modified Functional Independence Measure was used to measure functional independency.

Results: Of the 100 individuals, 63% presented to be fallen from height and 55 % had caused complete transactions of the spinal cord. The commonest level of injury was the upper thoracic region i.e. T1- T8 (40%).

Majority of paraplegics were “minimally assisted” for eating (48%) and grooming (38%). Bathing and dressing were “moderately assisted” by the majority (31%), whereas 37% needed maximum assistance for toileting. A great majority needed total assistance for bowel (78%) and bladder (77%) management. Approximately 40% required maximum assistance for transferring and approximately 53% was dependent on total assistance in locomotion.

Conclusion: The study concluded that fall from height to be the major cause for traumatic paraplegia and upper thoracic region is the most prone region for the injury. Traumatic paraplegics are with higher independency for functions involving the upper extremity. They were highly dependent for sphincter control and locomotion.

KEYWORDS: Functional Independence; Paraplegia; Spinal cord injury

INTRODUCTION

Paraplegia is a complete paralysis affecting the lower extremities, trunk and pelvic organs of the body¹, due to damage to the nervous tissue contained within the thoracic, lumbar or sacral regions of the spinal canal². It is caused by an injury to the spinal cord, such as those resulting from motor vehicle accident, gunshot wounds, falls, violence etc. This can also be caused by non-traumatic factors such as spinal tumors, scoliosis and spina bifida³.

Having a spinal cord injury can be a devastating and at times a life threatening event. According to WHO, between 20-40 people per million of population will acquire a spinal cord injury (SCI) each year. In America, 250,000 of them are spinal cord injured and 52% are considered paraplegic. 82% are male. In contrast however information gathered in Sri Lanka found a minimum of 66.7 per million of population incur a SCI.

For Correspondence:

Hewa Haputhanthirige Nadeesha Kalyani
No 104, Nagaha Watt, Elawella Road, Matara
Matara, Southern Province, SRI LANKA
Email: nadeeshakalyani84@gmail.com

Figures from the main spinal injuries unit in Sri Lanka (Rehabilitation Hospital Ragama) in fact reveal that only 5% of the national total of spinal injury cases in the whole of the country receives rehabilitation⁴.

Due to unsafe working environments, increased rate of road traffic accidents etc. the frequency of getting a spinal cord injury has increased causing health care, family and social issues in Sri Lanka. During the gruesome war which prevailed in North Eastern Sri Lanka for 30 long years, thousands of young men have become disabled⁵. Those who've become spinal cord injured during the war are still receiving their rehabilitation at rehabilitation hospitals in the country and some have left for their homes, but still disabled. Therefore it is timely to conduct a research in this field.

In a SCI, depending on the level of lesion, the impairment may vary². In injuries ranging from T-1 to T-8 there is most often control of the hands, but poor trunk control present as a result of lack of abdominal muscle control. Lower T-injuries (T-9 to T-12) allow trunk control and abdominal muscle control. At this level patient achieves sitting balance. Lumbar and Sacral injuries only result in

decreasing control of the hip flexors and legs¹. Besides the loss of sensation and motor functioning, these patients may experience dysfunction of bowel and bladder⁶. Sexual functions are also frequently impaired or lost¹. These physical losses created by paraplegia are obvious and the researches have analyzed the extent of impairment in different perspectives⁸.

Functional independency of an individual is defined as the extent of ability to perform activities of daily living in order to lead a normal life⁸ and it has been assessed by several researches world wide related to spinal cord injuries. Functional Independence Measure (FIM) is often considered the gold standard for assessing activities of daily living⁹. Dahlberg et al have revealed that FIM has demonstrated adequate reliability and its motor scales has discriminated subjects with different diagnoses (SCI vs. amputation) and injury levels (paraplegia vs. tetraplegia)¹⁰. Ota et al. have concluded that the FIM score reached the plateau in approximately 10 months, 6 months and 3 months post-injury, in tetraplegia, paraplegia above T5 and that below T6 respectively, Indicating that there were differences in the ADL improvement patterns among patients with different neurological levels. Thus they have stated that it is important not to delay the start of the rehabilitation of patients with spinal cord injury in proper time¹¹.

Literature findings suggest some important findings, as well as several major gaps in Sri Lankan literature where the attentions of the researches have not much focused yet. Therefore the current study is aimed at describing the level of functional independency for activities of daily living with special emphasis on self-care, sphincter control, transfer and locomotion in paraplegic patients due to traumatic spinal cord injuries attending two selected hospitals in Sri Lanka. The findings would be important for clinicians and therapist during rehabilitating these patients and the care givers when supporting their activities of daily living. Further these findings are useful when modifying public places to provide disabled people social accessibility.

AIMS AND OBJECTIVES

To assess the level of functional independency in the areas of mobility, sphincter control, transfer and locomotion among paraplegic patients admitted to rehabilitation hospital Ragama and National Hospital of Sri Lanka.

MATERIALS AND METHODS

This descriptive cross – sectional study was conducted aiming the patients with paraplegia caused by spinal cord injuries admitted National Hospital of Sri Lanka and Rehabilitation Hospital Ragama. The study was carried out at Accident Service, Orthopedic and Neurosurgery units of National Hospital of Sri Lanka (NHS) and the Spinal injury unit of Rehabilitation Hospital Ragama (RHR).

The study population was the patients who were admitted to the NHS and RHR with a diagnosis of paraplegia decided by the consultant in charge using the ASIA Impairment Scale (AIS)¹² and documented in the bed head ticket. According to inclusion criteria, patients with a diagnosis of paraplegia following spinal cord injury, four weeks after the onset are selected for the study. The age range recruited is between 18 and 65 years of age. Unconscious patients, patients in severe discomfort, those who are in confusion, psychiatric patients, and paraplegia due to pathological cause were excluded from the study. Patients less than four weeks of onset were excluded to avoid patients who are in the shock period/flaccid stage. The sample included 100 traumatic paraplegic patients admitted to these units in 2011. Initial visit was made to each unit and all patients who fulfilled the above criteria were included. Then visits were made at regular intervals as two weekly visits. Same procedure was followed until the required sample was fulfilled.

DATA COLLECTION METHOD

Data was collected using an interviewer administered questionnaire. Level of injury and completeness of the injury was taken from the consultant diagnosis made using the ASIA Impairment Scale (AIS). The information in the bed head ticket and details from patient and relatives were used where appropriate. Modified Functional Independence Measure (FIM) was used to measure the functional independency. A client's degree of functional independence for 18 activities following a spinal cord injury was modified to 12 items and was scored on a scale of 1 to 5, with 1 being total dependence and 5 being total independence⁸.

1 = Total Assist (Subject is unable to do the task or contributes < 25% of the effort)

2 = Maximum Assist [Subject performs less than half of the task (25 – 49 %)]

3 = Moderate Assist [Requiring incidental hands-on help only Subject provides less than half of the effort (subject performs 50 – 75 % of the task)]

4 = Minimum Assist [Requiring the use of a device or requiring only standby assistance or verbal prompting or help with set-up (subject performs > 75%)]

5 = Complete Independence [Fully independent]

Areas assessed were categorized under four main domains, namely self-care, sphincter control, transfers and locomotion. Under self-care the items assessed were eating, grooming, bathing, dressing upper body and toileting. Bladder and bowel management were assessed under sphincter control. Transferring skills were assessed by assessing the ability to transfer from bed to chair and toilet transferring. Walking, wheelchair transferring and stair climbing were assessed to evaluate locomotion.

The number of patients who belongs to each independency level was calculated under areas of mobility, sphincter control, transfer and locomotion. Under the area of mobility there are six sub components named, eating, grooming, bathing, dressing upper body, dressing lower body and toileting and the level of independency with related to each of the above component is calculated. (Figure 1) The graphical distribution represents the number of patients under each independency level for several functional activities. (Figure 1, 2, 3, 4)

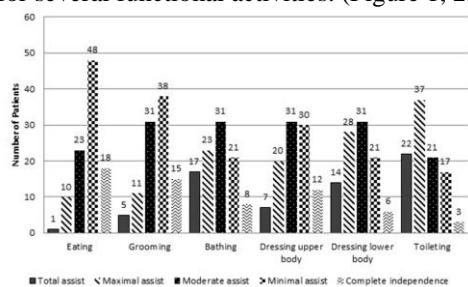


FIGURE 1: FUNCTIONAL INDEPENDENCY IN SELF CARE AMONG TRAUMATIC PARAPLEGIC PATIENTS (N = 100)

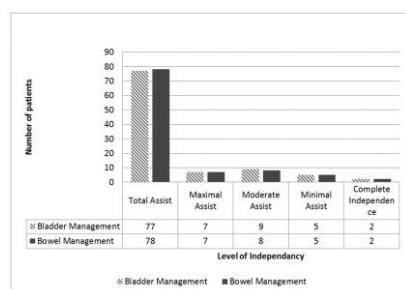


FIGURE 2: FUNCTIONAL INDEPENDENCY IN SPHINCTER CONTROL AMONG TRAUMATIC PARAPLEGIC PATIENTS (N = 100)

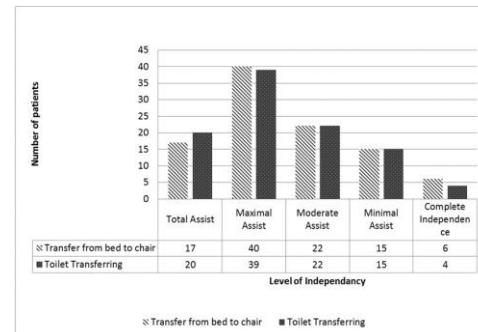


FIGURE 3: FUNCTIONAL INDEPENDENCY IN TRANSFERRING SKILLS AMONG TRAUMATIC PARAPLEGIC PATIENTS (N = 100)

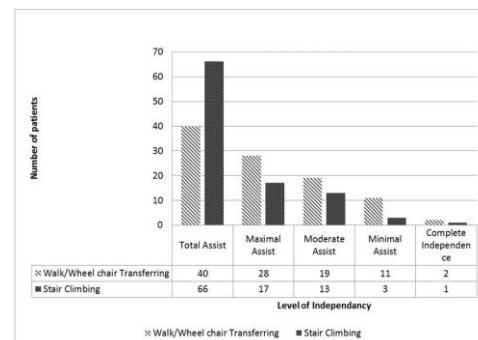


FIGURE 4: FUNCTIONAL INDEPENDENCY IN LOCOMOTION AMONG TRAUMATIC PARAPLEGIC PATIENTS (N = 100)

The percentages of individuals with different levels of independency were calculated for each item. The data was analyzed using SPSS (Statistical Package for Social Sciences) software.

Prior to data collection a pre-test was done using five paraplegic patients from each setting to find the understandability and time it takes to fill up the questionnaire.

ETHICAL CONSIDERATION

Ethics clearance was obtained from the Ethics Review Committee, Faculty of Medicine, University of Colombo. Permission to conduct the study was obtained from the Directors of National Hospital of Sri Lanka and Rehabilitation Hospital Ragama and the consultants in charge of the selected wards. Informed written consent was obtained from participants. No identification data was taken.

RESULTS

One hundred and sixteen subjects were examined to select 100 paraplegics to be eligible to participate for the study. Among the study sample

85 patients were males and 59% of patients represented the 26 to 45 years of age group. Majority was married (73%). When considering the mechanism of injury majority are found to be fallen from height (63%). Out of 100 participants 55 have got complete transaction of the spinal cord and the commonest affected region was T9 to T12 region (40%). (Table 1)

TABLE 1: SOCIO DEMOGRAPHIC CHARACTERISTICS AND FACTS RELATED TO INJURY IN TRAUMATIC PARAPLEGIC PATIENTS (N = 100)

Characteristic	n	Percentage %
Gender		
Male	85	85
Female	15	15
Age Group		
18 – 25	8	8
26 – 35	30	30
36 – 45	29	29
46 – 55	19	19
56 – 65	14	14
Mechanism of injury		
Fallen from height	63	63
Road traffic accidents	16	16
War injury	4	4
Violence	4	4
Sports injury	2	2
Other	11	11
Type of lesion		
Complete	55	55
Incomplete	45	45
Level of lesion		
T1 – T8	28	28
T9 – T12	40	40
L1 – S5	32	32

Functional Independence

Functional independency of traumatic paraplegics was measured using the Modified Functional Independence Measure (FIM) and the areas assessed were the self-care, sphincter control, transfers and locomotion.

Self-care includes patient's ability to perform functional activities such as eating, grooming, bathing, dressing upper body, dressing lower body and toileting. The findings indicate that majority of patients are highly independent for eating. For grooming majority of patients need moderate to minimum assistance whereas for bathing the majority needs moderate to maximum assistance. The function of dressing upper body is carried out with moderate to minimum assistance by the majority (61%). Even though dressing upper body was somewhat easier for them, for dressing lower body majority needs moderate to maximum assistance. Most individuals in the sample are highly dependent on toileting, requiring total to maximum assistance (Figure 1). Sphincter control is the patient's ability of bowel and bladder management. On the aspect of bladder management

77% need total assistance and for bowel management it is almost the same which is 78% (Figure 2). Transferring skills includes the patient's ability of transferring to bed, chair, wheel chair and toilet transferring and the findings indicate indicates that for transferring tasks more than half of the sample need maximum to moderate assistance (Figure 3). Locomotion indicates the patient's ability to move from one place to another by using a wheel chair, walking and stair climbing. The results show that for walk/wheel chair transferring and stair climbing paraplegics mostly need total assistance. For walk/wheel chair transferring 68% of sample and for stair climbing 83% of sample need total to maximum assistance (Figure 4). As a whole when the patient's functional independency is analyzed it shows that traumatic paraplegics are nearly half functionally independent (mean = 49.86, SD = 16.44) when compared to a healthy individual.

DISCUSSION

Current study which is to evaluate the effects of paraplegia caused by spinal cord injuries on an individual's functional independency, among patients admitted to two selected hospitals, deals with some areas the Sri Lankan researches have rarely touched and is the first of this kind in Sri Lanka where functional independency was assessed using paraplegic patients. A comparison of the literature findings with the outcome of this study reveals some important similarities as well as differences.

The results of this study revealed that the majority of traumatic paraplegics were males being 85% and majority were in 26 to 45 age groups which is 59%. The possible reason for this may be that they are the ones who mainly involved in radical sports, driving, construction activities, climbing trees as well as violence. In comparison with the demographic characteristics of the study by Blanes et al. it reveals a great majority being male participants¹³. In addition similar results were found in a study titled "Quality of life following a spinal cord injury for 20-40 year old males living in Sri Lanka". They had revealed almost half of the participants were from 35-40 years age group⁶. When considering the mechanism of injury, the present study observed that the leading cause for traumatic paraplegia is found to be fallen from height (63%). It was found that most of the fallen from height cases are those who engage in self-employments such as toddy tapping, coconut plucking etc. Another reason was found to be as unsafe house hold and construction activities and carelessness in climbing trees. Road traffic

accidents are the second highest with 16%. Reckless driving, using alcohol when driving and neglecting the road traffic signals were found as probable causes for accidents. Further the current study reveals that 55% of the cases are with complete spinal cord transections, indicating that the disability is considerably severe in most individuals. In comparison, a study to document the relationship between level of physical activity and quality of life in persons with spinal cord injury also has found 61% of their participants to be complete injuries. Moreover majority of cases are with higher T-injuries (T-1 to T-8) being 40% of the sample and this is almost same when compared to the study by Blanes et al. which has reported 48% to be presented with T1-T10 level injuries¹³.

Functional independency of a paraplegic patient has been evaluated in different ways in several researches. A study regarding physical activity and quality of life in adults with spinal cord Injury has found that level of physical activity depends on anatomical location of the injury, completeness of injury, and time since injury¹⁴. Apart from that the study by Blanes et al. reveals that most paraplegics show lowest scores for physical functioning¹³. In our study findings reveal that for eating (48%) and grooming (38%), majority need minimum assistance and dressing upper body (61%) can be done with moderate to minimum assistance indicate the fact that patients are highly independent for those functions. For dressing lower body and toileting majority need maximum assistance. In case of sphincter control 77% patient's bladder and bowel management is carried with total assistance. This indicates the fact that care giver assistance has to be mainly focused on those functions which need maximum to total assistance.

Blanes et al. in his study reveals that with regard to the physical aspects, mobility impairment and dependence on a wheelchair had a significant effect on their daily activities¹³. In comparison the current study indicates that most patients (40%) need maximum assistance to transfer from bed to chair/wheel chair and toilet transferring. Under locomotion, majority of cases receive total assistance for walk/wheel chair transferring and stair climbing. This brings that fact that at early stage a patient may need special assistance for toileting than for eating and grooming where patient possess much more independence. Also transferring and later for ambulatory tasks they should be highly helped. These findings again become helpful for home modification on how such patients should be facilitated for their activities of daily living. This becomes useful when deciding which kind of appliances have to be provided to accommodate

their needs. In addition when reenter such patients to the society public places such as hospitals; religious places should be modified for them to access. For examples elevators, facilitated toilets can be provided. Similarly the study by Blanes et al. mentions that public and private environments were not adapted for persons with disabilities¹³.

As recommendations it can be stated that majority of sample being males and the leading cause being fallen from height implies that attention should be paid on safety during house hold and construction activities. Those who engage in risky tasks such as toddy tapping, coconut plucking etc. should be advised to be careful of their safety. Road traffic accidents being the second highest indicates that the people should be highly attentive when driving and using of alcohol and neglecting the road traffic signals have to be strictly avoided.

As traumatic paraplegics are highly dependent for functions such as toileting, bathing, bowel and bladder management the care takers should be highly concerned on such aspects. In addition as most patients find transferring and ambulatory tasks difficult, and some are being wheelchair bounded for the life time, these should be concerned in home modification and creating social accessibility for them. For example elevators, facilitated toilets can be provided.

CONCLUSION

The study indicates that the traumatic paraplegia is common among males and is highly prevalent in 26 to 45 years age group. The leading cause for traumatic paraplegia is found to be fallen from height and majority is with complete transactions of T-1 to T-8 region. The paraplegics are minimally assisted for eating and maximum assistance for toileting. Bowel and bladder management are on total assistance for the majority. They need maximum assistance for transferring and total assistance for ambulatory tasks.

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LEARNING STYLES AMONG THE OUTSTANDING PHYSIOTHERAPY UNDERGRADUATES STUDENTS

Rai Satishkumar Sudhakar¹, Subhash Khatri²

1. Intern, College of Physiotherapy, Pravara Institute of Medical Sciences, Ahmednagar, Maharashtra
2. Professor & Principal, College of Physiotherapy, Pravara Institute of Medical Sciences, Ahmednagar, Maharashtra

ABSTRACT

Background: Teaching the undergraduate physiotherapy students is an important role of physiotherapy educators and it's like investing in future of this profession. Optimal learning environments consider how students learn and utilize various teaching methods to tailor curriculum delivery to match specified student learning preferences.

Objectives: The purpose of this study was to find out the preferred learning styles amongst the outstanding students.

Study Design: This was a questionnaire based survey study.

Methods: A total of 12 outstanding students with rank one to three from I, II, III& IV year undergraduate Physiotherapy classes completed the VARK Questionnaire after their results. The VARK (Visual, Aural, Read/write, and Kinesthetic) - questionnaire contains 13 multiple-choice- questions with four possibilities to select an answer. Each possibility represents one of the four modes of perception. But, one can select more than one answer for each question, which is necessary for the identification of the poly modal modes of perception and learning. The students' register numbers and names were used in the study and no blinding was practiced. All these participating rank holder students completed and returned back the questionnaire in approximately 10-15 minutes period of time. We analyzed their learning styles by putting the data at <http://www.vark-learn.com/english/index>

Results: Unimodal learning styles were observed in 41.66(5/12) students and multimodal learning style was preferred by 58.34% (7/12) and 33.33(4/12) students showed preference for kinaesthetic learning style indicating a crucial role for kinaesthetic learning along with other multimodal learning preferences like visual, auditory, reading, writing and kinaesthetic learning.

Conclusion: The top rank undergraduate physiotherapy students had a higher preference for multimodal learning.

KEYWORDS: Physiotherapy education; learning styles; VARK questionnaire; merit

INTRODUCTION

Natural or habitual pattern of acquiring and processing information in learning situations is known as learning style. The term "learning styles" often refers to the concept that individuals differ in regard to what mode of instruction or study is most effective for them. Learning style is an important core concept that helps us to understand how individuals differ in how they learn. The idea of individualized learning styles originated in the 1970s, and has greatly influenced education and proponents of learning-style assessment contend that optimal instruction requires diagnosing individuals' learning style and tailoring instruction accordingly¹. The transition from H.S.C.(10+2) to first year Physiotherapy course can be difficult for students because of the dramatic increase in the volume of content. Furthermore, today's Physiotherapy students represent a broad spectrum in terms of age experience, culture, ethnicity and level of preparedness as well as learning preference

and styles. This diversity is welcomed; however, it also presents a challenge for instructors to meet the educational need of all students. Specifically, students' motivation and performance improves when instruction is adapted to student learning preferences and style². The undergraduate Physiotherapy education, as with any other educational program, needs ongoing improvements to meet the changing demands of the Physiotherapy practice in the 21st century. Although, the complexities of the Physiotherapy care have increased dramatically over the last century, the method of teaching Physiotherapy has hardly changed. Recently, there is a widespread interest in the evaluation of the learning techniques. Students often find discrepancy between learning and delivery of instruction. They usually seek information that is methodically and efficiently presented to them. Teachers should be aware of students learning process, review their mode of instruction and adapt to those learning process, review their mode of instruction and adapt to those learning styles in a conductive environment preferred by students³.

Educational researchers have postulated that each individual has unique learning style⁴. As a

For Correspondence:
Rai Satishkumar Sudhakar
satish.rai.90@gmail.com

Physiotherapy teachers; perhaps it is their responsibility to be aware of the learning styles of our students. The knowledge on the learning styles may help the educators in identifying and solving the learning problems among the students, thus helping their students to become more effective learners⁵⁻⁷. While doing so, it may be possible to reach out to more students because of the better match between the teacher, students and the learner styles. In recent time, very few studies have focused on the possible relation between the preferred sensory modality used for learning and academic performance of students.

Recently, several studies have investigated the learning styles preferences in students interested in health professions. Despite the fact that there are many different learning style models that focus on aspects such as personality characteristics, information processing style, or instructional preferences, many of the previous studies have focused on the sensory modality used by students to learn and have used the VARK (Visual, Aural, Read/write, and Kinesthetic) questionnaire to assess it⁸⁻¹⁰. Many methods are available for assessing the learning styles, with each method offering a distinctly different view of the learning style preferences. VARK is a questionnaire which was developed by Neil Fleming¹¹, who was a teacher and an educator in New Zealand, who brought about a concept in the evaluation of the learning preferences among the population. The VARK questionnaire is an easy-to-use 16-question survey that provides the users with a profile of their learning preferences¹². In this questionnaire, V stands for the Visual in which students learn best from pictures, graphs and diagrams. A stand for Aural – the students learn best from spoken words, lectures and discussions. R stands for Reading – the students learn best from reading and writing texts. K stands for Kinesthetic – the students learn best when they move their bodies and manipulate things with their own hands.

Although various studies have investigated the learning styles of different health professional students, gender differences, effects of learning styles of academic performance, study about the learning styles amongst the outstanding Physiotherapy undergraduate students is hardly reported in the Indian context and this inspired us to conduct the present study.

METHODOLOGY

Participants: Participants were 12 (3 male & 9 female) top three rank holders undergraduate Physiotherapy (I to IV B.P.Th.) students with an average age of 20.1 ± 1.51 years studying at College

of Physiotherapy (PIMS), Loni, Maharashtra, India 413 736 at the time of study.

Instrument: A16 point scoring system of VARK questionnaire was used to identify the learning styles of the participants. The VARK questionnaire version that was available at <http://www.vark-learn.com/english/index.asp>¹³. Every question had four option out which participant can select any one or more than one of the options, each option represented each sensory modality. Based on their responses students were classified as unimodal or multimodal (bimodal, trimodal, quadmodal).

Procedure: Participation in this study was voluntary and an informed consent was obtained. The study was approved by the institutional ethical committee of Physiotherapy. The participating students were explained about the aim of the study and were asked to fill the questionnaire. They were assured that their confidentiality will be maintained. The questionnaire was distributed among the students by the researcher and the participants were asked to fill and return it on the very day they were collected back for the analysis. The analysis was done by clicking the responses by participants on the official VARK website (<http://www.vark-learn.com/english/index.asp> or <http://www.varklearn.com/english/page.asp?p=questionnaire>).

RESULTS

A total of twelve undergraduate physiotherapy students (I-IV B.P.Th.) who scored maximum marks in their university examinations and obtained higher ranks like 1, 2 & 3 participated in this study. Out of this, 3 males (25%) and 9 females (75%) completed and returned the questionnaires voluntarily. Their responses were checked and assessed for their learning style preferences, the gender difference in relation to learning style preferences and the correlation between the learning styles and their performances in the university examinations. (Table 1)

Out of 12 participants, 41.66% (5/12) preferred the unimodal learning, 8.33% were bimodal, 25% (3/12) were trimodal and 25% (3/12) were quad modal learner (figure 1). Among the unimodal learners, 20% (1/5) preferred the visual, 80% (4/5) preferred the kinesthetic mode of learning. So if we consider bimodal, trimodal and quad modal learners as multimodal then the multimodal learning style trend was observed in 58.34% (7/12). Although, we didn't find any gender related differences in learning style preferred, 11 students (3 male & 8 female) preferred kinaesthetic

learning style as part of their preferred learning style or styles. Comparing their scores according to their learning preference it was seen that the unimodal learners had mean score of 67.6% ($\pm 4.18\%$ SD) while on the other hand it was seen that the multimodal learners had a mean score of 69.4% ($\pm 4.49\%$ SD). No significant correlation were found in their performance in previous exams and marks obtained in the study and their learning styles however it was seen that most of the participant had a kinesthetic common modality as a part of their learning style.

TABLE 1: VARK SCORE & GENDER PREFERENCE

Preferred modality	Male	Female	Total
Unimodal			
Visual	0	1	1
Kinaesthetic	1	3	4
Bimodal			
Auditory kinaesthetic	0	1	1
Trimodal			
Visual reading kinaesthetic	0	2	2
Auditory reading kinaesthetic	1	0	1
Quad modal			
Visual auditory reading kinaesthetic	1	2	3
Total	3	9	12

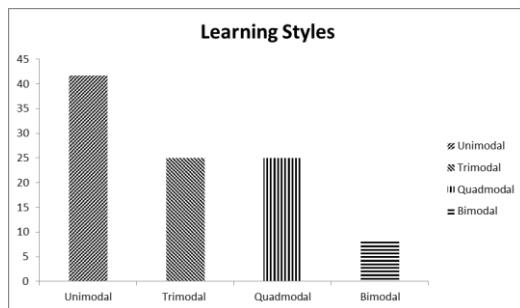


FIGURE 1: LEARNING STYLES AMONGST PHYSIOTHERAPY RANK HOLDERS

DISCUSSION

Benjamin Franklin said that “Tell me and I forget. Teach me and I remember. Involve me and I learn” hence it is important for the effectiveness of teaching environments to take account of group or individual learners’ characteristics, competence and experiences (pre-learning) throughout the process of planning learning environments¹⁴. In the present study, we found that top ranker physiotherapy students had multimodal learning styles. This could be due to immediate environment (sound, light, temperature, and design); (2) own emotionality

(motivation, persistence, responsibility, and need for structure or flexibility); (3) sociological needs (self, pair, peers, team, adult, or varied); and (4) physical needs (perceptual strengths, intake, time, and mobility)”¹⁵⁻¹⁹ and the pressure perceived by some of them like defending champions.

In a study done by El Tantawi described that multimodal students in one course (from one cohort) performed significantly better than unimodal students, our study also showed that the multimodal 69.4% ($\pm 4.49\%$) students performed better than the unimodal 67.6% ($\pm 4.18\%$) students. As it is said that every individual has its own learning style however in a study it is said that even individuals with strong learning style preferences preferred a variety of teaching approaches to avoid boredom²⁰. A study also showed that students with “low levels of learning activity” actually learned more when presented first with their least preferred material and resources²¹.

Looking on their motivation source these student were mostly motivated externally than internally. While in a study conducted by Fritz S et al to find out relationship between college student’s learning style and motivation and found out that a positive but a small correlation exist between in students²².

In our current study number of female population is three times that of male population however there was no significant difference in results however female population used broader range of sensory modality than the male participants. This can be due to the fact that the female population is thrice the times of male population. However a study conducted upon a difference in the learning style of male and female it showed that female student population is more diverse than the male population²³.

We understand the basic fact that VARK is a self-reported questionnaire and statistically it's not yet validated. Further, the number of participants or sample size was too small and the study involved the participants from only one constituent unit of the university and hence we believe that in future top rank students of various colleges and universities from different states and union territories may be considered.

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A COMPARATIVE STUDY OF TIMED UP & GO TEST AND TINETTI PERFORMANCE ORIENTED MOBILITY ASSESSMENT IN PREDICTING FALLS IN HEMIPARETIC STROKE PATIENTS

Bhatri Pratim Dowarah¹, Sangeeta Ghosh²

1. *PhD Scholar, Srimanta Sankardeva University of Health Sciences, Dr. B. Barooah Cancer Institute, Guwahati, Assam*
2. *Physiotherapist, Guwahati, Assam*

ABSTRACT

Hemiparesis following Stroke is the most frequent cause of adult disability. Falls in Stroke survivors are a consequence of Stroke related locomotor deficits or balance deficits or gait disturbances. Falls are common following Stroke but knowledge about predicting future fallers is lacking. The purpose of this study was to compare Timed Up and Go test (TUG) scores and Performance Oriented Mobility Assessment (POMA) scores for predicting falls in Hemiparetic patients with Stroke. Hemiparetic Patients with Stroke of duration of 3 months or more prior to the study enrollment were conveniently selected. TUG test was conducted first where the patient was asked to walk for a total distance of 3 meter. After performing this test, POMA was performed by each subject. Time allotted for completing the two tests was 30 minutes for each subject with adequate rest time. After recording the scores for each test, a follow up was done for six months. A log book was given to each subject for reporting the number of falls for each month. The number of falls for each subject was correlated with TUG test and POMA separately.

To conclude, we can say that there is significant difference between the Timed Up and Go test and Tinetti's Performance Oriented Mobility Assessment score on prediction of fall in Hemiparetic Stroke patients and that TUG is much better predictor than POMA.

KEYWORDS: *Hemiparesis; TUG test; Tinetti's POMA; Falls; t-test; ROC*

INTRODUCTION

Stroke is defined as a clinical syndrome typified by rapidly developing signs of focal or global disturbance of cerebral functions, lasting more than twenty four hours or leading to death, with no apparent cause other than of vascular origin (WHO, 1978). Depending on the location of vascular defect(s), different functions are disturbed leading to temporary or permanent impairment, activity limitations and participation restrictions^{1,2,3}.

Identification of high risk patients and fall prevention should be given much more importance in the present world where any person hardly have time to care for their old disabled parents or family members. The reliability and validity of Timed Up and Go test (TUG) and Performance Oriented Mobility Assessment (POMA) have been tested in

prediction of fall in Stroke patients and it was found to be excellent^{4,5}.

AIMS AND OBJECTIVES

- To determine the TUG scores in predicting falls in Hemiparetic stroke patients.
- To determine the POMA scores in predicting falls in Hemiparetic stroke patients.
- To compare TUG test scores and POMA scores for predicting falls in Hemiparetic stroke patients.

REVIEW OF LITERATURE

K S Chan, KNK Fong did a study to investigate the association between demographics, Stroke specific disabilities, fall related self-efficacy and fall history of people with chronic stroke living in the community of Hong-Kong⁶.

Marianne Beninato, Leslie G. Portney and Patricia E Sullivan examined the accuracy of clinical measures representing various domains of International Classification of Functioning, Disability and Health (ICF) relative to their ability to identify individual with a history of multiple falls and the findings suggest that the ICF is a useful framework and support the need for prospective study of tools in more-complex domains of the ICF

For Correspondence:
BHATRI PRATIM DOWARAH
C/o R. K. Sarma
H.No. 4, Opp. Passport Office
Housing Stop, Rangamancha Path
Rukmini Nagar, Dispur
Guwahati
ASSAM, India
LAND LINE
pratim4u@gmail.com

for their accuracy for fall prediction in people with stroke⁷.

METHODOLOGY

RESEARCH DESIGN

This is a comparative study design and the duration of the study is 6 months. Samples of 50 subjects were collected by convenient sampling method and the study was executed at Guwahati, Assam. All subjects diagnosed as hemiparetic stroke and referred by consultant Neurologists and Neurosurgeons were included in the study. All the subjects were required to sign written informed consent form prior to participation in the study.

50 subjects were to perform both the tests viz. TUG and POMA one after another on the date of evaluation or Day 0 and from Day 1 falls are recorded per month up to six months.

Sampling Method

Samples were conveniently chosen from Out Patient Department and the references made by consultant physicians observing the inclusion and exclusion criteria.

Inclusion Criteria:

- Hemiparetic patients with right or left side involvement.
- Hemiparetic patients of both the gender.
- Hemiparetic patients with stroke of duration of 6 months to 2 years prior to study enrollment.
- Age 45 to 65 years^{8,9}
- Able to rise from chair and walk 10M unassisted and without any orthosis.
- Only having experienced 1 stroke.
- A score of 20 or higher on MMSE¹⁰.
- No excessive spasticity in lower limb, lower than 3 in modified Ashworth scale¹¹.
- Patients consent for participation.

Exclusion Criteria:

- Had second episode of stroke.
- Any musculoskeletal injury or disorders
- Subject with visual impairments.
- Subjects with unstable cardiovascular problem.
- Subjects with cognitive impairments.
- Subject with frequent history of fall prior to stroke.

PROCEDURE AND PROTOCOL

Procedure

All the subjects were explained about what, how and why to do the tests. TUG test was

conducted at first where the patient had to walk for a total distance of 6 meters. The distance was marked with a red marker so that it was well visible by the subjects. As per procedure of the test the subject was made to sit on an armed chair with proper back rest and on the command 'go', the subject got up and walked till he/she reached the red marked line. On reaching the line, the subject turned, walked the same way till he/she reached the chair and sat down. Time taken was recorded with the help of a Stopwatch. After performing TUG, POMA was to be performed by each subject. Accordingly the two components of POMA viz. Balance and Gait test was performed sequentially. For the test to perform, the subject was first made to sit on a hard armless chair and at first the balance components were checked and then the gait. After the tests were done and the scores were recorded, a log book was given to each subject for reporting the number of falls for each month up to 6 consecutive months. The number of falls for each subject was correlated with TUG test & POMA separately and statistically analyzed. This correlation explained which test is better for prediction of falls.

Protocol

Timed UP& GO test was performed as 1 practice and 3 trials for average score. After the test had been administered, the prediction of falls would be judged with TUG test as:-

- Less than 8.5 sec is independent
- More than 14 in such Hemiparetic patients are at high fall risk
- 20-29 sec is normal for frail elderly or disabled person
- More than 30 is dependent in mobility skills and activities of daily living.

The total score of POMA is 28 scores, 16 for balance and 12 for gait. The fall prediction would be judged with this test as-

- Less than 19 are considered at high risk of falls
- Between 19-24 are at moderate risk.
- Between 24-28 are at low risk of falls.

Time allotted for completing the two tests was 30 minutes for each subject with proper rest time as needed between tests or portion of test. After recording the scores for each test, a follow up was done for 6 months.

ANALYSIS AND INTERPRETATION

In this study the data's are obtained using TUG and POMA and judgments were done on the basis of the pre-established cut off scores.

Determination of TUG scores in predicting falls in hemiparetic patients on the basis of pre-determined cut off value is given below:

Time	Frequency	Percentage	Mean	Std. Deviation
>14 sec	47	94.0	18.22	6.85
<14 sec	3	6.0		
Total	50	100.0		

The above table shows that 94% of the total hemiparetic patients took more than 14 seconds in performing Timed Up and Go test. This implies that 94% of the patients were at high risk of fall and only 6% were not at risk of fall.

For POMA, according to the pre-established cut off scores, subjects scoring less than 19 are at high risk, between 19 to 24 are at moderate risk and in between 24 to 28 are at low risk of falls³¹.

Determination of POMA scores in predicting falls in hemiparetic patients is given in the table:

Score	Frequency	Percent	Mean	Std. Deviation
< 19	12	24.0	22.54	7.18
19 - 24	37	74.0		
25 - 28	1	2.0		
Total	50	100.0		

Table reveals that 24% of the total patients scored less than 19 in POMA imply that 24% hemiparetic patients were at high fall risk, 74% of the patients had moderate risk of fall and only 2% had low risk of fall.

Tools	Mean
TUG	18.22
POMA	22.54

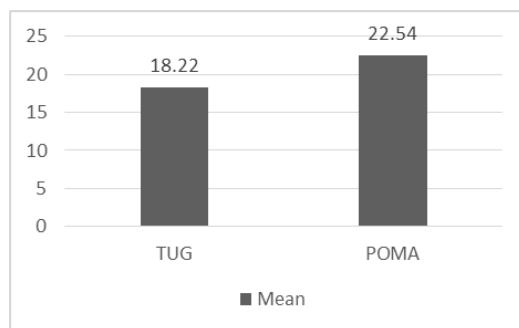


FIGURE 1: DISPLAY OF MEAN DIFFERENCE BETWEEN TUG AND POMA

Although the mean difference curve has been shown in the figure, it is of least importance in this kind of predicting study. This is not enough to prove the efficiency of a tool in predicting an event.

To compare the mean difference between the two tools viz. TUG and POMA, independent sample t-test is used.

TABLE 1: COMPARING THE MEAN DIFFERENCE OF TUG SCORE AND POMA SCORE

Tools	Mean	SD	t-test	df	p
TUG	18.22	6.85	-4.496	98	0.000
POMA	22.54	7.18			0.000

The above table is constructed to see whether there exists any significant difference in means of TUG and POMA scores. For this purpose Independent sample t-test was performed. It was found that $t = -4.496$ which is highly significant at ($p=0.00$). We can say that there has been remarkable difference in means of TUG and POMA. This interprets the experimental hypothesis is to be accepted.

As Receiver Operating Characteristic (ROC) is the best method to compare tools in prediction of an event, it is used in this study. To compare TUG and POMA for predicting fall, ROC is seen which helps to evaluate the sensitivity and specificity of each tool in predicting the event. For this, a single fall in this study is neglected because a single fall could have been due to overwhelming extrinsic factors.

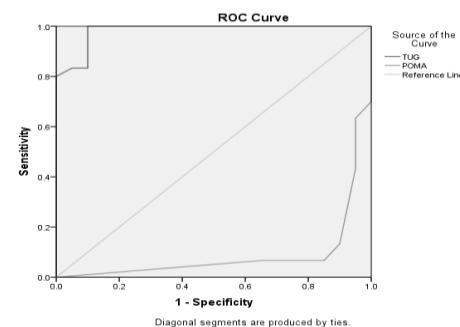


FIGURE 2: RECEIVER OPERATING CHARACTERISTIC (ROC) CURVE

Test Result Variable(s)	Area
TUG	0.970
POMA	0.135

TABLE 2: ROC CURVE INTERPRETATION

Table shows that area of TUG under ROC is 0.97 which is much higher than area of POMA which is 0.135. And the pre-established interpretation of the Area under Curve (AUC) reveals that the higher the AUC, the better the overall performance of the tool and area ranging from 0.90-1.00 represents excellent accuracy. Thus

it can be inferred that TUG is more effective in predicting fall in patients than POMA.

From the Data collected, it is clear that the subjects taking 19.33 seconds or more in TUG and the subjects scoring less than 23 in POMA are more prone to fall. Therefore sensitivity and specificity of the tools are calculated on the basis of these two scores or cut-off points.

RESULTS

Analysis of the data collected through the study of six months had shown that TUG is much better in predicting falls in such patients. One of the objectives of the study was to record the efficiency of TUG in predicting falls in Hemiparetic Stroke patients. The subjects were made to perform this test and the numbers of falls were recorded each month. After 6 months of recording, when an average of falls was calculated and correlated with the pre-established cut-off scores, results were found to be good.

Another objective of the study was to record the efficiency of POMA in predicting falls in the same patients. The subjects were made to perform this test and the same procedure was applied.

In order to find out whether there is any significant difference in TUG and POMA scores in prediction of fall of the same subjects, independent sample t- test was done. The mean values of each tools is compared in this test. It was found that $t = -4.496$ which is highly significant at ($p=0.00$) which proves that there is remarkable difference in means of TUG and POMA. Thus the alternative hypothesis has been proved and the null hypothesis is rejected.

DISCUSSION

Statistical analysis shows that there is significant difference between TUG and POMA in predicting falls in hemiparetic patients. And Receiver Operating Curve (ROC) revealed that TUG is much better predictor than POMA in such patients. Also its sensitivity and specificity shows the same.

Although reliability and validity of TUG and POMA are very good in stroke patients as established in previous studies, their comparison shows significant difference. In TUG, the time taken to get up from a chair and complete a lap of 3 meter is counted. The task includes both balance and gait but gives more importance to gait factors. Whereas POMA consists of two sub-tests viz. Balance and Gait tests in which there is 16 scores for Balance and

12 scores for Gait test summing up to total of 28. Thus it gives more score or points on balance. Studies have proved that balance is less related to fall in chronic stroke patients⁴⁰. Also while performing the study, more precisely while collecting data's it was found that many of the patients scoring 15 out of 16 in Balance tests of POMA scored 5 or 6 out of 12 in Gait test. The same patient gave a record of frequent falls almost falls of average 2.17 within 6 months. This proves that a stroke patient having fair balance has a significant gait disturbance leading to fall. Gait disturbances mainly include inadequate ground clearance possibly due to extensor synergy or Dorsi flexor weakness. At times there may be effects of other extrinsic factors on falls. As a trial to eliminate error due to such risk of fall, a single fall within 6 months is neglected.

The result of this study again showed that a patient taking 19.33seconds or more in TUG test and less than 23 in POMA is prone to fall. This gives the new cut-off point of the tools. But POMA could not predict falls accurately in such hemiparetic patients.

Thus on the basis of our results, we found out that TUG is a better predictor of falls in hemiparetic stroke patients.

LIMITATIONS

- The duration for follow up was six months
- The age group taken in the study was 45 to 65 years of age which means the study included.
- Sample size was not adequate for the study to prove.
- Numbers of falls were recorded depending on the version of the subject

SUGGESTIONS

In the future studies, it is recommended that homogeneity of the subjects should be done on a more specific and discrete fashion. A larger sample size can be studied to have more accurate results. The duration of Stroke can be more specified in the future study. Statistical analysis can be done by implying the tools on faller and non-faller categories to have a better illustrated result.

CONCLUSION

To conclude, we can say that there is significant difference between the Timed Up and Go test and Tinetti's Performance Oriented Mobility Assessment score on prediction of fall in Hemiparetic Stroke patients. Thus the null

hypothesis is rejected and the experimental hypothesis of the study is accepted.

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EFFICACY OF MULLIGAN SNAG TECHNIQUE FOR THE MANAGEMENT OF SPONDYLOGENIC REFERRED LOW BACK PAIN

Karthikeyan T¹, Moorthy², Pradnya³

1. Department of Neuro Rehabilitation, NIMHANS University, India

2. JPN Apex Trauma Centre, AIIMS University, India

3. Department of Neuro Rehabilitation, NIMHANS University, India

ABSTRACT

Background: Low back pain is one of the commonest conditions which almost every person suffer. There are several techniques devised to manage low back pain. Many patients get relief with mulligan method of mobilization which is very popular.

Objective: to find out the effect of mulligan SNAG technique in patients with Spondylogenic referred LBP.

Methods: Fifteen subjects were included in this study. Intervention group was given mulligan SNAG technique and exercises.

Results: Percentage change in scores of VAS for pain post intervention in mulligan group and slump stretching group was found to be significant (19.1% 42.2% respectively p value 0.001). Short term disability was assessed by ODI score.

Percentage change in score post intervention in both groups was also found to be significant (16.4% 31.3% p value 0.001)

Conclusion: The present study revealed that the mulligan SNAG technique in a subgroup of patients hypothesized to benefit from this form of treatment is beneficial for reducing short term disability, decreasing pain for the treatment of spondylogenic referred low back pain.

KEYWORDS: Low back pain; Neurodynamics; Slump test; Slump stretching

INTRODUCTION

Low back pain (sometimes referred to generally as **lumbago**) is a common musculoskeletal disorder causing back pain in the lumbar vertebrae. It can be either acute, sub acute or chronic in its clinical presentation⁸. Typically, the symptoms of low back pain do show significant improvement within two to three months from its onset. In a significant number of individuals, low back pain tends to be recurrent in nature with a waxing and waning quality to it. In a small proportion of sufferers this condition can become chronic. Population studies show that back pain affects most adults at some stage in their life and accounts for more sick leave and disability than any other single medical condition.

Disability associated with low back pain (LBP) continue to rise, contributing to a substantial economic burden that exceeds nearly 50 billion dollar annually in the United States alone¹.

Health care expenditures among individuals with LBP are 60% greater than those without LBP, with 37% of the costs a direct result of physical therapy services¹.

For Correspondence:
Karthikeyan Thangavelu
35, Type 2, Block 6, NIMHANS QTS, Byrasandra Campus,
Bangalore-560029
Karnataka, India
karthik_77in@yahoo.co.in

Physical therapists utilize wide range of interventions in the management of LBP; however, evidence for the effectiveness of these interventions is limited².

Given that LBP is a heterogeneous condition, it does not seem reasonable to expect that all patients will benefit from a single treatment approach. Rather the key is to identify sub groups of patients with a high probability of achieving a successful outcome with a particular intervention.

Evidence suggest that a short and longer term outcomes are improved when a classification based approach is used compared to decision making based on clinical practice guidelines⁹.

To date, evidence for several subgroups of LBP exists, such as patients likely to benefit from manipulation, lumbar stabilization, and specific directional exercise⁷.

One subgroup that has not been readily examined is patients with more distal symptoms whose symptoms are not improved with specific directional exercise (i.e. flexion- or extension-oriented exercise). These patients are commonly thought to be experiencing altered neurodynamics, the interaction between nervous system mechanics and physiology.

Neurodynamics

The nervous system as a whole is a mechanically and physiologically continuous structure from the brain to the end terminals in the periphery. The peripheral nervous system (PNS) and

central nervous system (CNS) need to be considered as one since they form a continuous tissue tract.

This a continuum in three ways firstly, the connective tissues are continuous, although in different formats, such as epineurium and dura mater. A single axon can be associated with a number of these connective tissues. Secondly, neurons are interconnected electrically so that for example, an impulse generated at foot may be received at the brain⁴.

Stresses imposed upon the peripheral nervous system during movement are transmitted to the CNS. Conversely, tension can be conveyed from the CNS to PNS. The CNS respond dynamically to limb movement due to its mechanical continuity with the PNS⁴.

Neuraxis is a term used when the CNS is considered along its length irrespective of its bends and folds.

The nervous system adapts to lengthening by, the development of tension or increased pressure within the tissue i.e. increased intraneuronal pressure or increased intradural pressure.

Spinal movements change the length and shape of the spinal canal and, by virtue of its attachments, the neuraxis is pulled from all directions. This causes the neuraxis to change shape and position in the canal.

Regular and appropriate movement of the neuraxis is necessary for optimum physiological function. This is supported by the fact that the vascular supply of the cord is affected by spinal movements. If the movement is reduced at a point along the tract, for example by an epidural adhesion, tension is no longer offset or dissipated adequately and neural mechanics are altered. Such alteration in mechanics are named pathomechanical changes.

The nervous system can be effectively and safely mobilized, the ultimate aim of treatment is to restore the patient's range of nervous system movement and stretch capabilities and to normalize the sensitivity of the system⁵.

Mobilization of the nervous system has recently emerged as an adjunct to assessment and treatment of pain syndromes. An important aspect of this approach is that healthy mechanics of the nervous system enable pain free posture and movement to be achieved.

Mulligan⁷ manual therapy treatment techniques are frequently used in clinical practice. In spite of its popularity, the efficacy of the mulligan concept has not been adequately established by clinical trials. Brian Mulligan states that when using SNAGs for the lumbar spine no change is elicited, then SNAGs are inappropriate. He suggests trying Nags in a combined weight bearing position first,

then SNAGs in appropriate combined movement and carry on along the combined movement treatment pathway⁶. It remains important however, that all the techniques are pain free.

The aim of this study is to probe the effectiveness of mulligan technique and mulligan method of mobilization in a subgroup. It is popular because of painless process.

The aims and objectives of the study include

- To find out the effect of mulligan SNAG technique in patients with Spondylogenic referred LBP
- To find out the effect of mulligan method of mobilization in patients with Spondylogenic referred LBP

METHODOLOGY

MATERIALS

- Examination table.
- Assessment Performa.
- Mulligan Belt.
- Modified Oswestry Disability Questionnaire

SAMPLE SELECTION

Population – subjects with low back pain
Sample size –15 subjects.

Sampling design – simple random sampling.

Inclusion criteria:

- Subjects with a chief complaint of LBP having age between 18 and 60 years.
- Subjects were required having symptoms that referred distal to the buttocks, reproduction of patient symptoms with slump Testing.
- Subjects with no change in symptoms with lumbar flexion or extension and baseline oswestry score greater than 10%.

Exclusion criteria:

- Subjects with serious spinal conditions like infections, tumors, osteoporosis and spinal fracture etc.
- Subjects having pregnancy, have history of spinal surgery, positive neurological sign or symptoms suggestive of nerve root involvement (Diminished upper or lower extremity reflexes, sensation to sharp and dull, or strength).
- Subjects with osteoporosis.
- Subjects exhibited a straight leg raise (SLR) test of less than 45 degree.

INTERVENTION

Participants were consecutive patients in primary care between 18 and 60 years of age with a chief complaint of spondylogenic referred LBP. All patients provided consent prior to participation. Patients completed self-report measures, followed by a standardized history and physical examination. Self report measures included a body diagram to assess the distribution of symptoms, visual analogue scale (VAS) and modified Oswestry Disability Index (ODI). The 10-point VAS ranges from 0 ("no pain") to 10 ("worst pain imaginable") and was used to indicate the intensity of current pain and at its best and worst level over the last twenty four hours (Jensen et al., 1994). These 3 ratings were averaged to arrive at an overall pain score. The scale has been shown to have adequate reliability, validity, and responsiveness in patients with LBP when the three scores are averaged (Childs et al., 2004).

The modified ODI was used to measure disability and consists of 10 questions. Each question is scored from 0 to 5, with higher scores indicating greater disability. The scores were then converted to a percentage out of 100. The test-retest reliability of the modified ODI has been shown to be high (ICC $\frac{1}{4} .90$) (Fritz and Irrgang 2001). The standardized history consisted of demographic information including age, gender, past medical history, location and nature of symptoms, relieving/aggravating activities, prior episodes, occupation and leisure activities. The standardized physical examination included measurements of active lumbar range of motion, passive postero anterior mobility of the lumbar spine (Maitland et al., 2000), myotomal testing, sensory examination to sharp and dull, muscle stretch reflex testing, the SLR test (Butler, 2000), and the slump test (Maitland, 1985). The slump test was performed as described by Maitland (1985). For the purpose of this study, the slump test was considered positive if the patient's clinical symptoms were reproduced during the performance of the slump test and these symptoms improved with structural differentiation, in this case, release of neck flexion. Following the baseline examination, patients were randomly assigned to receive lumbar spine mobilization, exercise and mulligan snag technique or lumbar spine mobilization, exercise, and mulligan technique a computer-generated randomized table of numbers created prior to the beginning of the study was utilized to determine the randomization scheme. All patients were scheduled for treatment thrice weekly for 2 weeks, for a total of 6 visits.

Mulligan group:- The lumbar spine mobilization by mulligan method was performed in a high sitting position on a couch and the exercise intervention group performed a 5-min exercise cycle warm-up at the beginning of each treatment. Following the warm-up patients received mulligan SNAG spine mobilization in high sitting position on couch. Patient will sit on a couch in high sitting position the therapist wind the mulligan belt around patient's abdomen which is in continuation on the back of therapist. Therapist asked the patient to bend forward in pain-free range and overpressure was applied by therapist's ulnar border of hand on patient's lumbar spinous process. Patient had been asked to extend his spine while the pressure was maintained on spinous process. Each set consisted of ten movements after which patient was given rest for thirty seconds and again same procedure was repeated. Patient did 3 sets of 10 repetition and completed a standardized exercise regimen since a combination manual therapy and exercise have been shown to be effective in reducing disability in patients with chronic LBP (Aure et al., 2003). Patients also completed a standardized exercise program consisting of pelvic tilts, bridging, wall squats, quadruped alternate arms/legs activities as described by Childs et al. (2004), which has been shown to result in clinically meaningful improvements in disability. Patients were asked to perform 2 sets of 10 repetitions of each exercise. The patient's exercise routine was progressed according to the patient's symptoms. Patients were instructed to perform the exercises at home once daily, and to maintain their usual activity level and refrain from initiating any new forms of exercise during the study.



FIGURE 1: SHOWING ADEQUATE MATERIAL INTERVENTION STRATEGY

RESULTS

Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean \pm SD (Min-Max) and results on categorical measurements are presented in Number (%).

Significance is assessed at 5 % level of significance. Wilcoxon signed rank test (non-parametric) has been used to find the significance of study parameters on continuous scale within the group.

Wilcoxon signed rank test Procedure:

- Obtain the differences between two sets of data and rank the differences after arranging the differences in ascending and descending order.

- Compute the rank sum of R1 of the positive differences

- Compute

$$T = \frac{|R1 - (n(n+1)/4)| - 1/2}{\sqrt{(n(n+1)(2n+1)/24)}}$$

- If $T > Z_{1-\alpha/2}$, then reject the null hypothesis, otherwise accept the null hypothesis

- Chi-Square Test

$$\chi^2 = \frac{\sum (O_i - E_i)^2}{E_i}$$

, Where Oi is observed frequency and Ei is Expected frequency

+ Suggestive significance (P value: $0.05 < P < 0.10$)

* Moderately significant (P value: $0.01 < P \leq 0.05$)

** Strongly significant (P value: $P \leq 0.01$)

A comparative study with 30 low back pain subjects out of which 25 were males and 5 were females randomized in to 15 subjects in Group A (Mobilization based on Mulligan principles)

TABLE 1: SHOWING AGE IN YEARS

Age in years	Intervention Group	
	No	%
21-25	5	33.3
26-30	6	40.0
31-35	2	13.3
36-40	2	13.3
Total	15	100.0
Mean \pm SD	28.27 \pm 4.67	

Homogeneity of Sample

Chi-square test has been used to test the significant proportion of study characteristics (age and gender) between the two groups.

Mean age in group-a (mulligan group) was 28.27 with a SD= 4.67 and in group-B (mulligan technique group) the mean age was 29.13 with a SD=3.66. Hence the samples are age matched with $p=0.578$.

TABLE 2: GENDER DISTRIBUTION

Gender	Intervention Group	
	No	%
Male	12	80.0
Female	3	20.0
Total	15	100.0

There were 12 males and 3 females in intervention group. Gender distribution between the two groups are statistically similar ($p= 0.624$)

TABLE 3: EVALUATION OF EFFECT BASED ON VAS SCORE

VAS score	Intervention Group
Pre-assessment	6.27 \pm 1.03 (5-8)
Post-assessment	5.07 \pm 0.59 (4-6)
% Change	19.1%
Significance	P=0.003

The mean of pre intervention score of VAS in intervention group was 6.27 with SD= 1.03 ranging from 5-8. The percentage change in Vas score in group A was found to be 19.1% which is statistically significant ($p < 0.001$).

TABLE 4: Evaluation OF EFFECT BASED ON ODI SCORE

ODI score	Intervention Group
Pre-assessment	38.27 \pm 4.52 (34-48)
Post-assessment	32.00 \pm 2.50 (28-36)
% Change	16.4%
Significance	P=0.001

DISCUSSION

The results of this study confirm our hypotheses that mulligan technique may be beneficial in the management of patients with non-radicular LBP. Mulligan technique in addition to lumbar spine mobilization and exercise was beneficial in reducing short-term disability and improving pain.

The mean ODI scores for both groups were statistically equivalent at baseline ($P=0.001$). It has been reported that reductions in the Oswestry of 6 points or greater are considered clinically meaningful (Fritz and Irrgang, 2001). The change scores for both groups in this study surpassed this clinically meaningful level (6.27, 16.4%, in the mulligan group).

Effectiveness of mulligan SNAG technique in treatment of LBP has been found to be popular in UK. Although very few studies supported this evidence. Brian Mulligan's techniques are effective in the treatment of patients with spinal pain, but possible cause has not yet established. Only one recent study⁶ investigated the immediate effect of SNAG in ROM and pain levels in 26 LBP patients with pain and flexion ROM limitations. The treatment consists of SNAG mobilizations of 1 to 3 levels, using 2– sets of 4–6 repetitions (at each level), whereas, the placebo consisted of adoption of a comfortable position for around three minutes time. Results indicated that 73% of the intervention

condition and 35% of the placebo condition had improvements in flexion-extension ROM (as measured with an inclinometer) and/or pain scores. However, it is useful to consider plausible physiological explanations for findings. Perhaps the mulligan SNAG was effective in reducing the patients' pain by dispersing intraneural edema, thus restoring pressure gradients, relieving hypoxia and reducing associated symptoms (Cowell and Phillips, 2002). Mulligan SNAG may also have resulted in improved outcomes by reducing antidromic impulses generated in C-fibers at the dysfunctional site which result in the release of neuropeptides and subsequent inflammation in the tissues supplied by the nerve. Hence if normal neurodynamics are restored by alleviating any sites of neural compression, excessive friction or tension, antidromically evoked impulses may perhaps be eliminated. It is also possible that Mulligan SNAG may have resulted in a reduction of scar tissue, which had adhered to neural tissue and its associated connective tissue structures. Although preliminary evidence exists in support of the validity of the slump test in identifying neural tissue involvement, the possibility that the source of pain was derived from structures other than the neural tissues cannot be eliminated. Further research is necessary to examine the sensitivity and specificity of neurodynamic tests as well as the effectiveness of using such techniques in the management of altered neurodynamics.

CONCLUSION

The present study revealed that the mulligan SNAG technique in a subgroup of patients hypothesized to benefit from this form of treatment is beneficial for improving short term disability; decreasing pain for the treatment of spondylopathic referred low back pain. These data provide preliminary evidence supporting the notion that patients with distal symptoms who are unable to centralize their symptoms may be a distinct subgroup of patients with LBP that benefit from SNAG Mulligan technique. Future studies should examine whether these benefits are maintained at a longer-term follow-up.

SOURCE OF FUNDING

This study utilized by the scholar self-source of money

ETHICAL CLEARANCE CERTIFICATE

As this study involving human subjects the ethical clearance has been obtained from the ethical committee of as per the ethical guidelines for Biomedical Research on Human subjects, 2001 ICMR, and New Delhi.

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PERCEPTIONS OF PHYSIOTHERAPY PROFESSION: A SHORT REVIEW

Pavithra Rajan¹

1. International community rehabilitation and research professional, Mumbai, India

ABSTRACT

Physiotherapy is a branch of rehabilitative medicine that plays an important role in client's return to function. Few decades ago, there were not enough educational institutions offering this specialization, leading to a dearth of qualified physiotherapists, especially in developing countries like India. The current scenario is such that there are many colleges and schools offering this specialization, due to which the turn-out of physiotherapists is on the rise. The gap between the required and the actual numbers of physiotherapists is reducing. One major factor that could influence this gap is the perception about this profession by current and future physiotherapists, including medical students. This short review paper aims to study these perceptions and look into the factors that might affect physiotherapy as a profession. Secondarily, any successful strategies that have been recommended or applied practically are discussed. A thorough review of literature was conducted. Physiotherapy as a profession was positively perceived by current and future physiotherapists across the globe. It was rated higher by physiotherapy learners as compared to students specializing in other fields. Few studies have pointed out the lack of enough awareness among the general masses about this profession. Increasing knowledge and application of physiotherapy in the different health conditions could be done by conducting campaigns and workshops in different communities and schools. Physiotherapy education needs to be strengthened to motivate physiotherapy learners to pursue this profession. Alternatively, this could also attract more students to enroll into a physiotherapy program.

INTRODUCTION

The World Confederation for Physical Therapy (WCPT) defines the profession as “provision of services to individuals and populations to develop, maintain and restore maximum movement and functional ability throughout the lifespan”¹. Higgs et al (2001) created a succinct portrait of this profession, outlining the different roles of physical therapy in the health system. Special emphasis was laid upon the education standards in this profession².

The perception of a profession is dependent upon the knowledge about that profession. For a profession to sustain and bring maximum benefits, it is important to understand the perceptions about the same among the current and future personnel. As already stressed by Higgs et al (2001), physiotherapy is an important cog in the wheel of health system. In addition, it can prove to be cost-effective during implementation at the community level³. Hence, it was of importance to understand the perceptions of physiotherapy (medical) students and physiotherapists about their profession. Secondarily, it was of interest to identify

certain areas that demand attention and methods to address lacunae.

AIMS AND OBJECTIVES

The aim of the current paper was to review the perceptions of physiotherapy (medical) students and staff about their profession. Secondarily, there was need to identify problem areas and methods to address them.

METHODOLOGY

A thorough but short review was conducted using search engines like PubMed and Google Scholar. The key words that were used in the above mentioned search engines were perceptions and physiotherapy profession. Only those studies that had these key words were included.

RESULTS

There were eleven studies that looked at the perceptions of physiotherapy (medical) students and staff about their profession (please refer to Table 1).

For Correspondence:
Pavithra Rajan (physiotherapist)
1, Sachinam Apartments, Almeda Road, Paanch Pakhadi,
Thane- west 400602
Thane, Maharashtra, India
E mail: docpatsy21@gmail.com

TABLE 1. PERCEPTIONS OF PHYSIOTHERAPY PROFESSION

S.No.	Author and Year	Results
1	Whitfield et al, 1996 ⁴	The professions of physiotherapy and osteopathy seem similar. Physiotherapy students graded their own profession higher than other professions as compared to non-physiotherapy students.
2	Lee and Sheppard, 1998 ⁵	Physiotherapy is a reputed profession in Australia. However, the knowledge about the specialist areas of physiotherapy like Parkinson's, incontinence and headaches was lacking among final year medical students. Medical students need more theoretical knowledge about this profession.
3	Turner, 2001 ⁶	Physiotherapy has a high status as a profession in Australia as per the survey conducted on 258 undergraduate physiotherapy students. It has a clear identity and is perceived as a desirable occupation.
4	Sheppard, 1995 ⁷	Physiotherapy as a profession in Australia needs increased awareness. This could be done by marketing the profession to doctors and clients within their region as well as to community groups and school students.
5	Streed and Stoecker, 1991 ⁸	Physiotherapy students in Chicago, United States, perceive their profession superior to occupational therapy. Physiotherapy was perceived as less conservative and conventional as compared to occupational therapy.
6	Odebiyi et al, 2008 ⁹	Final year medical students from Nigeria had a good knowledge of physiotherapy as a profession. However, their knowledge was theory based and not clinically acquired.
7	Akinpelu et al, 2011 ¹⁰	Physiotherapy was rated as the fifth best profession out of 11 by physiotherapists in Nigeria. It was considered a "useful" profession; however it was not well rated for income. The authors suggested that the physiotherapists should develop a healthy perception of the occupation.
8	Holdsworth et al, 2008 ¹¹	Awareness about physiotherapy needs to be enhanced among the general masses. The general practitioners have sound knowledge about physiotherapy; however the same needs to be encouraged among Scottish general public.
9	Marwaha et al, 2010 ¹²	Awareness about physiotherapy has to be increased among Indian patients and general public. This is required in order to increase the adherence to the treatment.
10	Sarkar YA, 2012 ¹³	Physiotherapy students in Bangladesh perceive physiotherapy as a good profession. It is included in the national health system of Bangladesh. However, the awareness among general public and opportunities for further study are lacking.
11	Park et al, 2003 ¹⁴	Physiotherapy in UK was perceived as an attractive profession because of the caring nature of work, job availability and variety in health conditions that could be treated among others.

DISCUSSION

The aim of this short review paper was to understand the perceptions of physiotherapy (medical) students and staff about their profession. While there were few studies specifically addressing this issue, they were quite elaborate about the perceptions and methods to address the existing lacunae.

Physiotherapy is viewed positively by the current and future physiotherapists as compared to students from other professions like engineering design⁴ and occupational therapy⁸. In comparison to other allied health professions, physiotherapy is perceived as a better occupation. The pride in the profession can play a major role in improved satisfaction while working as a physiotherapist. As well, this could lead to more workforces joining this profession, thus addressing the gap of lack of enough physiotherapists in the health care system. It has been noted that education could be a major influencing factor in physiotherapy¹⁵. Thus, devising better curriculums aimed to motivate and enlighten learner physiotherapists is of importance. Problem-based learning has been shown to be an effective teaching strategy¹⁶.

The profession of physiotherapy could also be influenced by the perceptions of the clients. In a study by Lorraine Sheppard in 1994¹⁷, a telephonic survey was used to understand the perceptions of the general public in Australia about physiotherapy. It was found that physiotherapy was, by and large, associated with the treatment of musculoskeletal conditions. The other specialist areas like women's health and pediatrics were less known. It was suggested that physiotherapy profession needs better marketing campaigns in order to educate the general masses. It would be interesting to understand the perceptions of people in developing countries (for instance, India) about the physiotherapy profession.

LIMITATIONS AND FUTURE RECOMMENDATIONS

This short review included only two search engines. Future research could be done using a larger database.

CONCLUSIONS

Physiotherapy as a profession was positively perceived by current and future

physiotherapists across the globe. It was rated higher by physiotherapy learners as compared to students specializing in other fields. Many researchers have pointed out the lack of enough awareness among the general masses about this profession. Increasing knowledge and application of physiotherapy in the different health conditions could be done by conducting campaigns and workshops in different communities and schools. Physiotherapy education needs to be strengthened to motivate physiotherapy learners to pursue this profession. Alternatively, this could also attract more students to enroll into a physiotherapy program.

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ASSESSMENT OF WORKING ENVIRONMENT OF PHYSICAL THERAPY IN THE KINGDOM OF SAUDI ARABIA

Qassim I. Muaidi¹, Al Sayed A. Shanb²

1. *PhD, Assistant Professor of Physical Therapy, Vice Dean for Academic Affairs of College of Applied Medical Sciences, University of Dammam & Chairman of Physical Therapy Department,*
2. *PhD, Associate Professor of Physical Therapy, Department of Physical Therapy, College of Applied Medical Sciences, University of Dammam*

ABSTRACT

Background: The physical therapy practice is physically demanding as it involves repetitive therapeutic tasks and manual techniques of patient care. **Objective:** was to evaluate physical and psychological risk factors, and job control in the physical therapy working environment.

Methods: A cross sectional study was administered to 550 physical therapists, with a response rate of 64.7% (54.0% males & 46.0% females). A self-administered questionnaire was used for the assessment of work demands and job control of the physical therapy work environment. The data were statistically analyzed using SPSS.

Results: The clinical experience of most participants was (10.5 ± 6.5) years. There were significant associations between physical demands, work setting, BMI and gender ($p < 0.05$). The mean values of physical and psychological work demands were (37.8 ± 8.1) and (18.6 ± 5.1) respectively. The Job control included factors such as decision authority, skill discretion, co-worker support and supervisor support, with mean values of (36.01 ± 3.6), (21.2 ± 2.3), (24.3 ± 2.5) and (24.6 ± 2.0) respectively.

Conclusion: Physical therapists think that their work situations are very positive. They have low to moderate physical and psychological environmental work demands and moderate to high levels of job control. They may require these maximal levels of control to perform their jobs adequately. Therefore specific facilities and strategies should be established to overcome the different work environmental risk factors for physical therapists to protect themselves and to improve quality of patient care.

KEYWORDS: Environmental risk factors; Job control Physical Therapy

INTRODUCTION

Nature work of the physical therapy is physically demanding as it involves repetitive tasks, manual techniques, awkward positioning of joints during certain maneuvers and prolonged constrained postures. It places great demands on the public health system and in particular, physical therapy¹. An assessment of stress in the workplace allows employers to assess the degree of excessive demands as indicated by emotional, behavioral, cognitive and physical symptoms. It can also assist in identification of causes of excessive demands and any consequent adverse reactions².

Occupational stress usually affects physical therapists³. Work stress has various dimensions, its common sources include excessive workloads, administrative and clinical tasks as bending and twisting movements⁴⁻⁶, in addition a lack of different resources such as equipment, staffing, and time⁷. Work demands have been

associated with a variety of adverse outcomes such as sickness, poor outcomes and reduced quality of patient's care⁸. Job demands is the need to work quickly, job control is the ability to use skills on the job while social support means the nature and quality of social support⁹. Job control has direct and indirect effects on health status over time¹⁰. Excessive work demands can be problematic but only when accompanied by a person's lack of control over his or her work situation. High demands coupled with high control means active jobs and low demands coupled with low control means passive jobs^{8,9,11}.

Physical exertion is the balance between work demands and the capacity to perform this work¹²⁻¹⁴. Psychosocial work environments is the range of opportunities given to an individual to meet his or her need for well-being and positive self-experience¹⁵, the perceptions of social and organizational factors in their jobs⁷. Focus on psychosocial risk factors points to new needs and priorities for research and prevention¹⁶. It is very important to evaluate physical and psychosocial dimensions simultaneously as they are likely to interact with each other in the work environment¹⁷. Physical therapists have reported high levels of job

For Correspondence:
Qassim Ibrahim Muaidi
Dammam
Eastern province, KSA
qmuaidi@uod.edu.sa

demands and different stresses that reduce quality of patient care. There is a little of research that has explored the assessment of physical and psychological risk factors in the work environment for physical therapists. Therefore studies of job stress and associated risk factors in physical therapy work environment with larger samples are needed^{3,5,8}. Physical therapists felt that they could provide both the best quality of patients care and protect themselves against work demands through selection a suitable area of specialty, and establishment of some strategies to minimize demands in the work environment.

Aims & Objectives: To evaluate job demands of physical, psychological risk factors and job control including decision authority, skill discretion, co-work support and supervisor support of physical therapists working in Kingdom of Saudi Arabia (KSA).

METHODOLOGY

Sample size:

Out of 850, 550 physical therapists had spent at least one year in their current work setting enrolled in this study. Physical therapists suffering from musculoskeletal disorders as a result of any previous surgery or trauma were excluded. Each participant read and signed a consent form, which is approved by the Ethical Review Board of the University of Dammam. All participants were informed that collected data would be submitted for publication.

Materials:

A self-administered questionnaire was used in a published study¹⁸, and based on the studies of Lund et al. Murtezani et al. and Karsak¹⁹⁻²¹. It consists of four parts, firstly questions about demographic information and clinical experience, secondly questions about educational qualifications, areas of specialty, years of experience, type of work setting, thirdly 19 questions about different physical tasks e.g. squatting, uncomfortable work positions and extreme bending. Each question has four possible responses (never, sometimes, often and always), they were coded as (1, 2, 3, 4) respectively^{3,14,19}. One question was used to measure perceived physical load during regular activities at work (very light to very big)^{3,19,20}, and fourthly respondents were asked about psychological risk factors associated with regular work with 45 questions and possible responses also were coded as (1, 2, 3, 4) respectively^{3,19}.

Study Procedure:

850 copies of a self-administered questionnaire were manually distributed to physical therapists working in almost all areas of KSA. It was accompanied by a cover letter stating the purpose of the study. The questionnaire was explained to each participant and provided a contact number for further explanation. Each therapist was asked to answer and fill all questions of the questionnaire if he or she had more than one year of clinical experience. The completed copies of the questionnaire were collected and checked; only 550 of them were properly and fully completed.

DATA ANALYSES

A summated index was used to calculate mean values, standard deviation, median and association between some of measured variables by using SPSS. T-test was used to compare male with female participants regarding work demands, and job control sub-items. A Pearson Chi-square analysis was used to determine the association between genders, years of work experience, works status, work setting, and area of specialty. Statistical significance was determined at a p-value < 0.05 and confidence interval of 0.95.

RESULTS

Descriptive data of the study sample

Only 550 physical therapists with a response rate of (64.7%), (54.0% of male & 46.0% of female). Their age ranges from 24 to 61 years old with the mean values of (41.1 ± 12.1) years. Mean values of their weight and body mass index were (75.7 ± 14.6) Kg and (26.7 ± 5.7) Kg/m^2 respectively. Clinical experience of the majority of participants was (10.5 ± 6.5) years and most common areas of specialty were general practitioner (47.5%), orthopedic (15.5%), pediatric (14.2%), neurology (12.9%) and geriatric (6.2%). Their professional ranks were physical therapists specialist 27%, and general practitioner 40%. The primary job of 13.1% of participants was staff members and 86.9% of them were clinicians for patient treatment. Nationality of participants was Saudi (28%), Egyptian (36%), Jordanian (12%), and others (24%). About 68% of them practiced exercise training, 74.5% trained for at least 1 to 2 days/weeks, and 24.5% of them did exercise training for 3 hours/ week. 70.7% of participants were in direct patient contact from 25 to 40 hours/ week with mean values of (36.3 ± 10.2), working days/ week

was (5.0 ± 0.7) and percent of physical therapists working in morning shift was (90.4%).

Physical and psychological work demands

Job demands were evaluated with some combined questions to form a scale of psychological demands. A job demands scale with higher scores represents higher demands^{11,21}. An *independent t-test* showed that there were non-significant differences ($p > 0.05$) between those working as clinicians with patients and staff member in education, whereas there was a significant difference ($p < 0.05$) between their perceptions of workloads. Mean values of physical, psychological and perceived workload in males and females was (37.5 ± 8.8 , 38.1 ± 7.4), (18.8 ± 5.2 , 18.5 ± 5.0) and (13.2 ± 1.6 , 13.5 ± 2.2) respectively with non-significant differences between them whereas there were significant associations between work setting and physical demands ($\chi^2 = 293.3$, $p < 0.05$).

There were significant associations between physical demands, BMI and gender ($p < 0.05$). Mean values of physical demands according to work setting were (32.8 ± 8.4) in special hospitals, (40.3 ± 8.8) in private clinics, (39.9 ± 7.6) in private hospitals, (39.5 ± 7.2) in general hospitals, and (38.4 ± 6.9) in rehabilitative hospitals and centers. Physical work demands were higher in private and general hospitals. Physical work demands ranged from 19 to 68 out of 76 with a mean value of (37.8 ± 8.1), which is $<$ median value (38). Majority of physical risk factors in the current study were performed by slightly more or less than 50%, and some of the physical risk factors were often done within 20%, e.g. working with hands above or below the shoulders, working in awkward postures, standing, sitting and walking for long periods (Table 1). Perceived workload ranged from 4 to 19 with mean values of (13.3 ± 1.9) with a significant association between perceived workload, BMI, area of specialty, gender, professional rank, days, hours and years of work ($p < 0.05$).

Psychological work demands ranged from 11 to 44 out of 44 with mean values of (18.6 ± 5.1), which is $<$ median value (19). Majority of psychological risk factors affected participants (60% sometimes), and (20% often) including working extra hard to finish something, interrupting his or her work if needed, and experiencing problems with pressure of work (Table 2). Therefore physical and psychological work demands can be

considered low to moderate job demands for physical therapists as the higher the score the higher the work demands (Table 1 & 2). It was reported that median area is a common choice for classification of job demands thresholds^{22,23}. Therapists with job demands above median score were classified as having high demands. Therapists with job control scores below median score were classified as having low control^{22,24}. There were significant associations between psychological demands, BMI, area of specialty, professional rank, work setting and years of work ($p < 0.05$).

Job control in the physical therapy

Psychosocial risk factors can be evaluated through measurement of these sub-items decision authority, skill discretion, quantitative demands, and social and supervisor support¹⁹. The decision authority scale measures ability to make decisions and the skill discretion scale measures how varied and skilled position is. Decision authority and skill discretion were added together to form job control. Job control scale with higher scores represents higher control^{11,21}. Therefore physical therapists should consider psychosocial work environment before choosing a first position or transferring to a new position¹¹. In the current study, job control included decision authority ranged from 27 to 44 out of 44 with mean values of (36.01 ± 3.6) which is greater than median values (35.0). Skill discretion ranged from 14 to 24 out of 36 with mean values of (21.2 ± 2.3) which is greater than median values of (21.0). Co-worker support ranged from 18 to 36 out of 36 with mean values of (24.3 ± 2.5) which is greater than median values (24.0). Supervisor support ranged from 16 to 32 out of 32, with mean values of (24.6 ± 2.0) which is greater than median values (24.0). Therefore all the job control sub-items can be considered as moderate job control, as lower scores mean lower control (Table 3&4). On comparison to the gender, mean values of decision authority and skill discretion were (35.9 ± 3.7) and (36.1 ± 3.6) in males and females with non-significant differences between them ($p > 0.05$). Mean values of co-worker and supervisor support were (23.9 ± 2.2), (24.7 ± 2.7), and (24.4 ± 1.7), (24.8 ± 2.3) in males and females respectively with significant differences between them. Regarding their work as clinicians and staff members, there were non-significant differences in skill discretion ($p > 0.05$).

TABLE 1: PHYSICAL WORK DEMANDS ASSOCIATED WITH THE PHYSICAL THERAPY ENVIRONMENT (%).

Physical work demands	Never	Sometimes	Often	Always
1- Standing for long periods	26.3	53.1	15.0	5.6
2- Sitting for long periods	23.3	48.7	20.6	7.4
3- Long periods with a Video Display Units	21.5	47.1	18.5	12.9
4- Walking for long periods	22.2	48.5	19.8	9.5
5-Working for prolonged periods squatting/kneeling	27.7	59.4	6.2	6.7
6- Working with your hands above shoulder	17.2	42.8	32.8	7.2
7-. Working with your hands below knee	19.3	49.3	20.9	10.5
8- Reaching far	27.3	53.1	14.0	5.6
9- Lifting or carrying loads (below 5 Kg)	27.2	59.2	6.2	7.4
10- Lifting or carrying loads (over 5 Kg)	26.3	53.1	15.0	5.6
11- Pushing or pulling loads (over 5 Kg)	27.2	59.2	5.2	8.4
12- Slipping or falling during transportation	20.0	50.4	20.7	8.9
13- Regularly applying force with hands	27.0	61.5	5.7	5.8
14- Working with vibrating hand tools	40.0	40.0	10.5	9.5
15- Driving in vehicles	47.7	49.3	1.5	1.5
16- Bending and/or twisting with upper body	27.0	61.5	4.7	5.8
17-. Working in awkward postures	15.5	53.6	26.8	4.1
18- Working for prolonged periods in the same posture	29.2	58.2	6.8	5.8
19- Repeating the same movement of arms	29.4	58.1	5.9	6.6

TABLE 2: PSYCHOLOGICAL WORK DEMANDS ASSOCIATED WITH THE PHYSICAL THERAPY WORKING ENVIRONMENT (%).

Psychological work demands	Never	Sometimes	Often	Always
1- Do you have to work very fast?	49.0	46.4	2.1	2.5
2- Do you have too much to do?	72.2	15.1	10.9	1.8
3- Do you have to work extra hard?	14.4	44.6	28.1	12.9
4- Do you have to work against the clock?	82.1	14.9	1.9	1.1
5- Can you briefly interrupt your work?	28.9	45.8	20.1	5.2
6- Do you have to hurry?	5.3	69.1	11.6	14.0
7-. Do you have to deal with getting behind with work?	82.1	14.9	1.9	1.1
8- Do you have too little work to do?	57.9	35.5	4.1	2.5
9- Do you have problems with the work?	42.7	42.3	8.1	6.9
10- Do you have problems with the pressure of work?	7.8	66.8	15.2	10.2
11- Would you like to work at a gentler pace?	38.2	46.8	2.5	2.5

TABLE 3: JOB CONTROL SUB-ITEMS ASSOCIATED WITH PHYSICAL THERAPY WORKING ENVIRONMENT (%).

Decision authority	Never	Sometimes	Often	Always
1- Do you have freedom in carrying out tasks? .	5.0	10.5	50.7	33.8
2- Do you have influence on planning of tasks?	10.2	3.6	54.1	32.1
3- Can you influence the pace of your work?	0	6.9	48.6	44.5
4- Can you decide how you carry out your tasks?	10.2	3.4	58.6	27.8
5- Can you briefly interrupt your work if needed?	10.0	14.9	59.5	15.4
6- Can you decide order you carry out tasks?	6.2	10.6	42.5	40.7
7-. Do you have a say on completion deadlines?	10.0	9.3	35.1	36.6
8- Can you decide time to spend on a task?	10.0	5.4	64.6	20.0
9- Do you solve day-to-day work problems f?	9.5	15.5	34.2	40.8
10- Can you plan your own work?	11.0	9.4	43.1	36.5
11- Can you determine for the content of work?	10.0	5.4	64.6	20.0

TABLE 4: JOB CONTROL ASSOCIATED WITH THE PHYSICAL THERAPY WORKING ENVIRONMENT (%)

Skill discretion	Never	Sometimes	Often	Always
1- Do you have to do the same things time and time again?	10.0	1.6	38.7	49.7
2- Does your work require creativity?	1.1	1.8	37.6	59.5
3- Is your work varied?	2.2	5.8	36.8	50.2
4- Does your work call for your own input?	7.2	1.6	41.0	50.2
5- Does your work make sufficient demands on abilities?	10.0	6.1	36.7	47.2
6- Do you have enough variation in your work?	5.4	6.0	38.1	49.5
Co-worker support	Never	Sometimes	Often	Always
1- Can you count on your colleagues if you run into difficulties?	64.7	24.3	10.3	0.7
2- Can you ask your colleagues for help if necessary?	29.8	2.8	50.0	17.2
3- Are you on good terms with your colleagues?	3.0	5.2	50.5	41.3
4- Do you have conflicts with your colleagues?	35.5	25.3	35.8	3.4
5- Do you feel respected for your work by your colleagues?	3.3	5.5	35.1	55.1
6- Do you have to deal with hostility from your colleagues?	12.5	23.6	50.1	13.8
7- Are your colleagues friendly towards you?	1.0	19.1	50.0	30.9
8- Is there a good atmosphere between you and your colleagues?	0.4	0.1	43.4	56.1
9- Do unpleasant situations arise between you and your colleagues?	64.1	24.3	10.3	1.3
Supervisor support	Never	Sometimes	Often	Always
1- Can you rely on your immediate supervisor during your work?	4.1	3.8	70.6	21.5
2- Can you ask your immediate supervisor for help if necessary?	10.1	3.6	63.4	22.9
3- Are you on good terms with your immediate supervisor?	1.2	2.5	32.6	63.7
4- Do you have conflicts with your immediate supervisor?	5.2	61.9	30.2	2.7
5- Do you feel respected for your work by your immediate supervisor?	4.1	4.4	32.7	58.8
6- Do you have to deal with hostility from your supervisor?	3.2	45.8	42.1	8.9
7- Is there a good atmosphere between you and your immediate supervisor?	4.2	3.8	30.5	61.5
8- Do unpleasant situations arise between you and your colleagues?	5.2	50.0	43.0	1.8

DISCUSSION

Participants' response rate in the current study was 64.6%, which is consistent with a similar study of Campo et. al.⁸ with a response rate of 59%. Body type of majority of participants ranged from normal to overweight, and body mass index was (26.7 ± 5.7) Kg/m². This may be attributed to that the majority of participants being in adult category of age, it was found that 60% of them do exercise training, almost 79.2% of them practicing exercise at least 1 to 2 days per week. Mean values of clinical experiences were (10.5 ± 6.5) years that means majority of them was among junior and physical therapists and recently graduated. About 28% of participants were Saudi, and 72% from other nationalities, this may be due to increase rate of traffic car accidents and need for rehabilitative staff. Our results reflected the common applied system in KSA of working in rehabilitative centers and hospitals, they work 5 days /week and in morning shifts (90%).

Physical therapy work demands includes both physical and psychological environmental work demands in terms of uncomfortable working positions, lifting loads, pressure in work and working fast. They increase prevalence of WRMDs among employees which could be reflected in the well-being of physical therapists and in quality of patients care. There was an increase in physical and psychological work demands for junior and recently graduated physical therapists than consultants. This finding was supported by higher levels of emotional exhaustion, work stressors and depersonalization in more recent graduates than those who had a longer work history^{23,24}. In contrast, consultants become more oriented by proper applications of body mechanics and ergonomics during their handling and treatment of patients.

Clinicians showed more loaded than staff members without any significant differences between them. Regarding their perceptions of workload there was a significant difference between them. This may be due to clinicians usually dealing with a higher proportion of patient treatments than academic staff and because of nature of their

profession, which requires performance of many repetitive and intensive tasks related to delivery of patient care⁶. Physical therapists usually perform different manual therapy techniques such as joint/soft tissue mobilization and manual traction that involve application of relatively high levels of force^{17,25}. Academic staff holders also complained of physical demands may be attributed to non-clinical duties such as education, administrative duties and complex medical cases which are more often assigned to senior staff⁴.

There was a significant association between work setting and physical demands, as it depends upon exerted workload in various work setting areas. Some areas of specialty, such as orthopedic, pediatric, and neurology need more physical work and manual techniques. This was supported by our results where majority of physical risk factors affected participants (60% sometimes) and (20% often), such as squatting/kneeling positions, lifting or carrying loads, and pushing. Physical demands performed in private clinics and hospitals was greater than that in general and rehabilitative hospitals or centers due to increase number of patients in private hospitals and the unavailability of assistive facilities and equipment.

Psychological demands in the current study ranged from low to moderate work demands, this was supported by our results e.g., having to work very fast, having to hurry, and problems with the pressure of work (Table 2). So it is very important that physical therapists have awareness of various work settings to avoid multiple causes of musculoskeletal injuries²⁵⁻²⁷. Despite different physical and psychological work demands was still seen as a profession with low to moderate^{3,8,28}, the results of current study showed that job control including decision authority, skill discretion, co-work support and supervisor support ranged from moderate to high job control.

Our results showed non-significant differences between males and females regarding to work demands as both are exposed to same work environment. This was supported with Campo et al.⁸, they reported that women had slightly higher demands and slightly lower control than males due to psychosocial work conditions and job strain. Our findings contradict with that of De Bruin and Taylor 2006³⁰ who found higher levels of job strain in men than in women, and Blackmore et al.³¹ found that job strain led to depression in men but not in women. This may be due to shorter working hours by women on average^{30,31}. Our findings showed that participants have moderate to high levels of job control. This was supported by Karasek et al. reported that physical therapists might require high

levels of control to perform their jobs adequately¹¹. Accompanied job stress with physical therapy practice are commonly due to lack of resources and excessive workloads^{29,30}. Both physical and psychological risk factors may alter their physical health^{8,14,23,32}.

On comparing male with female participants an independent t-test proved that there was only a significant differences between them with physical risk factors, such as perceived work load (female was more loaded than male) and co-work support ($p<0.05$). However, regarding exercise practice, educational qualifications, area of specialty, professional rank and work setting, there were non-significant differences between them ($p>0.05$). The negative consequences of exposure to these risk factors are a serious problem not only for the physical and psychological well-being of medical staff, but also for the quality of patient care²⁷. It was stated that changes in psychosocial working conditions are associated with subsequent changes in health status¹⁰. Therefore different strategies should be applied to minimize further stress and injuries such as avoiding lifting, changing the working position, and a decrease in the use of manual techniques³².

RECOMMENDATIONS

Highlighted important considerations for physical therapists: how to choose their workplace, work setting, to modify quality of life of themselves and patient care and to encourage establishment and apply various preventive strategies.

LIMITATIONS

This questionnaire evaluated most dimensions of the work environment but there are non-specific scores for its different sub-items. Additional studies with proper scales instruments are needed to explore other aspects of the physical and psychosocial work environment in physical therapy.

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EFFECT OF MUSCLE ENERGY TECHNIQUE ON PAIN AND DISABILITY IN PATIENTS WITH NON SPECIFIC BACK PAIN

Ajay Kumar¹, Deepinder Singh²

1. MPT, BPT, Baba Farid University of Health Sciences, Faridkot, Punjab, India.
2. Research Scholar, MSPT, BPT, Guru Nanak Dev University, Amritsar, Punjab, India.

ABSTRACT

Introduction: Nonspecific back pain is defined as pain not attributed to recognizable, known specific pathology (e.g. infection, tumor, osteoporosis, ankylosing spondylitis, fracture, inflammatory processes, radicular syndrome or cauda equina syndrome. The most frequently reported are heavy physical work, frequent bending, twisting, lifting, pulling and pushing, repetitive work, static postures and vibrations. Muscle Energy Technique is an active technique in that the patient, instead of the care provider, supplies the corrective force. It has been hypothesized that MET can be used to lengthen and strengthen muscles, to increase fluid mechanics and decrease local edema, and to mobilize a restricted articulation. Muscle Energy Technique helps in decreasing disability and improving function in patients with back pain.

Objectives: To study, the effect of Muscle Energy Technique on pain and disability in patients with nonspecific back pain.

Method: Subjects were explained about the procedure. A single general thoracic MET was applied. Four repetitions were completed on each movement and each subject. Treatment was given 3 times a week for 3 weeks.

Results: A significant decrease in pain and disability was found after 3 weeks of treatment at 95% confidence interval.

Conclusion: This study found that application of MET lead to reduction in pain and disability significantly after 3 weeks of MET application.

KEYWORDS: Muscle Energy Technique; Non-Specific Back Pain; Thoracic Spine.

INTRODUCTION

Nonspecific back pain is defined as pain not attributed to recognizable, known specific pathology (e.g. infection, tumor, osteoporosis, ankylosing spondylitis, fracture, inflammatory processes, radicular syndrome or cauda equina syndrome)¹.

Non-specific low-back pain (LBP) is by most physicians considered as a recurring, benign, and self-limiting condition, but for patients it is a painful and disabling experience for which they frequently demand treatment.

Many patients have self-limited episodes of acute low back pain and do not seek medical care⁴. Among those who do seek medical care, pain, disability, and return to work typically improve rapidly in the first month²⁵. However, up to one third of patients report persistent back pain of at least moderate intensity 1 year after an acute episode and 1 in 5 report substantial limitations in activity³¹.

The prevalence of LBP peaks around the end of the sixth decade of life. Low back pain (LBP)

is a substantial health problem³² and accounts for considerable healthcare and socioeconomic costs²¹. Peak prevalence occurs between ages 35-55 years. Risk factors are poorly understood. The most frequently reported are heavy physical work, frequent bending, twisting, lifting, pulling and pushing, repetitive work, static postures and vibrations. Pathology and radiological appearances are poorly correlated. Pain is not attributable to pathology or neurological encroachment⁸.

Over \$13 billion in medical expenses per year are attributed to low back pain, which affects from 5% to 10% of the adult population annually with a prevalence from 60% to 90% over a lifetime^{20,24}. Half of the population will have experienced a significant incident of low back pain by age²³. Acute low back pain occurs in people with a wide variety of professions, including those involving heavy labor, repetitive work activities, and extended sedentary postures¹¹. Chronic non-specific low back pain (CLBP) and its resulting disability have become a huge and epidemic health and socioeconomic problem. To reduce this burden, treatments aimed at increasing activity levels and functional ability is widely being used. Physical treatments are based on the assumption that increased muscle strength and aerobic capacity are crucial for the resumption of activities, and hence for the restoration of functional abilities. Clinicians managing low back pain vary substantially in the noninvasive therapies they recommend⁶. Although

For Correspondence:
Ajay Kumar
House No. 28, B. NO. 8,
G.T.B Nagar, Chandigarh Road,
Khanna. Dist. Ludhiana
PIN: 141401
PUNJAB, INDIA
deepindergahir@gmail.com

earlier reviews found little evidence demonstrating efficacy of most noninvasive therapies for low back pain^{2,8,30}, many more randomized trials are now available.

While under the broad umbrella of manual therapy, Muscle Energy Technique (MET) does not fall into the subcategories of manipulation or mobilization. Muscle Energy Technique is an active technique^{7,15} in that the patient, instead of the care provider, supplies the corrective force. Greenman defined MET as a “manual medicine treatment that involves the voluntary contraction of patient muscle in a precisely controlled direction, at varying levels of intensity, against a distinctly executed counterforce applied by the operator”¹⁵. It has been hypothesized that MET can be used to lengthen and strengthen muscles, to increase fluid mechanics and decrease local edema, and to mobilize a restricted articulation¹⁵. It helps in decreasing disability and improving function in patients with back pain³³. The effect of MET or similar isometric techniques, such as contract-relax and proprioceptive neuromuscular facilitation (PNF) has been examined on muscle extensibility, particularly the hamstring complex^{12,13,22}. Few studies, however, have examined the effect of MET on spinal range of motion (ROM)^{19,26,27}. Greenman & Chaitow have advocated 3 repetitions of 3-7 second resisted contraction for adequate therapeutic effect^{5,15}. Some authors have speculated on the neurological mechanisms that may produce increased range of motion of a joint after MET; however, there is little research to substantiate these theories. Kuchera attributed the effectiveness of MET to the inhibitory Golgi tendon reflex¹⁷. This reflex is believed to be activated during isometric contraction of muscles, which is claimed to produce a stretch on the Golgi tendon organs and a reflex relaxation of the muscle²⁸. This theory, however, is poorly supported by research. It has been suggested that a viscoelastic change in muscle is responsible for the increase in muscle flexibility after MET, but this theory remains largely untested. Stretching of the connective tissue elements when the muscle isometrically contracts from a lengthened position has been offered as another explanation of the observed range of motion increase, and explains the greater flexibility achieved with contract-relax exercises when compared with static stretch¹⁸. The muscle energy procedure was used to lengthen potentially shortened cervical muscles and fascia to normalize the gross cervical range of motion. Furthermore, regional range-of-motion barriers (flexion/extension, side bending, and rotation) of the cervical spine were increased by investigators using muscle energy technique³.

Several treatments are available for LBP, such as analgesics, nonsteroidal anti-inflammatory drugs (NSAIDs), exercise, behavioral therapy, spinal manipulation, and acupuncture. Numerous randomized trials have been published investigating the effectiveness of treatments for non-specific LBP¹⁶. Muscle energy technique is used to increase cervical as well as lumbar range of motion^{26,27}.

MATERIALS & METHODOLOGY

SUBJECTS

Study design: The study was of pretest-posttest experimental design.

60 subjects referred by Orthopaedician were taken in a single experimental group (Table 2). Subjects were screened as per the inclusion and exclusion criteria and selected as shown in Table 1. The treatment group included males 27(45%) and females 33 (55%). The minimum age was 20 years and maximum was 50 years (Table 1). The nature of sampling in the study was random sampling. The procedure was fully explained to the patient and no blinding was done to either patient or the therapist. Sample consisted of the non-specific back pain patients with confined diagnosis from physicians. 60 non-specific back pain patients were selected to serve for the study was referred for physiotherapy intervention. The study was conducted at University College of physiotherapy, Faridkot.

TABLE 1. INCLUSION AND EXCLUSION CRITERIA

Inclusion criteria	Exclusion criteria
Age: 20-50 years Nonspecific back pain	Pregnancy. Known history of tumors, severe osteoporosis, and spinal stenosis. Inflammatory joint diseases. Severe acute low back pain. Known history of severe systemic disease. Uncooperative attitude.

TABLE 2: DEMOGRAPHIC CHART OF THE SUBJECTS

Demographic chart of the subjects		Age (years)	
N= 60		Mean	SD
Male = 27 (45%)	Female = 33 (55%)	38.4	±10.26

PROCEDURE

The study was of pretest-posttest experimental design.

A single general thoracic MET was applied.

Each subject was made to sit on the treatment table and the treating examiner stood behind him or her.

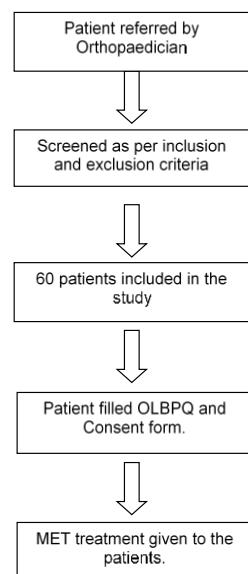
The subject was instructed to place his or her hands on the opposite shoulders and to relax.

The examiner used palpatory assessment to achieve a spinal neutral range. Restriction barrier was engaged.

The patient resisted a five second isometric contraction of 20% of maximum voluntary contraction of side bending, rotation to each side, forward and backward bending by the subject.

After each isometric effort, a new barrier was engaged and subject was repeated the isometric contraction.

Four repetitions were performed on each movement.



STATISTICAL ANALYSIS

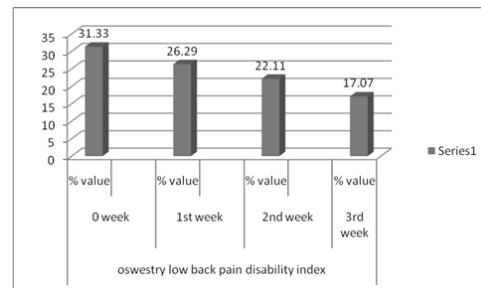
TABLE 3: PAIRED SAMPLE ANALYSIS OF VARIABLES AT END OF 3 WEEK TREATMENT AT 95% CONFIDENCE INTERVAL

	ODI	VAS
Mean	1.4259	2.5733
SD	7.4922	1.3223
t	14.743	15.201
p	.000	.000

RESULTS

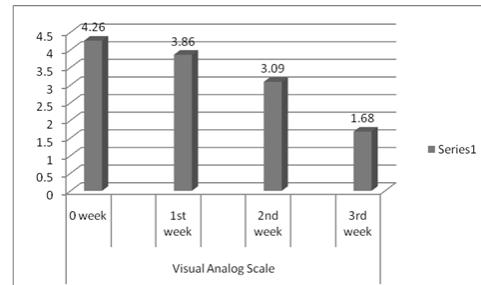
Results after data analysis were as follow

Graph 1 shows a significant improvement in the OLBPO score after 1st, 2nd & 3rd week.



GRAPH 1

Graph 2 shows a significant improvement in the visual analog scale reading after 1st, 2nd & 3rd week.



GRAPH 2

DISCUSSION

Among the different approaches for the treatment of back pain, MET is one of the important methods, generally practiced by the Physiotherapists and Osteopaths.

The purpose of the study conducted was to study, the efficacy of MET on pain and disability in nonspecific back pain cases. The results showed that the MET is beneficial in reducing pain and disability.

Greenman stated that Muscle Energy technique can be used to lengthen a shortened, contracted or spastic muscle; to strengthen a physiologically weakened muscle or group of muscles; to reduce localized edema, to relieve passive congestion, and to mobilize an articulation with restricted mobility¹⁵.

The result of the study is in consistence with Dhinkaran who proposed that along with the corrective exercises MET is moderately significant over conventional physiotherapy i.e. TENS with corrective exercises in improving functional ability and decreasing pain¹⁰. Burns also demonstrated that MET produced significant improvement in the cervical range ROM among asymptomatic young and middle-aged adults³. Lenehan in his study proved that a single application of MET produced a significant improvement on the thoracic range of

motion on restricted side. The improvement was non-significant on the non-restricted side. Therefore the results of the study are consistent with the other studies¹⁹.

Wilson suggested MET as an effective treatment option for reducing pain and disability in patients with acute low back pain supporting the current study³³. Schenk conducted a study to examine the effect of MET on the lumbar spine extension range of motion in asymptomatic subjects. After a treatment of 4 weeks twice per week the results of the study indicated that MET group significantly improved in lumbar extension range of motion²⁷.

The present study is also in accordance with Schenk²⁶ who conducted a study on 18 asymptomatic volunteers with limited cervical range of motion to determine the effect of MET on restricted range of motion. The results of the study supports MET as an effective technique for increasing cervical range of motion.

VAS was used to measure the pain intensity in the current study. The validity and reliability of the VAS has been established by Gallagher¹⁴ who concluded that the VAS is a methodologically sound instrument for quantitative assessment of acute abdominal pain and for detecting clinically important changes in pain.

Oswestry Low Back Pain Disability Index was used to measure the functional disability in this study which has been well validated by Sichuan²⁹. The author concluded that OLBPI is a valid and reliable instrument for measuring functional disability in patients with acute low back pain.

CONCLUSION

This study found that application of MET produced significant reduction in pain and disability after 3 weeks of MET application.

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THERAPEUTIC EFFICACY OF STRUCTURED PHYSIOTHERAPY ON SLEEP-PATTERN, QUALITY OF LIFE AND FUNCTIONAL PERFORMANCE IN INDIVIDUALS WITH INSOMNIA

Caleb Ademola Gbiri^{1,3}, Bosede Abidemi Tella¹, Adetokunbo Osarobo Tunde-Olowu², CW Van Staden³

1. Department of Physiotherapy, College of Medicine, University of Lagos, Idi-Araba, Lagos, Nigeria.

2. Department of Physiotherapy, University of Benin Teaching Hospital, Benin City, Nigeria

3. Department of Psychiatry, University of Pretoria, Pretoria, South Africa

ABSTRACT

Background and Objectives: Efforts at improving quality of life in individuals with insomnia has been the concern for researchers in the past decades. This study determined effect of graded exercise and infra-red therapy on sleep-pattern, quality of life (QoL) and functional performance (FP) in individuals with insomnia.

Methods: This study involved 69 participants clinically diagnosed of insomnia. They underwent graded exercises and infra-red therapy for six weeks. Insomnia was assessed using the Insomnia Severity Index; QoL using Quality of Life and Fatigue Scale; and FP using Functional Assessment Scale. Data was analysed using Independent t-test, Wilcoxon rank test and Kendall's tau_b at 0.05 significant level.

Results: Participants were aged 34.87±8.69 years. There was significant improvement in each of symptoms of insomnia, QoL and FP between baseline and six-week. Before intervention, 91.3% had severe insomnia and 4.3% had each of sub-threshold and moderate insomnia respectively while at six-week, 95.7% had no insomnia and 4.3% had sub-threshold insomnia. All participants were at poor QoL rating before intervention while at six-week, 82.6% rated their QoL as good and 17.4% rated it fair. At pre-intervention, 95.7% were severely functionally limited and 4.3% had moderate functional limitation while at post-intervention, 65.2% reported having no physical limitation and 34.8% reported mild limitation. Insomnia had negative significant ($p<0.05$) correlation with FP and QoL.

Conclusion: Graded exercises significantly reduce severity of insomnia and fatigue, and improve quality of life and functional performance in individuals with insomnia.

KEYWORDS: Graded exercise; Insomnia; Fatigue; Functional performance

INTRODUCTION

Insomnia is the expressed dissatisfaction with the quantity, quality or timing of sleep¹. Insomnia may present in different ways including, prolonged sleep latency, early or multiple awakenings during sleep, or that the sleep is non-restorative and do not feel refreshed in the morning after². Insomnia assessment and diagnosis is often based on individual's description³. However, to be considered a disorder, the complaint must be accompanied by distress and/or impairment in the patient's daytime functioning^{2,4}.

For Correspondence:
Caleb Ademola Gbiri PhD
Department of Physiotherapy,
College of Medicine,
University of Lagos,
Idi-Araba, Lagos, Nigeria
&
Department of Psychiatry,
University of Pretoria,
Pretoria, South Africa
Email: calebgbiri@yahoo.com; cgbiri@unilag.edu.ng

Classifications of insomnia are typically based on symptoms, duration, or presumed etiology. Symptom-based classifications are of limited value, since the specific type of sleep complaint often varies within an individual over time and majority of patients actually complain of more than one type of sleep disturbance⁵⁻⁶. Another form of classification is duration-based classifications, such as transient (several days), short-term (up to 3 weeks), and long-term insomnia, repeated brief and continued insomnia have had limited validation and are of questionable value given the high rate of chronicity and recurrence in insomnia⁷. Transient and short-term insomnias are often related to specific psychosocial or environmental stresses, whereas chronic insomnia is more often related to intrinsic sleep disorders or primary insomnia.

Etiology-based classifications are the most useful for categorizing chronic insomnia. Specific classification systems include the International Classification of Disease (ICD)-9, the ICD-10, the Diagnostic and Statistical Manual-Fourth Edition (DSM-IV), and the International Classification of Sleep Disorders Second Edition (ICSD-2) associated with other sleep disorders, or primary

when no other etiology can be identified⁸⁻⁹. Secondary insomnia refers to the insomnia syndrome when it is due to a medical or psychiatric disorder or to the effects or withdrawal from a substance/medication⁸⁻⁹. In practice, however, it is often very difficult to distinguish whether insomnia is truly caused by these other conditions or whether it is simply co-morbid¹²⁻¹³. Primary insomnias are those disorders in which insomnia is the major symptom, with no other disorder as a likely cause¹⁰⁻¹⁵. The DSM-IV includes a single category for primary insomnia, whereas the ICSD-2 includes narrower categories of insomnia, such as psychophysiological, idiopathic, and paradoxical insomnias, which have received some support from validation studies⁸⁻⁹.

Sleep problems have important consequences. Poor sleep the night before has been linked to impaired cognitive performance the following day¹⁶. Having inadequate sleep is associated with a mortality risk higher than those who have adequate sleep at night¹⁶⁻¹⁷. Sleep problems are also associated with emotional disturbances⁴. Adequate, restorative, sleep is an important determinant of quality of life¹⁵. Exercising would be the most cost-effective health intervention for insomniacs and has been shown to be as effective as pharmacotherapy in improving sleep quality and duration^{1,18}. However, there is dearth of literature on the effect of exercises on insomnia. Therefore, individuals diagnosed of insomnia have become conventionally managed on pharmacotherapy and psychotherapy with varied results. Relapse and drug dependency have also been shown to be frequent with treatment of insomnia. These have posed significant challenges to its adequate management. However, exercises has been inadequately explored in the management of inorganic insomnia in Nigeria clinical setting despite the fact that exercise has been shown to be effective in a lot of psychiatric disorders without side effects. Therefore, this study was designed to determine the effect of six-week graded exercise and infra-red therapy on the sleep-pattern, quality of life and functional performance of individuals diagnosed of insomnia.

METHODS

The participants for this study were 69 individuals diagnosed of inorganic insomnia who were receiving care at the Federal Neuro-Psychiatric Hospital, Yaba, Lagos and Lagos University Teaching Hospital, Lagos Nigeria. The criterion for inclusion was clinical diagnosis insomnia using

DSM-IV criteria. However, individuals who were psychotic were excluded. A written ethical approval for this study was obtained from the Research and Ethical Committee of the hospitals. The consent of each of the participants was obtained for the study. Participant's demographic data was obtained through structured and standard. Sleep pattern was assessed by using the Insomnia Severity Index Scale¹⁸. The QoL was rated using the QoL and Fatigue Scale and their FP was measured using the Functional Assessment Scale. Their weight and height were measured using stadiometer following standard methods and their Body mass index was calculated¹⁰. Their diastolic and systolic blood pressures were measured.

INTERVENTION

Participants underwent aerobic exercise in addition to education on practicing good sleep hygiene. They were advised not to take any pharmacological treatment and should report any increase in symptoms or worsening of condition to the researcher for possible referral to the appropriate clinic. The aerobic exercises were carried out in three phases: the warm up phase, the main exercise and the cool down phase.

Warm-up and Cool-down phases

The warm-up and cool-down phases consisted of breathing exercise, stretching exercise to the neck, upper limbs, the trunk and lower limbs. Participant was asked to breathe in through the nose at maximal inspiration and breathe out through the pursed-lip: this was done to increase the lung expansion. Sitting on a chair with back straight and neck at the midline, participant was asked to flex, extend and rotate the neck. This was followed by standing upright with the foot firmly on the floor, the hand was put at the pelvic rim to stabilize the pelvis then the trunk was moved flexed laterally to both right and left side. The warm-up ended with participant sitting on a chair and the hand placed on their thigh, elbow slightly flexed, arm in abduction and shrugged the shoulder. The warm-up period was for 15 minutes.

Main exercises

The main exercise consisted of six minutes' walk, stair climbing and ball throwing exercises. The exercises were performed three times a week starting at 70% of the expected exercise heart rate of the participants. Each of the exercises was progressed at 30% at every six sessions (two weeks). At every exercise session, patient was observed for any sign of fatigue or distress. Each participant carried out the exercise programme at self-initiated

pace. However, each person was encouraged to perform the exercises to his/her maximum.

Six Minutes' walk exercises

Participants briskly walked to and fro on a 10 meter straight line in the gymnasium for duration of six (6) minutes. The distance covered was measured in meters. Participants were allowed to rest during the exercise when necessary or discontinued the exercise when patient could not go further.

Stair climbing

Ascend and descend a number stairs for duration of five minutes. Participants were allowed to rest during the exercise when necessary or discontinued when the patients could not go further or show sign of fatigue.

Jogging

The participants were instructed to do mild jogging at a spot which lasted for duration of four minutes. Participants were allowed to rest during the exercise when necessary or discontinued the exercise when patient could not go further or show sign of fatigue. Individual was told that they can drink water during the exercise period. Competition was discouraged from the participants. They were pre-informed that each person has to do the exercise at his/her own set pace.

Ball throwing

Participants sat on a chair, with the therapist seated directly in front, at 30 meters away from the participant, instructions on throwing and catching and holding of football were given. The ball was thrown and caught from different angles. This exercise lasted for five minutes.

Infra-Red Therapy

At the end of each exercise session, each participant received 15 minutes of moist heat (infrared therapy) in the Sauna. The patient entered into the sauna bathroom and locked him/herself up for 15 minutes while undressed in the sauna.

Post-training assessment: At the end of the six-week graded (aerobics) exercise programme, insomnia, quality of life and functional performances were re-assessed. The weight and height was also measured and their body mass index calculated. Their blood pressure was also assessed and documented.

DATA ANALYSIS

Data were summarised using mean and standard deviation, frequency and percentages. The Independent t-test was used to compare the groups at every stage while Wilcoxon rank test was used to

compare variables in the participants. Kendall's tau_b was used to find the relationship between level of insomnia and each of quality of life and functional performance. Level of significant was set at 0.05.

RESULTS

This study involved 69 individuals diagnosed of inorganic insomnia. None of the participants reported any worsening in condition throughout the intervention period, so there was no need for any referral to other clinic. Fourteen (60.9%) were female and 39.1% were male. Pre-intervention and post-intervention body profiles of the participants are presented in table 1. Their ages ranged between 18-45 years with a mean of 34.87 ± 8.69 years with 39.1% were between 41 and 45 years (figure 1). Eleven (47.8%) were single, 39.1% were married, 8.7% had been separated from their spouses and 4.3% were widowed. Weight of the participants significantly ($p < 0.05$) reduced from 76.78 ± 8.42 kg to 70.97 ± 7.2 kg. Their height ranged between 160 cm and 180cm with a mean of 168.02 ± 6.03 cm. Body mass index significantly ($p < 0.05$) reduced from 27.04 ± 3.91 kg/m² to 24.12 ± 3.91 kg/m². Diastolic and systolic blood pressure significantly reduced ($p < 0.05$) from 79.96 ± 5.70 -90 mmHg to 75.82 ± 6.03 and from 169.09 ± 9.26 -90 mmHg to 121.12 ± 6.91 respectively. Table 2 presents the pre-intervention and post-intervention ratings of the participants on insomnia, QoL and FP. Severity of insomnia scores at baseline ranged between 11.00 and 35.00. At baseline, 4.3% had sub-threshold insomnia, 4.3% had moderate insomnia while 91.3% had severe insomnia. The QoL scores at baseline ranged between 5.00 and 24.00. The quality of life ratings of all the participants at baseline was at poor ratings. The functional limitation scores at baseline ranged between 52.00 and 107.00 with a mean of 91.70. At baseline, 4.3% reported having moderate functional limitation while 95.7% had severe functional limitation. Severity of insomnia scores at six week post-intervention ranged between 11.00 and 15.00. At six week, 4.3% had sub-threshold insomnia while 95.7% reported having normal and adequate sleep pattern. QoL scores at six-week post-intervention ranged between 21.00 and 27.00. At six week, 17.4% had fair QoL score, 82.6% good and scores. Functional limitation scores of the participants at six week post-intervention ranged between 39.00 and 58.00. At six week, most (65.2%) reported having no functional limitation, 34.8% reported mild to moderate functional limitation. There was significant improvement in each of severity of

insomnia, QoL and FP scores between baseline and six weeks of exercise intervention (table 3). Level of insomnia had negative significant ($p < 0.05$) impact on functional performance and quality of life of the participants (table 4).

TABLE 1: COMPARISON OF PRE-INTERVENTION AND POST-INTERVENTION ADIPOSITY AND CARDIOVASCULAR PROFILES OF THE PARTICIPANTS

Variable	Pre-Intervention		Post-Intervention		P value
	Mean	SD	Mean	SD	
Weight (Kg)	76.78	8.42	70.97	7.12	0.036
Height (m)	1.68	0.06	1.68	0.06	—
Body Mass Index (kg/m ²)	27.04	3.91	24.12	3.91	0.035
Systolic BP (mmHg)	131.69	9.25	121.12	6.91	0.042
Diastolic BP (mmHg)	79.96	5.69	75.82	6.03	0.046

TABLE 2: SEVERITY OF INSOMNIA, QUALITY OF LIFE AND FUNCTIONAL PERFORMANCE RATINGS OF THE PARTICIPANTS AT BASELINE AND SIX WEEKS

Variable	Base line		Six Week	
	Frequency	Percentage	Frequency	Percentage
Severity of Insomnia Ratings				
No insomnia	0	0.0	88	95.7
Sub-Threshold insomnia	4	4.3	4	4.3
Moderate insomnia	4	4.3	0	0.0
Severe insomnia	84	91.3	0	0.0
Quality of Life Ratings				
Poor	69	100.0	0	0.0
Fair	0	0.0	12	17.4
Good	0	0.0	80	82.6
Functional Limitation				
None	0	0.0	60	65.2
Mild	0	0.0	32	34.6
Moderate	4	4.3	0	0.0
Severe	88	95.7	0	0.0

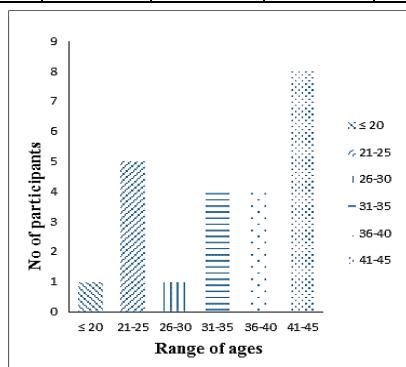


FIGURE 1: AGE GROUP DISTRIBUTION OF THE PARTICIPANTS

TABLE 3: COMPARISON OF PRE-INTERVENTION AND POST-INTERVENTION OF SEVERITY OF INSOMNIA, QUALITY OF LIFE AND FUNCTIONAL PERFORMANCE SCORES OF THE PARTICIPANTS AT BASELINE AND SIX-WEEK

Variable		Mean Rank	Sum of Rank	Z-Value	p value
ISI	Negative Rank	5.50	44.00	-2.558	0.011*
	Positive Rank	1.00	1.00	—	—
QoL	Negative Rank	1.00	1.00	-2.549	0.011*
	Positive Rank	5.50	—	—	—
FAQ	Negative Rank	5.00	45.00	-2.668	0.008*
	Positive Rank	0.00	0.00	—	—

Key

ISI-Insomnia Severity Index Questionnaire

QoL-Quality of Life Fatigue Scale

FAQ-Functional Assessment Questionnaire

*Significant at $p \leq 0.05$

TABLE 4: RELATIONSHIP BETWEEN LEVEL OF INSOMNIA AND EACH OF QUALITY OF LIFE AND FUNCTIONAL PERFORMANCE OF THE PARTICIPANTS

Variables	Correlation Coefficient	p-Value
AT BASELINE		
Quality of Life	-0.463	0.04*
Functional Performance	-0.638	0.001*
AT SIX WEEK		
Quality of Life	-0.467	0.03*
Functional Performance	-0.641	0.001*

*Significant at $p \leq 0.05$

DISCUSSION

This study involve 69 individuals clinically diagnosed of insomnia by the consultant psychiatrist were enrolled into the study. They participated in six-week graded exercises. The age range (20-45years) of the participants in this study shows that insomnia is more common in young adult and middle age. This can be attributed to activities at these ages. People are more active and engage in gainful employment at this age. By this reason, they are also faced with more challenges of life. They try to meet up with many exigencies and thereby are more emotional. They face more daily stress and have unmet demands. This calls for more public awareness on stress management and adequate preventive health. This is much important to prevent upsurge of emotional disorder and other psychiatry illnesses. Previous study has identified sleeplessness as a major predisposing factor to the development of psychiatry disorder¹⁹.

The negative impact of insomnia on both the quality of life and functional performance of the participants shows that when there is sleeplessness, the quality of life of an individual will deteriorate

and subsequent reduction in functional performance. This can be attributed to the fact that when an individual did not sleep adequately a night before, he or she will be tired the morning after and this may result in reduced functional performance and quality of life. This corroborates previous study that sleeplessness has negative effect on functional performance and predisposes individual to the development of psychiatry disorders¹⁹. The most frequent sleep complaints among the participants in this study were restless sleep, low concentration, low back pain, leg cramps and frightening dreams. This shows that efforts should be increasingly directed towards the reduction of insomnia and causes of insomnia among Nigeria in order to live healthy lifestyle.

The positive effect of graded exercise on the amelioration of severity of insomnia in the participants in this study shows that exercise is effective in the management of inorganic insomnia and it is a complimentary non-pharmacological modality in the management of psychiatry disorder. A previous study had established that exercises produced significant reduction in the severity of insomnia¹⁵. The improvement in the quality of life and functional performance in the participants in this study can be attributed to improvement in their severity of insomnia. This shows that when the sleep pattern and habit of individual improves, there will be improvement in quality of life and he or she will be able to function at optimal level. This agrees with a previous study which concludes that exercise has positive impact on physiological mechanisms resulting in improved physical activity, quality of life and functional performance on individuals diagnosed of insomnia¹⁵.

In Nigeria, the workforce with an ever-increasing proportion of people working late to meet targets in their place of employment causing insomnia leading to low performance due mental overuse, the potential impact of occupational functional performance in individuals diagnosed of insomnia outcome is a legitimate concern. This is especially so since the risk of morbidity could be increased by fatigue. Therefore, physiotherapist should increase their societal relevance by embarking on activities that prevent insomnia and its complications among Nigerian.

Although, this study was not specifically set to find the effect of exercises on body composition and cardiovascular system, it was observed that exercise significantly reduce the body adiposity and cardiovascular system. This shows that exercise is an effective way of managing overweight/obesity as well as treating mild to moderate hypertension. The normalisation of the

sleep pattern of the participants can be attributed to reduced body adiposity and normalisation of the body blood pressure. It is not uncommon that if an individual has not been sleeping well, there is likelihood of increase in the blood pressure parameters of the individual. Therefore, moderate exercise should be encouraged among apparently healthy individuals to prevent insomnia and possible breakdown in the body system and mental illness.

CONCLUSION

The outcome of this study has shown that graded exercises significantly reduced the severity of insomnia and fatigue in individuals diagnosed of inorganic insomnia. Insomnia has negative impact on the quality of life and functional performance of individuals. Improvement in severity of insomnia results in improved quality of life and functional performance among individuals clinically diagnosed of insomnia. It is recommended that regular graded exercise become an integral part of routine treatment of individuals diagnosed of insomnia care programme.

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A COMPARISON BETWEEN MCKENZIE EXTENSIONS EXERCISES VERSUS WILLIAM'S FLEXION EXERCISES FOR LOW BACK PAIN IN B.PT. STUDENTS

Sapna Gupta¹

1. Lecturer of Physiotherapy, Smt. Kamlaben P. Patel Institute of Physiotherapy and Occupational therapy, Anand.

ABSTRACT

Aim: This study is designed to compare the effectiveness of McKenzie Extension Exercises versus William's flexion Exercises for reducing Low Back Pain in B.PT. Students.

Study design: Experimental study, Randomized Control Trial.

Method: 30 Low Back Pain subjects were recruited into two groups.

Experimental Group (n=15) received McKenzie Extension Exercises such as Prone lying, Prone lying on elbows, Prone press-ups, Standing extension, Flexion in Lying, Flexion in Standing and Sitting.

Control Group (n=15) received William's Flexion Exercises such as Pelvic tilt, Single Knee to chest, Double knee to chest, Partial sit-up, Hamstring stretch, Hip Flexor stretch (Lunges), Squat and Seated Flexion.

All subjects were undergone with detailed evaluation including Numeric Pain Rating Scale (NPRS) were taken as baseline and after the end of 6th week of Low Back Pain treatment session for B.PT. Students included in both the groups.

Results: Both the groups showed clinically and statistically significant improvement in NPRS scores at the end of 6-weeks of treatment session. NPRS scores had improved by 65.8 % in experimental group and 53.2 % in control group at the end of 6-weeks of treatment session. However, the experimental group showed significantly higher improvement compared with control group after intervention between the groups.

Conclusion: There was significant improvement in both the groups; however the McKenzie extension exercise group was more effective in reducing low back pain for B.PT. Students as compared to William's Flexion Exercises group.

KEYWORDS: McKenzie Extension Exercises; William's Flexion Exercises; Low Back Pain

INTRODUCTION

Low back pain (L.B.P) is one of the most common musculoskeletal disorders. It is an emerging public health problem all over the world. In 2013, about 52.9% women suffered from Low Back Pain at age of 20 years and above in Southern India¹.

L.B.P is a painful clinical, biopsychosocial syndrome with multiple etiology, characterized by pain between the twelfth rib and the sacrum, associated or not with radiation to the lower limbs, causing limitation of current activities and disability². The emergence of L.B.P is influenced by the combination of several anatomical factors: age, working and environmental conditions, racial and psychosocial factors³.

The causes of precipitation for L.B.P among physical therapists were commonly described activities such as patient handling, bending, stooping, lifting, carrying, pushing and

pulling. Hospitals and private practices were the most prevalent work settings in which injury occurred⁴.

The occurrence rates of work-related L.B.P among physical therapists in Edmonton was 49.2% physical therapist higher than that of the general population reported in Canada (27%), Great Britain (27%), and the United States (26-29%). The initial onset of work-related L.B.P frequently occurred within the first 5 years of practice as a physical therapist and before the age of 30 years⁴. The severity of back discomfort had been sufficient to require 13.7% of therapists to stop their work. Despite L.B.P, 35.3% of the pain sufferers continued to work. Over half (55.4%) of the respondents with current work-related L.B.P demonstrated little or no disability.

L.B.P is a complicated clinical condition related with pathologic pain generators in the spinal column, weakened and deconditioned muscles in the trunk and extremities that control the motion and stability of the spine and pelvis, faulty biomechanics caused by connective tissue contractures, and behavioral problems such as fear-avoidance beliefs and emotional distress⁵.

There are many types of treatments for L.B.P, varies from conventional methods

For Correspondence:
Sapna Gupta,
407, Nand Apartment,
Krishna Road,
Anand, Gujarat
Email: drsapnagupta@yahoo.com

(physiotherapy, kinesiotherapy, massage) to modern methods like ozone therapy but two protocols stand out due to their popularity like the Williams and McKenzie protocols².

Studies have shown that the goals of McKenzie protocol have resulted in pain relief, lumbar mobility, return to normal functioning in daily activities, and minimize the number of hospital visits and number of sessions of treatment needed to recover².

The goals of performing William's protocol exercises were to reduce pain and provide lower trunk stability by actively developing the abdominal, gluteus maximus and hamstring muscles as well as passively stretching the hip flexors and lower back (sacrospinalis) muscles⁶.

Clare, et al. have shown that Six trials were found to be eligible, all comparing McKenzie therapy to a comparison treatment included NSAIDS, educational booklet, back massage and back care advice, strength training, spinal mobilization and general exercises. The data from five lumbar trials were pooled at short term (less than three months) follow-up⁷. There are insufficient data showing the comparison between McKenzie and William's protocol for treating L.B.P.

So, there was need to study the comparison of the effectiveness of McKenzie Extension Exercises and William's Flexion Exercises for reducing Low Back Pain in B.PT. Students

AIM AND OBJECTIVE OF THE STUDY

To compare the effectiveness of McKenzie Extension Exercises versus William's Flexion Exercises for reducing Low Back Pain in B.PT. Students.

MATERIAL AND METHODOLOGY

STUDY SETTING: Low back pain among B.PT. Students of College of Physiotherapy, Anand, Gujarat

STUDY DESIGN: Experimental study.

SAMPLING TECHNIQUE: Simple random sampling technique.

SAMPLE SIZE: 30 (15 subjects in each group.)

INCLUSION CRITERIA

- Age group: 19-25 years.
- Only Female B.PT students were included
- Duration of LBP more than 1 month and less than 6 months.
- Mechanical L.B.P subjects were included.

EXCLUSION CRITERIA:

- Subjects with any recent spinal surgery or medications.
- Subjects could not attend required number of visits.
- Subjects with L.B.P of duration less than 1 month and more than 6 months.
- Subjects with any renal diseases.
- Subjects with spinal condition like PIVD, tumors, spondylolisthesis, infection and spinal fracture

PRIMARY OUTCOME MEASURE: Numeric Pain Rating Scale (NPRS) (used for assessing low back pain)

PROCEDURE

Following baseline measurements, the subjects were randomly divided into 2 equal groups:

Group 1: EXPERIMENTAL GROUP (n=15) received McKenzie Extension Exercises alone.

1. Prone lying: Lie on your stomach with arms along your sides and head turned to one side. Maintain this position for 5 to 10 minutes.

2. Prone lying on elbows: Lie on your stomach with your weight on your elbows & forearms and your hips touching the floor. Relax your lower back. Remain in this position for 5 to 10 minutes. If this position causes pain, repeat exercise 1.

3. Prone press-ups: Lie on your stomach with palms near your shoulders. Slowly push your shoulders up, keeping your hips on the surface and letting your back .Slowly lower your shoulders. Repeat 10 times.

4. Standing Extension: - While standing, place your hands on your back and lean backward. Hold for 20 seconds and repeat.

5. Flexion in Lying: - Lie on your back with your knees bent and your feet flat on the floor of bed. Bring both knees up toward your chest. Place your hands around your knees and gently but firmly pull your knees as close to your chest as pain permits.

6. Flexion in Standing: - Bend forward and run your fingers down your legs as far as you can comfortably reach.

7. Flexion in Sitting: - Bend your back while subject is seated on a chair

If any position causes pain, repeat previous exercise and then when pain subsides perform next exercise again. If there is no response to any of the exercises, then move the hips away from pain side or add some pressure.



FIGURE 1: PRONE LYING ON ELBOW



FIGURE 2: STANDING EXTENSION

Group 2: CONTROL GROUP (n=15) received William's Flexion Exercises alone.

1. Pelvic tilt: - Lie on your back with knees bent, feet flat on floor. Flatten your back against the floor, without pushing down with the legs. Hold for 5 to 10 seconds.

2. 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 for 5 to 10 seconds. Lower the knee and repeat with the other knee.

3. 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.

4. Partial sit-up:- Do the pelvic tilt, hold this position, slowly curl your head and shoulders off the floor. Hold briefly. Return slowly to the starting position.

5. Hamstring stretch: - Sit in long sitting position, 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.

6. Hip Flexor stretch (Lunges):- 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 axilla. Repeat with right leg forward and left leg back.

7. 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. Seated Flexion: - This exercise is performed by having the patient sit in a chair and flex fully forward in a slumped position.



FIGURE 3: HAMSTRING STRETCH



FIGURE 4: SEATED FLEXION

Exercise regimens was conducted for a period of 6 weeks. This regimen was under the supervision of physical therapist for every alternate day for a period of 6 weeks. The subjects were advised to practice their respective regimen once a day at home alternately when they don't attend department during total intervention period.

Outcome measures such as Numeric Pain Rating Scale (NPRS) was assessed prior (baseline) and at the end of 6th weeks of treatment.

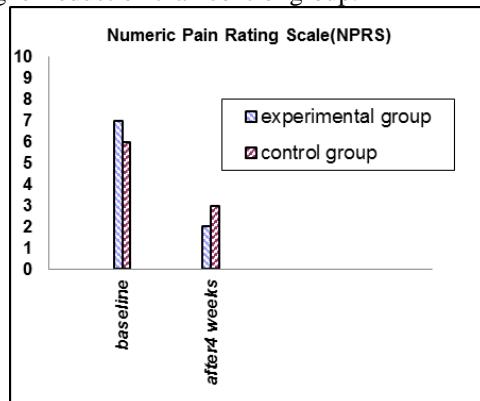
DATA ANALYSIS

To compare the outcome measurement data between the two groups, unpaired 't' test was used. In present study, P- value is used to test two tailed hypothesis at 5% level of significance i.e. if P-value is < 0.05, the difference is significant otherwise not. Statistical software SPSS had been used.

Unpaired t-test**TABLE 1: NPRS SCORES BETWEEN BOTH THE GROUPS.**

Scales	't' calculated value	P- value
NPRS score	2.161	0.037

P<0.05, there is significant difference between the groups for NPRS scores. i.e. Mean NPRS of experimental group shows significantly higher reduction than control group.

**GRAPH 1: COMPARISON OF NPRS SCORE BETWEEN THE TWO GROUPS****RESULTS**

NPRS scores had improved by 65.8 % in experimental group and 53.2 % in control group for L.B.P in B.PT students after 6-weeks of treatment. There was significant reduction in NPRS scores between the groups.

However, the experimental group showed significantly higher improvement compared with control group after intervention between the groups.

DISCUSSION

Both treatment groups obtained successful outcomes by significant reduction in Numeric Pain Rating Scale (NPRS) scores over a 6-week period. The results are in agreement with other studies suggesting by Mircea, he found that McKenzie protocol proved to be superior to Williams program as 67% pain relief occurred, which supports this study.²

The benefits of McKenzie method is a more passive form of spinal manipulation in which subject produces the motion, position and forces that improve L.B.P. Examples of pathoanatomic alterations include a tear in the annulus and acute facet arthritis. Repeated lumbar extension may reduce edema and nuclear migration in an annular

tear or may realign a facet joint in such a way as to reduce inflammation and painful stimuli. Furthermore, cyclic range of motion exercises (usually in passive extension) are the cornerstone of the McKenzie program. These repetitive exercises “centralize” pain, and certain postures prevent end-range stress. Lumbar flexion exercises may be added later, when the patient has full spinal range of motion.

Nachemson arguably discredited Williams's flexion back exercises when his study showed that these exercises may significantly increase the pressure within intervertebral discs of the lumbar spine possibly aggravating herniated or bulging discs.⁸

Moreover, Ponte et al. found that McKenzie protocol has improved significantly (P<0.001) to greater extent for decreasing pain than did the subjects in the William's group and these changes came about in a significantly (P<0.01) shorter period of time.³

Furthermore, the results also suggested by Clare et al. found that the McKenzie therapy provided a mean 8.6 point greater pain reduction on 0 to 100 point scale compared to strength training, spinal mobilization, general exercises, NSAIDS, educational booklet, back massage and back care advice at short term follow-up (less than three months).⁷

Cherkin DC et al. found that in one of the randomized trials of nonsurgical back pain treatments undertaken in recent years, they conclude that McKenzie back exercises provide slightly greater pain relief than a placebo-the control group received a patient education booklet on L.B.P.⁹

Some evidences found by Machado LA has showed in eleven trials of mostly high quality which supports that McKenzie method is more effective than passive therapy for acute L.B.P. McKenzie method has reduced pain (weighted mean difference [WMD] on a 0- to 100-point scale, -4.16 points; 95% confidence interval, -7.12 to -1.20) at 1 week follow-up when compared with passive therapy for acute LBP¹⁰.

LIMITATIONS

- The sample size was small.
- Study duration (data collection) was less.
- Study was done for subjects whose symptoms were from more than 1 month and less than 6 months duration of low back pain.
- There may be chances of biased for subjects performing home exercises program.

- The outcome measures were taken after 6th week of exercise program, hence long term benefits and follow up were not checked.

FURTHER IMPLICATIONS

- Other Outcome Measures can be taken.
- Sample size should be large in both groups.
- Long term benefits can be checked.
- Multicentered studies should be carried out to check the effectiveness of these interventions in low back pain subjects.

CONCLUSION

Results of the study concluded that there was significant improvement in both the groups; however the McKenzie Extension Exercise Group was more effective in reducing L.B.P in B.PT. Students as compared to William's Flexion Exercises group.

ACKNOWLEDGEMENTS

There are no words to gratitude sufficient enough to thank my honorable Dr. Vattianandane for his help, direction, supports and encouragement for my work.

CLINICAL APPLICATION

The McKenzie Extension Exercises should be used in Low Back Pain students as it is more effective than William's Flexion Exercises for reducing Low back pain.

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PREVALENCE OF PREMENSTRUAL SYNDROME IN MARRIED AND UNMARRIED FEMALES OF 18-28 YEARS OF AGE

Hetal Jain¹, Avani Parekh²

1. Lecturer, Ashok & Rita Patel Institute of Physiotherapy CHARUSAT, Changa
2. Intern, Ashok & Rita Patel Institute of Physiotherapy CHARUSAT, Changa

ABSTRACT

Introduction: Premenstrual syndrome refers to distressing physical, psychological and behavioral symptoms not caused by organic disease, which regularly occur during the same phase of menstrual cycle and significantly regress or disappears during the remainder of the cycle.

Method: A cross sectional study was carried out in 2013-14 among female married and unmarried from Charotar region, aged 18-28 year. Over all 400 participants were asked to fill up the Premenstrual Syndrome Screening Tool.

Results: Out of 400 participants, 200 unmarried females who participated in this study 63% have mild to moderate PMS symptoms, 34.50% have moderate to severe and 2.50% have severe symptoms of PMS and from 200 married females 65.50% have mild to moderate PMS symptoms, 31.50% have moderate to severe and 3% have severe symptoms of PMS. Most common symptoms in unmarried and married were feeling of fatigue (around 60%), decrease interest in work, social activity and home activity (around 55%), physical symptoms which include breast tenderness, headaches, joint/muscle pain, bloating and weight gain (around 50%).

Conclusion: Prevalence of premenstrual syndrome in focus group of Charotar region was found to be low but comparable to the result reported from the studies done in other countries.

KEYWORDS: Prevalence, Premenstrual syndrome, premenstrual symptoms screening tool.

INTRODUCTION

Premenstrual disorder has been variously defined as psycho-neuro-endocrinological disorder of unknown etiology¹ that consists of a myriad of physical and psychological symptoms. Premenstrual syndrome includes a range of disorder from mild premenstrual syndrome (PMS) to premenstrual dysphoric disorder (PMDD)². Premenstrual syndrome is cyclic recurrence of distress with somatic and affective symptoms in the luteal phase of menstrual cycle and in few days of the next follicular phase. The most important somatic symptoms are feeling overwhelmed, food craving, insomnia or hypersomnia, headache, pelvic pain and discomfort, breast tenderness, joint pain, bloating; and the most common and distressing affective symptoms are irritability, anxiety, depression, mood swing, hostility, poor concentration, confusion, social withdrawal and interpersonal conflicts^{3,4,5}. First, Frank in 1993 described this clinical phenomenon and used the term “premenstrual tension”⁶. The American College of Obstetrics and Gynecology (ACOG) guidelines for PMS⁷ adopted the diagnostic criteria developed by the University of California at San Diego (UCSD) and National Institute of Mental Health (NIMH). According to American college of Obstetrics and Gynecology

(ACOG) guideline, PMS include one or more affective or somatic symptoms that negatively impact a woman's function and lifestyle, occur during the five days prior to menses, and are present in each of three previous menstrual cycles⁷. The symptoms are relieved within four days of the onset of menses and do not recur until at least thirteenth day of next cycle day⁸. The American Psychiatric Association has established criteria for the diagnosis of PMDD. The cyclic nature of depressive symptoms that occur in PMDD should help differentiate PMDD from other depressive disorder that occurs throughout the cycle⁹.

Reports on prevalence of PMS differ in different studies are for example, one study on female students showed that out of 100% of participants, 98.2% reported at least one mild to severe premenstrual symptoms¹⁰. Derman et al (2000) conducted a study in Turkey that showed 61.4% of adolescent girl met criteria for PMS. Among women samples up to 85% have reported one or more premenstrual symptoms^{7,11}. Dean et al (2000) concluded that regardless of criteria used, PMS prevalence ranges from 19% to 30%.

In a study by Patricia Coughlin titled Premenstrual syndrome: How marital satisfaction and role choice affect symptom severity, it was observed that the degree of dissatisfaction in marriage could increase the intensity of PMS symptoms. It also stated that life stressors, marital distress and career issues worsen PMS not that PMS

For Correspondence:
hetaljain.phy@charusat.ac.in

worsens these life variables. It demonstrated the negative effects of stress derived from unhealthy marital relationship on the intensity of PMS. According to Ryser and Feinauer 1992, marital relationships of PMS sufferers deteriorate during the luteal phase, whereas relationship satisfaction is similar between PMS and non PMS sufferers during follicular phase.

In terms of severity, research studies have reported up to 200 premenstrual symptoms of varying degree of severity¹². Overall, it is seen that PMS is associated with health related quality of life and women with PMS have greater work productivity impairment than women without PMS¹³. Pearlstein et al (2000) in a study on 276 women who met criteria for PMDD found that the most frequent PMDD symptoms included anger/irritability (76%), anxiety/tension (71%), tiredness/lethargy (58%), and mood swings (58%). For 2-10% of women the symptoms are disabling⁷.

As the reviewed literature indicates, significant group of women experience various degrees of PMS. In addition, PMS symptoms can have debilitating effects on women's quality of life and work production. However, competition, society^{14,15}. And culture may control expression of premenstrual symptoms and their severity. Most current studies on PMS have been conducted in western countries. Thus, it is imperative to investigate the prevalence, severity, and most common symptoms of PMS among various populations to promote quality of life, health and wellbeing of reproductive age women in that population. The current study investigated the prevalence of premenstrual symptoms in age group of 18 to 28 age group of females.

The questionnaire used in study Premenstrual Syndrome Screening tool (PSST) consists of two parts. The first part included 14 questions about psychological, physical and behavioral symptoms and second part measured the effects of these symptoms on personal life that includes five questions. There are four parameters for each questions including: (a) not at all (symptoms not present at all), (b) mild (the symptoms are noxious but they don't affect the interpersonal relationship or routine activity), (c) moderate (the symptoms are noxious and affect some of interpersonal relationship or routine activities), (d) severe (the symptoms are very noxious and affect completely on interpersonal relationship or routine activity). Scoring method in this questionnaire was that the people were divided into 4 categories based on the severity: First: includes women who don't have this syndrome and didn't have PMS symptoms. Second: includes those

who have slight symptoms of syndrome. Third: includes those who have medium to severe symptoms of this syndrome²⁰.

OBJECTIVE

To find out the prevalence of Premenstrual syndrome among married and unmarried females of 18-28 age.

METHODS

Design: Cross sectional study

Setting: Charotar region

Sampling method: Convenient sampling

Sample size: 400

Inclusion and exclusion criteria:

Inclusion criteria:

Age: 18 to 28 years

Marital status: unmarried, married and willingness to participate

Exclusion criteria:

Pregnant women

Irregular menstrual cycle

Current major medical and psychological problem

Receiving any hormonal therapy.

Data collection tools

Premenstrual symptoms screening tool survey questionnaire

PROCEDURE

Females of Charotar region were recruited through personal contact for initial response. An explanatory discussion about the disorder was given in order to make them aware about the syndrome so that the questions could be accurately understood later on informed consent and premenstrual syndrome screening tool was asked to be filled up. Participants were not given any incentives to get involved in the study and those who participated were assured about the confidentiality of their response. They were given freedom to express their symptoms by allowing them to mention personal comments.

SUBJECTS AND METHODS

This survey study was conducted between June 2013 and November 2014 on females of Charotar region. Overall, 400 female married and unmarried were randomly recruited. The 200 unmarried female students of Charotar University of Physiotherapy, Indukaka Ipcowala pharmacy collage, and S.M Patel Ipcowala collage of

commerce were recruited as subjects after obtaining approval from the respective authorities. The married females were recruited from the Charotar region. Participation in study was voluntary and if a female refused to participate, no objection was taken. Questionnaires and consent form were handed out to females and collected after being filled.

Premenstrual symptoms screening tool (PSST) is considered among the most important inventories. The design of this questionnaire is to gain simple and easy screening tool for the determining the women who suffer from premenstrual syndrome. The designer of PSST believed that this questionnaire indicates the severity of disease at necessity and also indicate its effects of symptoms on individual's life.

DATA ANALYSIS

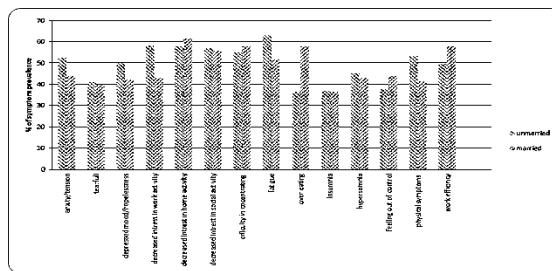
Descriptive analysis using mean and percentage values to determine the average age of the participants along with the total percentage of female with PMS symptoms.

RESULTS

The age of 400 female who participated in this study ranged from 18 to 28, with mean age of 25 years. In total 400 participants all reported experiencing various degrees of at least one symptom of 14 symptoms included in the questionnaire. The most prevalent symptoms felt by 200 unmarried females were of fatigue (62%), decreases interest in work, social activity and home activity (58%, 57.75%, 56.87%), physical symptoms which include breast tenderness,

TABLE 1: SYMPTOMS SEVERITY OF PMS

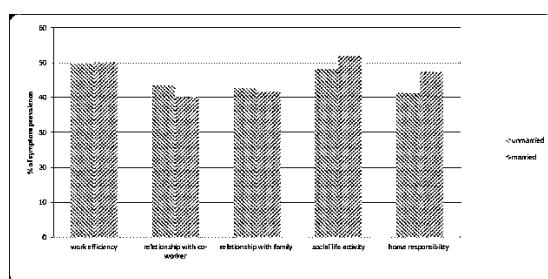
Variable	Range	Score (total)		No. Percentage	
		Married	Unmarried	Married	Unmarried
Mild	19-38	126	131	63%	65.5%
Moderate	39-57	69	63	34.5%	31.5%
Severe	58-76	5	6	2.5%	3%



headaches, joint/muscle pain, difficulty in concentrating (55%), bloating and weight gain(53.25%), anger and irritability (52.62%), depressed (50%), hypersomnia (45.125%), anxiety and tension (43.625), tearful (41), feeling out of control (37.62%), insomnia (36.87%), over eating (36.37%). This is shown in graph 2.

Same as unmarried in 200 married female the most prevalent symptoms were feelings of decrease interest in work fatigue (61.37%), decreases social activity and home activity, (57.87%, 57.75%, 55.5%), physical symptoms which include breast tenderness, headaches, joint/muscle pain, difficulty in concentrating (57.87%), bloating and weight gain (53.25%), anger and irritability (43.75%), depressed (43%), hypersomnia (43.87%), insomnia (43%), tearful (42.125), feeling out of control (41.37%), anxiety and tension (39.75%), over eating (36.25%). This is shown in graph 1.

The symptoms of PMS, both psychological and physical according to the age group are showed in table 1. Instead of these 14 symptoms there are 5 more questions which show the interference of these 14 symptoms. The most prevalent ones to be affected in unmarried are work efficiency and productivity (49.75%), social life activities (48.125%), relationship with co-workers (43.5%), relationship with family (42.75%), home responsibility (41.375%), this is showed in the figure 2. In married group the most prevalent ones to be affected in are work efficiency and productivity (50.125%), social life activities (51.875%), relationship with co-workers (40%), relationship with family (41.625%), home responsibility (47.25%).



GRAPH 1, 2: COMPARATIVE PREVALENCE OF VARIOUS PMS SYMPTOMS IN MARRIED AND UNMARRIED FEMALES

DISCUSSION

The present study conducted on 400 females in which 200 were unmarried and 200 were married, showed that all the participants had at least one premenstrual syndrome of minimal severity. The total symptoms scoring of the study is 76 accordingly the score is divided in following range and variable set as follow- mild 19-38 (25-50%)score , moderate 39-57 (50-75%)score , severe 58-76(>75 %) score were grouped.

Derman et al conducted study in Turkey that showed 61.4% of adolescent girl met criteria for PMS. Among women sample up to 85% have reported one or more premenstrual symptoms^{7,11}. Nour Mohammad Bakhshani et al (2009) had done study to find prevalence and severity of premenstrual symptoms among Iranian female university students. The study done on 300 students from 18 to 27 age concluded that backache, tiredness, mood changes, depressed mood and anxiety were most prevalent and with the 18-20 years old age group having the highest figure¹⁷. A study done in Hong Kong indicated a comparable prevalence rate of PMS is 19% ²⁶.

Finally, studies have not consistently confirmed a strong association between PMS and demographic risk factors. In our study age was the only demographic factor that contributed to severity of PMS. The symptom severity in younger participants (18-21 years old) was significantly higher than that of the other group (22-25 and 26-28 year old).Our findings are comparable to the study by Nour Mohammad Bakhshani et al who found more symptoms in age group 18-20 years compared to 21-24 years¹⁰. The same study stated no difference in the females who were married to the unmarried counterparts which abolishes the influence of marriage on presence of symptoms¹⁰.

The prevalence of PMS in our study showed 63% females having mild, 34.50% moderate and 2.50% having severe complains of PMS in unmarried and same as that in married 65.50% having mild, 31.50% having moderate and 3 % having severe complain of PMS. The result shows that, prevalence of mild symptoms was maximum compared to other studies. Severe symptoms of PMS indicate the premenstrual dysphoric disorder which greatly affects the lifestyle and ADL of females. Presence of PMS among females depends on culture, education, ethnicity health status and age of participant. Sternfeld et al found that Hispanics reported greater severity than Asians⁷.

In a study by Patricia Coughlin titled Premenstrual syndrome: How marital satisfaction

and role choice affect symptom severity, it was observed that the degree of dissatisfaction in marriage could increase the intensity of PMS symptoms. It also stated that life stressors, marital distress and career issues worsen PMS not that PMS worsens these life variables. It demonstrated the negative effects of stress derived from unhealthy marital relationship on the intensity of PMS. According to Ryser and Feinauer 1992, marital relationships of PMS sufferers deteriorate during the luteal phase, whereas relationship satisfaction is similar between PMS and non PMS sufferers during follicular phase.

Moreover PMS symptoms are maximum evident in one week before the menses and subside after 3 days of cycle due to the drastic hormonal imbalance in this period but due to practical considerations it was not possible to collect data of the participants during their individual menses period which can obscure the result due to recall bias and is the limitation of this study. We do feel that this can affect the total prevalence rate of our study population.

LIMITATIONS

The limitations of our study are as follows

- Effect of exercise and physical work has not been studied
- Effect of PMS on quality of life has not been assessed
- The study is only limited to finding the prevalence of PMS and it is not centered towards management of females having disabling PMS
- The use of retrospective and self-reported research method and recall bias.

CONCLUSION

Prevalence of premenstrual syndrome in married group of females was not significantly different compared to the unmarried females. The influence of PMS on work efficiency, social responsibility and home responsibility did not differ between the married and unmarried females.

FUTURE RECOMMENDATION

- Effect of PMS on quality of life using health related quality of life questionnaire and SF 36
- Effect of various exercise protocols and aerobic training on PMS needs to be investigated in the females.

CLINICAL APPLICATION

Premenstrual syndrome is common in females of age group 18-28 but the present study denotes that there is no difference in the prevalence rates between married and unmarried females which highlights the need to address the syndrome in females without considering the marital status and its impact.

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CORRELATION OF BODY MASS INDEX AND HEALTH RELATED PHYSICAL FITNESS IN YOUNG HEALTHY INDIVIDUALS

Sweety Shah¹, Jumana Vanwala²

1. Lecturer, SBB Physiotherapy College, Ahmedabad.
2. M.P.T. student., SBB Physiotherapy college, Ahmedabad

ABSTRACT

Introduction-Physical fitness is defined as set of attributes or characteristics that people have or achieve that relates to ability to perform physical activity. These characteristics are separated into health related & skill related physical activity. There are few studies that suggest correlation of BMI & health related physical fitness in young college going healthy individuals of Gujarat. So purpose of this study is to know its correlation in young healthy individuals of Gujarat.

Aim & Objective: To correlate the health related physical fitness in underweight, normal weight, overweight and obese young healthy individuals.

Method: 40 subjects were selected and divided into four groups underweight ($BMI < 18.5\text{kg}/\text{m}^2$), normal weight ($BMI 18.5\text{-}24.9\text{kg}/\text{m}^2$), overweight ($BMI 24.9\text{-}29.9\text{kg}/\text{m}^2$) and obese group ($BMI \geq 30\text{kg}/\text{m}^2$).

Written informed consent and ethics approval were taken. Subjects are selected in the age group between 18 to 24 yrs. Procedure is explained to the subjects. Subjects with any neurological, orthopedic, cardio-respiratory diseases were excluded. People who are doing gym training and yoga were also excluded. Outcome measure were

1. Skin fold measurement (body fat %)
2. Maximum oxygen uptake ($\text{Vo}_2 \text{ max}$)
3. Strength
4. Endurance

5. Flexibility was measured in all four groups.

Result- Statistical analysis was done using SPSS version 16. Data were analyzed by using Pearson & spearman correlation tests and correlation coefficient (r) was calculated.

Conclusion: There is positive correlation for skin fold measurement and strength and negative correlation for $\text{Vo}_2 \text{ max}$, endurance and flexibility.

INTRODUCTION

Physical fitness is defined as set of attributes or characteristics that people have or achieve that relates to ability to perform physical activity. These characteristics are separated into health related & skill related physical activity. Civilization and industrialization make our life pleasant and luxuriant. Indeed, automation and other technologies have contributed greatly to lessening physical activities at work place and home¹. Physical fitness component include cardio respiratory endurance, muscle strength, endurance, flexibility and body composition^{2,3}. Maximum oxygen uptake is considered the gold standard to assess the cardio respiratory fitness². In adults, both poor physical fitness and physical inactivity are associated with morbidity and mortality⁴. There are few studies that suggest correlation of BMI & health

related physical fitness in young college going healthy individuals of Gujarat. So purpose of this study is to know the effect of BMI on health related physical fitness in young healthy individuals and educating participants about their present health related fitness status relative to health related standards and age and sex norms.

AIMS AND OBJECTIVE

To know the effect of different BMI on health related physical fitness.

METHODOLOGY

40 Subjects who were 15 to 24 year old young healthy individuals and willing to participate were taken. Ethics approval was taken from ethics committee board of SBB College of physiotherapy. Written informed consent form was taken from participants. Procedure and purpose of study were explained. Baseline Age, sex, BMI were taken. Subjects who were having any orthopedic conditions, Neurological conditions,

For Correspondence:
Sweety Shah
B-61 Soham Tower, Someshwar Bunglow Compound,
Shyamal Cross Road, Satellite, Ahmedabad-380 015
Gujarat, India
Email: sweetyshah@yahoo.com

Cardiorespiratory disorders and People who were doing gym training and yoga were excluded. Participants were divided in 4 groups as per international classification of body mass index according to WHO⁵

- **Group 1-** underweight (BMI <18.5 kg/m²)
- **Group 2-**normalweight (BMI 18.5-24.9 kg/m²)
- **Group 3-**overweight (BMI 25-29.9 kg/m²)
- **Group 4-**obese(BMI >30 kg/m²)

Skin fold measurement was done by using Jackson Pollock 3-site formula for men & women. Maximum Oxygen uptake was calculated by Rockport 1 mile walk test⁶. Equation that was used was

Estimated VO_{2max}= [132.85-0.077 body weight-0.39 age+6.32 gender (0=F, 1=M)-3.26 elapsed time-0.16 HR] (Where weight in lb, time in min, HR in bpm)

Muscular strength of major muscles such as Grip strength, abdominal strength, and Quadriceps strength was measured. Grip strength was measured using jammer hand dynamometer. Quadriceps strength was measured using hand-held dynamometer. Average for the 3 time measurement for right and left was calculated for both grip strength and quadriceps strength. Muscular endurance of abdominal muscle was calculated using Curl ups in 1 minute. Flexibility of hamstrings was assessed using straight leg raise test and average of right and left was calculated.

RESULT

Statistical analysis was done using SPSS version 16. Data were analyzed by using Pearson & spearman correlation tests and correlation coefficient (r) was calculated. For parametric data Pearson correlation test and for non-parametric data spearman correlation test was applied. Mean age of the subjects was 21.82 ± 2.037 years. Gender distribution of subjects was as per following pie chart.

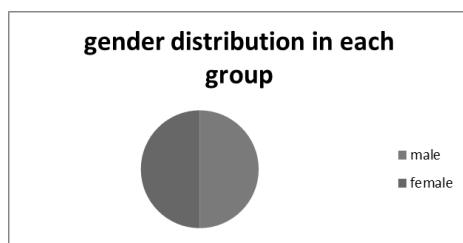
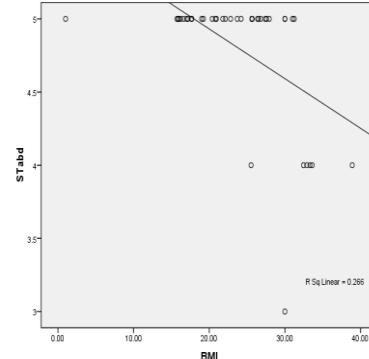
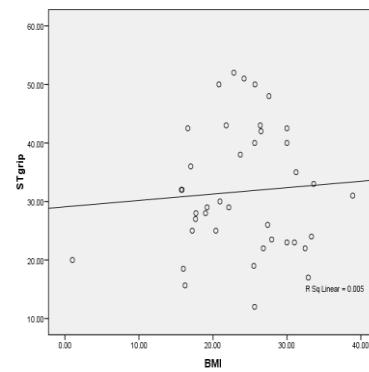
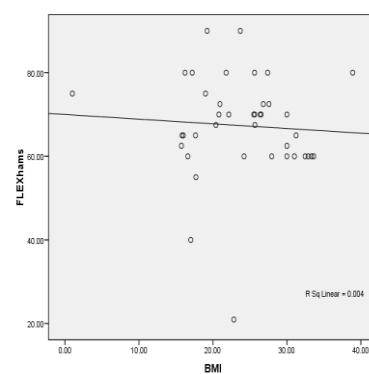
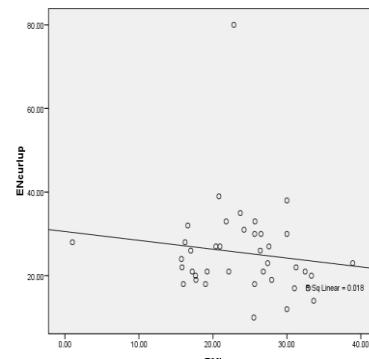


FIGURE 1: GENDERWISE DISTRIBUTION IN EACH GROUP

TABLE 1: SHOWING CORRELATION COEFFICIENT R VALUE BETWEEN BMI AND PHYSICAL FITNESS.

	VO _{2max}	Skinfold	Grip Strength	Abdominal Strength	Quadriceps Strength	Abdominal Endurance	Hamstring Flexibility
BMI	-0.543	0.818	0.017	-0.563	0.440	-0.134	-0.064



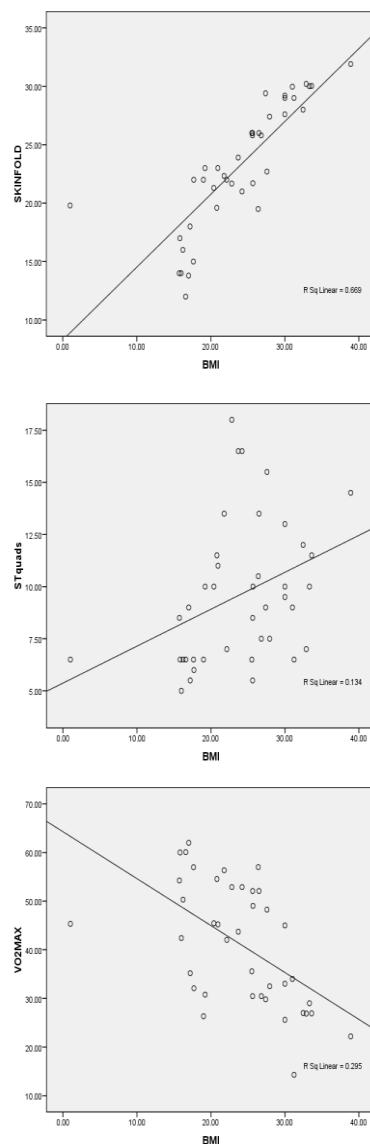


FIGURE 2-8: SHOWING THE SCATTER PLOT FOR CORRELATION BETWEEN BMI AND HEALTH RELATED PHYSICAL FITNESS

From the r value there is strong negative correlation for $\text{VO}_{2\text{max}}$ and abdominal strength, strong positive correlation for skin fold measurement, moderate positive correlation for quadriceps strength, weak positive correlation for grip strength and weak negative correlation of hamstring flexibility with BMI.

DISCUSSION

Result shows that BMI has negative correlation with fitness. Bokna H et al 2003, found the same thing in his study on college going women

of seol and concluded that obese group had a tendency of lower levels in all the variables related to body fitness. They showed significantly lower endurance.⁷

Subjects with a low fitness level at baseline had a higher risk of becoming overweight or obese compared to those who had high initial fitness levels.⁸

Aires et al⁹ showed that while physical activity influenced cardiorespiratory fitness and cardiorespiratory fitness influenced BMI, BMI was not related to physical activity. Therefore cardiorespiratory fitness acts as a mediator in the relationship between physical activity and BMI.

According to Must et al.¹⁰, most cross-sectional and longitudinal studies showed no relationships between physical inactivity and overweight in adolescents and inconsistent gender specific results.

In managing overweight and obesity, there is a need to prescribe exercises addressed toward improving muscular strength, power, endurance, and aerobic capacity

Participation in a variety of exercises targeting all major muscle groups and including weight-bearing activities will likewise improve strength and power. Properly designed and adequately supervised resistance training programs will also be beneficial in enhancing strength, endurance, self-satisfaction, self-esteem, and body image.

CONCLUSION

There is strong positive correlation for skin fold measurement, moderate positive for quadriceps strength, weak positive for grip strength and strong negative correlation for $\text{VO}_{2\text{max}}$, weak negative for curl ups and hamstring flexibility with BMI.

LIMITATION

This article reports results from cross-sectional study, which might not reflect the cause and effect relationship of obesity and physical fitness. Long-term, prospective studies are recommended to provide a clearer perspective on the relationship between body composition and physical fitness parameters in young healthy individuals. Physical activity pattern of the subjects was not considered.

FUTURE STUDIES

Same study can be done on larger sample size. Obese class 1, 2 and 3 can be studied separately.

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EVALUATION OF PSYCHOEDUCATIONAL INTERVENTION WITH FAMILY CARE GIVERS OF CHILDREN LITTLE DISEASE ATTENDING PEDIATRIC PHYSIOTHERAPY-QUASI EXPERIMENTAL STUDY

Karthikeyan T¹, A S Moorthy²

1. Department of Neuro Rehabilitation, NIMHANS University, India

2. Moorthy A S, Physiotherapist, JPN Apex Trauma Centre, AIIMS, New Delhi.

ABSTRACT

Introduction: Little disease is the most common motor disability during childhood with prevalence from 1.5 to more than 4 per 1000 live births. Over 25 lakh people including children in India are estimated to have little disease. Incidence of little disease is not decreasing in spite of improved health care in India especially in the rural areas.

Evidence based study survey report to identify neuro impairment, among 181 children with little disease, which revealed that associated medical problems were epilepsy (32%), mental retardation (48%), 85% children needed rehabilitation equipment, 60% needed help with dressing, conducted a study on health of caregivers of children with little disease which revealed that, Even though family caregivers are the long-term care providers to people with little disease, they receive little preparation, information, or support to carry out their vital role. Family caregivers often are expected to navigate an increasingly complex and fragmented health care system on their own and to find whatever help that may be available. In recent years, the caregiving responsibilities of family members have increased dramatically, primarily due to the use of toxic treatments in outpatient settings, the decline in available health care resources, and the shortage of health care providers. Family caregivers of little disease patients have participated in a limited number of intervention programs but these programs have focused almost exclusively on improving patient outcomes (e.g., symptom management, quality of life) with less attention directed to the needs of family caregivers. Family caregivers have psychosocial needs that must be addressed so they can maintain their own health and provide the best care possible to the patient.

Research methodology: Quasi experimental study; pretest and post test design with out control group approach

Study variables

Dependent variable: Psychological distress and Coping strategies

Independent variable: Psychoeducational intervention

Extraneous variables: Socio demographic variables of parents and children

Conclusion: Little disease is a complex disease and the affected children need multiple and variable care. It affects many aspects of the child's and the family's daily life. The pre test findings revealed that parents had moderate psychological distress and adopted partially adaptive coping strategies. There was highly significant difference in the psychological distress and coping strategies after implementation of psychoeducational intervention. The information and the psychological support provided and the relaxation techniques taught by the investigator had helped parents to adopt positive coping strategies and reduce their psychological distress.

INTRODUCTION

Little disease is the most common motor disability during childhood with prevalence from 1.5 to more than 4 per 1000 live births¹. Over 25 lakh people including children in India are estimated to have little disease. Incidence of little disease is not decreasing in spite of improved health care in India especially in the rural areas².

A survey to identify neuro impairment, among 181 children with little disease, which revealed that associated medical problems were epilepsy (32%), mental retardation (48%), 85% children needed rehabilitation equipment, 60% needed help with dressing³. Another study on health of caregivers of children with little disease which revealed that, Psychological problems were

cognitive problems (38.3%), distress (28%), and emotional problems (25.3%). Physical problems included back problems (35.5%), pain (28.8%), migraine headache (24.2%), asthma (15.8%), arthritis (17.3%), stomach ulcers (8.4%)⁴.

OBJECTIVES

- 1) To assess psychological distress of parents of children with little disease before implementation of psychoeducational intervention.
- 2) To identify the coping strategies adopted by parents of children with little disease before implementation of psychoeducational intervention.
- 3) To determine the effectiveness of psychoeducational intervention on

- psychological distress among parents of children with little disease.
- 4) To determine the effectiveness of psychoeducational intervention on coping strategies adopted by parents of children with little disease.
 - 5) To compare the effectiveness of psychoeducational intervention with their selected demographic variables.
 - 6) To determine the association of posttest psychological distress with their selected demographic variables.
 - 7) To determine the association of post test coping strategies with their selected demographic variables.

METHODOLOGY

Quasi experimental study; pretest and posttest design without control group approach

STUDY VARIABLES

Dependent variable: Psychological distress and Coping strategies

Independent variable: Psychoeducational intervention

Extraneous variables: Sociodemographic variables of parents and children

SETTING OF THE STUDY

Site of the study: Pediatric Physiotherapy division NIMHANS Bangalore

Sample: Parents of children with little disease in the age group of 1-12 years

Sample size: Thirty (30)

Sampling technique: Non-probability, purposive sampling technique

INCLUSION CRITERIA

- Parents of children with little disease, who were,
- Having children in the age group of 1-12 years.
- Attending the Paediatric Physiotherapy Department of
- Willing to participate and cooperate in the study.
- Available during the data collection period.
- Able to understand kannada, English and hindhi and speak

INTERVENTION

Psychoeducation was organized as;

- Introduction

- Meaning
- Causes
- Types
- Management
- Care of the child
- Relaxation therapies
- Conclusion

TOOLS AND TECHNIQUE

Structured questionnaire was used

SECTION A: Sociodemographic variables of parents and children with little disease.

SECTION B: Rating scale to assess the psychological distress

SECTION C: Rating scale to assess the coping strategies

Validity: Content validity was obtained from experts of different departments.

Reliability: Test and retest method using Karl Pearson's Correlation Coefficient formula.

Psychological distress: $r = 0.97$ and Coping strategy: $r = 0.98$

PILOT STUDY

Pilot study was conducted in DNR with 3 samples those who were fulfilling the criteria included in the study.

DATA COLLECTION PROCEDURE

The study was approved by institutional review board.

Pretest

Conducted before implementing psychoeducational intervention

Intervention

Immediately after pretest, psychoeducation was provided individually with lecture cum discussion and demonstration method forty five minutes a day for three consecutive days.

Posttest

Posttest evaluation of the survey of the study has done after 1 month of implementation by psychoeducational intervention strategy.

DATA ANALYSIS

Descriptive statistics: Mean, Mean percentage, Standard deviation

Inferential statistics: Paired t test

RESULTS

TABLE 1: PSYCHOLOGICAL DISTRESS BEFORE IMPLEMENTING PSYCHOEDUCATION

SN	Area	Mean	SD	Mean %
1	Anxiety	16.76	2.7	67
2	Depression	14.16	3.0	56.66
3	Hope	13.50	2.2	54
4	Relationship	12.40	2.7	49.60
5	Family support	10.36	4	41.46
6	Social support	17.46	3.2	69.86
	Over all	84.66	10	56.44

TABLE 2: COPING STRATEGIES BEFORE IMPLEMENTING PSYCHOEDUCATION

SN	Area	Mean	SD	Mean %
1	Problem solving	18.70	2.4	74.80
2	Self-criticism	17.60	5.2	70.40
3	Emotional reaction	15.03	4.3	60.03
4	Social support	14.20	2.5	56.80
5	Wishful thinking	14.80	2.6	59.20
6	Cognitive restructuring	14	3.5	56
	Over all	94.73	12.1	63.15

TABLE 3: EFFECTIVENESS OF PSYCHOEDUCATION ON PSYCHOLOGICAL DISTRESS

Area	Pre test			Post test			Diff
	Mean	SD	Mean %	Mean	SD	Mean %	
Anxiety	16.76	2.7	67	14.46	3.5	57.86	9.14
Depression	14.16	3	56.66	10.83	1.7	43.33	13.33
Hope	13.50	2.2	54	11.50	1.5	46	8
Relationship	12.40	2.7	49.60	10.80	3	43.20	6.40
Family support	10.36	4	41.46	7.90	2.2	31.60	9.86
Social support	17.46	3.2	69.86	14.36	3	57.46	12.40
Over all	84.66	10	56.44	69.86	9.2	46.57	9.87

TABLE 4: EFFECTIVENESS OF PSYCHOEDUCATION ON COPING STRATEGIES

Area	Pre test			Post test			Diff
	Mean	SD	Mean %	Mean	SD	Mean %	
Problem solving	18.70	2.4	74.8	19.23	2.4	76.93	2.13
Self-criticism	17.60	5.2	70.4	21.93	3.9	87.73	17.33
Emotional reaction	15.03	4.3	60.13	16.53	3.6	66.13	6
Social support	14.20	2.5	56.8	15.36	3.1	61.46	4.66
Wishful thinking	14.80	2.6	59.20	16.86	2.3	67.46	8.26
Cognitive restructuring	14	3.5	56	16.46	3	65.86	9.86
Over all	94.73	12.1	63.15	106.4	10.6	70.93	7.78

Table 4 showing that the Comparison of effectiveness of psychoeducation with selected demographic variables. The Findings of the study which suggest that psychoeducation was more extensive effective.

- Reducing psychological distress of parents who were, belongs to more than 25 years and they were from joint family.
- Improving coping strategies adopted by parents who, were <25 years and participants had higher secondary education

TABLE 5: PAIRED 'T' VALUE OF PRE AND POST TEST PSYCHOLOGICAL DISTRESS SCORES

SN	Area	t value	Level of significance
1	Anxiety	3.16	Significant
2	Depression	6.09	Highly significant
3	Hope	5.10	Highly significant
4	Relationship	3.81	Highly significant
5	Family support	5.06	Highly significant
6	Social support	5.51	Highly significant
	Over all	6.37	Highly significant

(df = 29, table value = 3.66, p <0.001) (df = 29, table value = 2.05, p <0.05)

TABLE 6: PAIRED 'T' VALUE OF PRE AND POST TEST COPING STRATEGIES SCORES

SN	Area	t value	Level of significance
1	Problem solving	0.09	Not significant
2	Self-criticism	4.85	Highly significant
3	Emotional reaction	2.21	Significant
4	Social support	2.40	Significant
5	Wishful thinking	3.60	Significant
6	Cognitive restructuring	5.07	Highly significant
	Over all	4.83	Highly significant

(df = 29, table value = 3.66, p <0.001) (df = 29, table value = 2.05, p <0.05)

TABLE 7: ASSOCIATION BETWEEN POST TEST PSYCHOLOGICAL DISTRESS AND SELECTED DEMOGRAPHIC VARIABLES

SN	Variables	χ^2 value	Level of significance
1	Age	16.42	Highly significant
2	Education	0.13	Not significant
3	Occupation	1.88	Not significant
4	Monthly income	0.88	Not significant
5	Type of family	7.84	Significant
6	Number of children	0.002	Not significant
7	Age of child	1.82	Not significant
8	Gender of child	0.02	Not significant
9	Type of little disease	0.70	Not significant
10	Co morbid illness	0.56	Not significant

(df = 1, table value = 10.83, p <0.001) (df = 1, table value = 3.84, p <0.05)

TABLE 8: ASSOCIATION BETWEEN POST TEST COPING STRATEGIES AND SELECTED DEMOGRAPHIC VARIABLES

SN	Variables	χ^2 value	Level of significance
1	Age	4.82	Significant
2	Education	0.53	Not significant
3	Occupation	1.48	Not significant
4	Monthly income	0.43	Not significant
5	Type of family	0.42	Not significant
6	Number of children	3.45	Not significant
7	Age of child	0.34	Not significant
8	Gender of child	0.20	Not significant
9	Type of little disease	1.15	Not significant
10	Co morbid illness	0.32	Not significant

(df = 1, table value = 3.84, p <0.05)

DISCUSSION

The multifamily psychoeducation remarkably reduced the FAS score in women, but not in men. The baseline score of the FAS among

women was significantly higher than that among men (55.1 ± 17.1 for women, 36.0 ± 16.0 for men). This may be due to the difference in gender-related expectations between men and women in Japanese society⁸. The above study reported that female spouses seem to have a burden-related increased risk of depression, independent of the partner's type of illness. The reason why only the women's FAS score remarkably decreased in this study cannot be definitively determined, but it may be because women respond better to increased social support obtained through telling her experience to other participants and getting advice from the other participants in family psychoeducation⁷. For male relatives, we must further refine methods of psychoeducation. The Findings related to socio demographic data of parents which is highest percentage (50%). They were the actively participated in the estimated survey study. In present study, the number of participants of care givers age group of more than 25 years. All the samples participants of genders where belongs (100%) to mothers. The most (40%) of the responders of parents had secondary education. The Majority of participants (86.6%) those who were housewives. The Majority (90%) belonged to Hindu religion. All the parents (100%) were married and living with spouse. The Majority (83%) who had non consanguineous marriage.

Majority (77.4%) of the parents belonged to upper-lower or lower socioeconomic strata according to modified Kuppuswamy scale. The age of the fathers ranged from 23 to 64 years (mean \pm SD = 31.02 ± 7.42) and that of mothers ranged from 20 to 55 years (mean \pm SD = 27.11 ± 6.46)⁵. The educational status of fathers was illiterate (15.1%), primary (9.4%), intermediate (58.5%), and graduate (17%). The educational status of mothers was illiterate (37.7%), primary (9.4%), intermediate (45.3%), and graduate (7.5%). The interviewees were mothers in majority of the cases (31/53 or 58.5%) whereas fathers constituted 15.1% (8/53) and both parents were interviewed in 26.4% (14/53) of cases⁶. The present study socio economic status of responders which is highest percentage (63.3%) had monthly income of Rs 5,001-Rs 10,000. The Majority (83%) who they belonged to joint family. The Highest percentage parents who they (46.6%) had two children. All the parents of responders (100%) which they were healthy and social wellbeing. The majority (93%) had not received any information regarding special care of their children.

Findings related to socio demographic data of children

The Majority (63.3%) who they were in the age group of 1-3yrs. The Most (60%) of participated

children were females. The majority (76.6%) of responder's children were first-borns. The Majority (93%) of participants who they were born through by normal delivery. The Majority of children (73.3%) were preterm. The Most (77%) of the children were diagnosed to have spastic type of little disease^{9,10}. All the participated children (100%) present study who they had duration of illness of less than six months. The responded children with family history of little disease. All (100%) the participated who were immunized up to the right age. The Highest percentage participated in the study who they (26.6%) had neurological illness of seizure.

CONCLUSION

Little disease is a complex disease and the affected children need multiple and variable care. It affects many aspects of the child's and the family's daily life. The pretest findings revealed that parents had moderate psychological distress and adopted partially adaptive coping strategies. There was highly significant difference in the psychological distress and coping strategies after implementation of psychoeducational intervention. The information and the psychological support provided and the relaxation techniques taught by the investigator had helped parents to adopt positive coping strategies and reduce their psychological distress.

RECOMMENDATIONS

Similar study can be conducted:

- With a large sample size for generalization of study findings
- With a control group.
- By increasing the duration of psychoeducational intervention.
- As a longitudinal study.
- As a comparative study among mothers and fathers.

ETHICAL CLEARANCE CERTIFICATE

As this study involving human subjects the ethical clearance has been obtained from the ethical committee of as per the ethical guidelines for Biomedical Research on Human subjects, 2001 ICMR, and New Delhi.

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THE EFFECT OF MULLIGAN MOBILIZATION WITH MOVEMENT TECHNIQUE ON INTERNAL ROTATION RANGE OF MOTION OF GLENOHUMERAL JOINT IN PATIENT WITH ADHESIVE CAPSULITIS

Shruti Patel¹, Sanket Nagrale², Rachana Dabadghav³, Nilima Bedekar⁴, Ashok Shyam⁵

1. BPT, Sancheti Institute College of Physiotherapy
2. Assistant professor at Sancheti Institute College of Physiotherapy
3. Assistant professor and research coordinator at Sancheti Institute College of Physiotherapy
4. Principal at Sancheti Institute College Of Physiotherapy
5. MS Ortho, Research Officer at Sancheti Institute of Orthopaedic and Rehabilitation

ABSTRACT

Introduction: Adhesive capsulitis is also called as “frozen shoulder” or “periarthritis” is characterized by the development of dense adhesion, capsular thickening, and capsular restriction. There is wide range of treatment existing for treatment of adhesive capsulitis, physical therapy is the most important part of conservative treatment of frozen shoulder.

Brian Mulligan's mobilization with movement technique (MWM) is widely used to treat various musculoskeletal dysfunctions. MWM involves a sustained passive joint glide while the patient actively moves the joint (or motion segment) and the application of overpressure at the end of available range is necessary for lasting improvement. The aim of this study was to find the effect of mulligan mobilization with movement (MWM) technique on internal rotation range of motion of glenohumeral joint in patients with adhesive capsulitis. The objective of this study was (1) to asses change in internal rotation ROM of shoulder joint pre and post treatment in Control Group (stretching + strengthening) and (2) to asses change in internal rotation ROM of shoulder joint pre and post treatment in Experimental Group (stretching + strengthening + MWM).

Study Design: Experimental, Single blinded

Method: A total of 40 subjects were randomly allocated in two groups: Group 1 (Control Group) – conventional treatment was given, Group 2 (Experimental Group) – conventional treatment + mulligan was given. Post stretching ice was given in both the groups. Pre and Post internal rotation ROM was taken by other therapist.

Results: The results of this study indicates that the experimental group shows significant difference in internal rotation range of motion when compared with control group ($p = 0.00$)

Conclusion: This study shows that Mulligan technique is more effective when compared with that of stretching technique.

KEYWORDS: Adhesive Capsulitis; Mulligan MWM technique; Shoulder internal rotation ROM; stretching technique

INTRODUCTION

Adhesive capsulitis also called as “frozen shoulder” or “periarthritis” is characterized by the development of dense adhesion, capsular thickening, and capsular restriction. The onset is insidious and usually occurs between the ages of 40-60 years; there are two types of adhesive capsulitis (1) idiopathic i.e. is without a known cause and (2) adhesive capsulitis secondary to some underlying conditions like diabetes mellitus, trauma, immobilization, etc. The clinical entity follows a classic pattern of “freezing”, “frozen”, and “thawing”¹. Patients with adhesive capsulitis complain of night pain and difficulty in overhead

activities and hand behind back¹. Most of the patients show typical capsular pattern of shoulder joint i.e. external rotation, abduction and internal rotation. Common impairments seen in patient with adhesive capsulitis are disturbed sleep during acute flares; decrease joint play and ROM; protracted shoulders; decrease in arm swing during gait; muscle weakness and poor endurance in the glenohumeral muscles leading to pain in the trapezius and posterior cervical muscles; guarded shoulder motions with substitute scapular motions¹. Common functional limitation seen are inability to reach overhead, behind head, out of side and behind back; thus, having difficulty in dressing (such as putting on a jacket or coat or women fastening undergarments behind their back), reaching hand into back pocket of pants (to retrieve wallet), self-grooming such as (combing hair, brushing teeth, washing face); difficulty lifting weighted objects, such as dishes into a cupboard; limited ability to sustained repetitive activities¹. There is wide range of treatment existing for treatment of adhesive

For Correspondence:
Dr Sanket Nagrale (PT),
Sancheti Institute College of Physiotherapy, Thube Park,
Shivajinagar, Pune 411005.
Phone no- 02025539393
Fax No- 02025539494
Email id- doc.ashoshayam@gmail.com

capsulitis, which ranges from rest and analgesic, physical therapy, electrotherapy, arthroscopic/open surgery, injection, manipulation under anesthesia, corticosteroids, exercise , transcutaneous electrical nerve stimulation (TENS), deep heat and ice, whereas, no such treatment is being consider as standard treatment².

Physical therapy is the most important part of conservative treatment of frozen shoulder¹¹. Brian Mulligan's mobilization with movement technique (MWM) is widely used to treat various musculoskeletal dysfunctions¹⁰. The mulligan concept of MWM is a manual therapy technique which has been designed to address positional fault for restoration of normal arthrokinematic and osteokinematic motions. Mobilization with movement is the sustained repositioning of one articular surface on its partner with a movement or function³. The Mulligan concept of mobilizations with movement (MWM) is a specific therapeutic intervention designed to couple accessory mobilization with physiological motion³. MWM involves a sustained passive joint glide while the patient actively moves the joint (or motion segment) and the application of overpressure at the end of available range is necessary for lasting improvement. The direction of the applied force is perpendicular to the plane of movement or impaired action it is parallel to the treatment plane^{4,5}. It has been shown that Mulligan's technique can produce concurrent hypoalgesic effects during and following its application, as well as altering sympathetic nervous system function⁶. The purpose of this study was that, to date there were few studies done to check the efficiency of MWM for internal rotation of shoulder joint. It is seen that many patients by the time they come to physiotherapist for treatment they already have restriction in internal rotation range which is useful in day to day activity like taking hand behind back, wearing clothes, etc. Therefore there was need to find out that mulligan MWM is effective in improving internal rotation ROM in patient with adhesive capsulitis or not.

Null hypothesis: mulligan mobilization with movement technique is equally effective in improving internal rotation range of motion in patient with adhesive capsulitis. The aim of this study was to find the effect of mulligan mobilization with movement (MWM) technique on internal rotation range of motion of glenohumeral joint in patients with adhesive capsulitis. The objective of this study was – (1) To asses change in internal rotation ROM of shoulder joint pre and post treatment in Control Group (stretching + strengthening), (2) to asses change in internal rotation ROM of shoulder joint pre and post

treatment in Experimental Group(stretching + strengthening + MWM).

METHOD AND METHODOLOGY

A randomize control trial was performed on 40 subjects, with the age group of 40-70 years whose mean age in control group was 59.4 ± 4.78 and in experimental group was 58.75 ± 4.78 . It was seen that 40 patients were randomly allocated, out of which control group had 13 (65%) males and 7 (35%) females and in experimental group 12 (60%) were males and 8 (40%) were females. The study design was experimental, single blinded. The inclusion criteria was recently diagnosed patient with adhesive capsulitis due to diabetic and idiopathic cause, both males and females. The exclusion criteria was traumatic adhesive capsulitis, any medical condition that would exclude the patient from physiotherapy treatment and patient taking prior treatment.

STUDY PROCEDURE

The subjects were explained about the research and a written informed consent was taken.

Two groups (control and experimental) were formed by random allocation.

In control group only stretching (anterior capsule, posterior capsule and inferior capsule) and strengthening (scapular muscles- rhomboid, supraspinatus, infraspinatus, teres minor) was given. Post stretching cryotherapy was given. Pre and post reading were taken in both the groups by other therapist which is single blinded.

In experimental group stretching (anterior capsule, posterior capsule and inferior capsule); strengthening (scapular muscles- rhomboid, supraspinatus, infraspinatus, teres minor) and mulligan MWM for IR was given. Post stretching cryotherapy was given. For application of MWM therapist stands facing the patient. Therapist then places web of his one hand around patient's axilla and thumb of other hand in the bended elbow and the glide was applied to the head of humerus down in the glenoid fossa using thumb while stabilizing the scapula with other hand. Therapist ensures that the other hand is stabilizing up and inwards. While this distraction is taking place the patient internally rotated his shoulder with the help of other hand, at the same time his affected upper arm was abducted by therapist abdomen distracting the head of humerus laterally. The hand in axilla acts as a fulcrum. Mulligan MWM was applied for four days continuously by following the rule of 3 i.e. 1st day 3 glides , 2nd day 3 sets of six glides, 3rd day 3 sets of

10 glides was given and 4th day again 3 set of 10 was given.

Patient who failed to come for 4 days continuously were discontinued from the study.

RESULTS AND ANALYSIS

Descriptive statistic (Mean and Standard Deviation), Unpaired t test were used at $p = 0.05$ level of significance. Unpaired t test was used to compare mean differences between two groups.

TABLE 1: DESCRIPTIVE STATISTICS OF BOTH THE GROUPS

	Control group	Experimental group
Mean±SD	8.30 ± 2.00	17.90 ± 3.85
P value	0.00*	

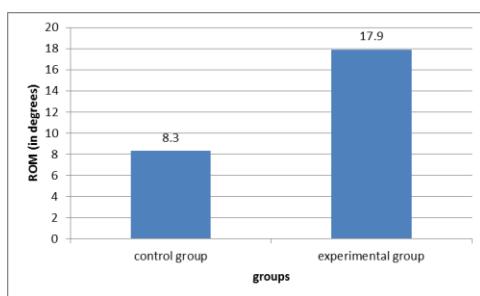


FIGURE 1: COMPARISON OF MEANS BETWEEN BOTH THE GROUPS (ROM)

DISCUSSION

This study was designed to know the efficacy of mulligan mobilization with movement technique in treatment of frozen shoulder for internal rotation ROM by comparing with stretching and strengthening technique. This study included 2 groups: (a) control group and (b) experimental group. The results of this study indicates that the experimental group shows significant difference in internal rotation range of motion when compared with control group ($p = 0.00$).

This study compared the effects of two treatment strategies; Mulligan's MWM technique and stretching exercises. Stretching exercise were taken in this study because Griggs et al have previously demonstrated that the patient with idiopathic adhesive capsulitis can be treated successfully with shoulder stretching programme^{7,9}. That is why in control group we have given patients stretching and strengthening exercise. The reason experimental group was given both Mulligan along with stretching and strengthening exercise, because mobilization with intense capsular stretching causes

tissue remodeling refers to a physical rearrangement of the connective tissue extracellular matrix (fibers, crosslinks, and ground substance) and collagenous tissues respond to increased tensile loading by increasing the synthesis of collagen and other extracellular components⁷.

Studies have shown that, mechanical force during mobilization may include breaking up of adhesions, realigning collagen, or increasing fiber glide when specific movements stress the specific parts of the capsule. Furthermore mobilization techniques are supposed to increase or maintain joint mobility by inducing biological changes in synovial fluid, enhanced exchange⁸. Studies have also shown that mulligan MWM technique stretches the tightened soft tissues and also improve the normal extensibility of the shoulder capsule and normalizes the abnormal scapulohumeral rhythm to induce beneficial effect¹². Mulligan technique was selected because it not only improves ROM it also has analgesic effect. In another study done by Doner et al says that Mulligan technique was compared with the stretching technique because stretching exercises are the mainstay of exercises in joint limitations; however, in contrast to Mulligan's technique they lack an analgesic effect. Two groups were formed, in which one group was given HCP, stretching and TENS and other group was given HCP, TENS and Mulligan for 3 months, were he successfully demonstrated that mulligan technique was better than conventional stretching technique⁷.

This study shows that Mulligan MWM along with stretching and strengthening exercises is more effective to that patient as compared to conventional stretching and strengthening exercises given to patient with adhesive capsulitis.

STUDY LIMITATION

- Intervention period was short.
- Patients with idiopathic and diabetic cause were not equal.

CONCLUSION

This study concludes that the Mulligan technique is more effective to the patient as compared to the conventional stretching and strengthening technique in the treatment of the adhesive capsulitis.

ACKNOWLEDGEMENT

We would like to thank Dr Parag Sancheti for his constant support. Also we extend our warm

gratitude to all the people who have participated in this project.

CLINICAL APPLICATION

Mulligan MWM technique can be incorporated as an integral part of treatment in patients with Adhesive Capsulitis along with stretching and strengthening exercises

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EFFECT OF DIFFERENT SCAPULAR POSITIONS ON ISOMETRIC SHOULDER ELEVATOR STRENGTH IN YOUNG NORMAL HEALTHY INDIVIDUALS

Shikha Jain¹, Suroshree Mitra², Rachana Dabaghav³, Nilima Bedekar⁴, Ashok Shyam⁵, Parag Sancheti⁶

1. *BPT, Sancheti Institute College of Physiotherapy.*
2. *Assistant Professor, Sancheti Institute College of Physiotherapy.*
3. *Lecturer and Research coordinator, Sancheti Institute College of Physiotherapy.*
4. *Principal, Sancheti Institute College of Physiotherapy.*
5. *M.S Ortho, Research officer, Sancheti Institute of Orthopaedic and Rehabilitation.*
6. *MS Ortho, Chairman, Sancheti Institute of Orthopaedic and Rehabilitation.*

ABSTRACT

Objective: To find effect of isometric shoulder elevator strength in three different scapular position (protraction, neutral, and retraction) with FET3 dynamometer.

Methodology: Sample of 500 were included in this study, with the mean age of 21 ± 2.08 ranging from 18-25 years, strength of shoulder elevator (upper trapezius) was tested in three positions with FET3 dynamometer in young healthy individuals with age group of 18 to 25 years. Participants were made to sit on a chair without arm rest with back erect, arm in neutral position and head flexed to contra-lateral side to be tested. 3 readings of 3 different scapular positions were noted and the mean of all 3 positions were calculated and the best was selected.

Results: The average of protraction was 6.99N, average of neutral was 7.73N, average of retraction was 5.87N. So amongst the 3 positions average of neutral position was maximum.

Conclusion: This study shows that neutral position has maximum isometric shoulder elevator strength as compared to other two positions

KEYWORDS: isometric shoulder elevator strength; 3 scapular position; FET3 dynamometer; length tension relationship

INTRODUCTION

The shoulder joint or glenohumeral joint is an incongruous ,ball and socket, triaxial joint with a lax capsule, supported by the tendons of the rotator cuff and the glenohumeral (superior, middle, inferior) and coracohumeral ligaments¹. Strength testing is one of the cornerstones of physical examination and an increase in strength is the aim of many rehabilitation programs². Various factors must be taken into account when testing muscles including test standardization, appropriate positioning, observation of how the patient performs the test and avoidance of pain or discomfort which may inhibit the participant from performing a maximal contraction³.

There are two methods of improving strength of the muscle namely static and dynamic: Static includes isometric muscle contraction whereas dynamic includes resistance with movement. But earlier studies state that isometric resistance training became popular as an alternative to dynamic resistance

For Correspondence:
Suroshree Mitra
Sancheti Institute College of Physiotherapy, Thube Park,
Shivajinagar, Pune 411005.
Email id- doc.ashoshym@gmail.com

exercise and initially was thought to be more effective and efficient method of muscle strengthening, which raised us to a question to check isometric shoulder elevators strength¹.

The rationale and indications for isometric strength are (1) to prevent or minimize muscle atrophy when joint movement is not possible owing to external immobilization (2) 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 (3) to develop static muscle strength at particular points in the ROM consistent with specific task related needs¹.

Isometric shoulder elevator strength is needed in daily activities and so we are checking, mainly the trapezius, it is a flat triangular muscle⁴. The right and left trapezius muscles form a shape that looks like a trapezium, hence the name trapezius. The trapezius muscle is a strong elevator of the shoulder and it turns and elevates the shoulder, simultaneously⁴.

This isometric shoulder strength was measured with Hogaan micro FET3 dynamometer. The wireless micro FET3 muscle testing dynamometer is an accurate, portable force evaluation testing (FET) device. It is designed specifically for taking accurate, objective muscle testing and range of motion

measurements. The microFET3 is the latest development in the field of diagnostic medicine and provides fast and reliable results. The isokinetic machine is considered the gold standard in muscle testing with validity and reliability well documented. Dynamometers offer an alternative to the isokinetic machine as they are a portable, time-efficient and relatively inexpensive method of measuring isometric contractions and have also been shown to be valid and reliable when compared to the isokinetic machine. Also, with the publication of normative Data, HHDs offer a simple alternative in clinical practice and provide a more quantitative objective measure than MMT⁵⁻⁷.

As shoulder injuries are very common, shoulder rehabilitation is practiced on a large scale so which shoulder position to be maintained to gain maximum strength as early as possible during rehabilitation, and hence this study compares all the three positions and finds which position has maximum strength.

METHODOLOGY

In this cross sectional, observational type of study 500 participants were included with 255 males and 245 females with mean age of 21 with SD+2.08 ranging in the age group of 18 to 25 years. Purposive sampling was done with the help of micro FET3 dynamometer. The inclusion criteria was young healthy individuals, both males and females in age group of 18 to 25 years. The exclusion criteria was participants having history of fracture or any trauma to shoulder and neck, participants having congenital deformity or any neurological disorder.

Isometric shoulder elevator strength was measured with micro FET3 dynamometer. Before starting the procedure written informed consent was taken then participants were explained about the procedure and a demo was given they were made to sit on a chair without arm rest with back erect, arm in neutral position and head flexed to contra-lateral side to be tested. Lateral flexion of neck was chosen because study done by Dale Edgar, Gwendolen Jull and Susan Sutton state that the tests for the movement and the length of the upper trapezius muscle and neural tissue of the upper quadrant share common components. These are shoulder girdle depression and cervical contra-lateral lateral flexion which maintains the upper trapezius length⁸.

Therapist was standing in front of the participants with one hand on the shoulder and the other hand holding FET3 dynamometer on the bulk of the muscle to be tested (upper trapezius). Different scapular positions (protraction, neutral, retraction) were tested. Participants were asked to elevate the

shoulder in the above mentioned positions while the therapist was resisting the elevation. 3 readings of 3 different scapular positions were noted and the mean of all 3 positions were calculated and the highest was selected. Subjects having any discomfort or pain during the procedure were discontinued from the study.

RESULTS

Sample of 500 were included in this study, with the mean age of 21 ranging from 18-25 years. The average of all three was calculated, average of protraction was 6.99N, average of neutral was 7.73N, average of retraction was 5.87N. So amongst the 3 positions average of neutral position was maximum.

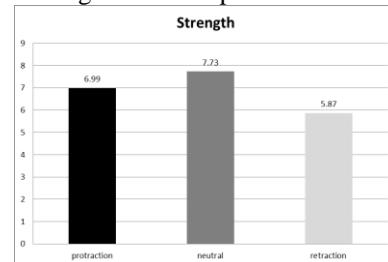


FIGURE 1: MEAN VALUES OF ALL 3 POSITIONS IN MALES AND FEMALES

DISCUSSION

In the previous study done by Smith J, Kotajarvi BR et al. on effect of scapular protraction and retraction on isometric shoulder elevation strength measured in sagittal plane with manual muscle testing concludes that strength is significantly reduced in protraction and retraction position as compared to neutral⁹. Another study done by Paul A. Matthews and Martin Scott on altering scapular position reduces isometric shoulder strength concludes that self-selected neutral position is stronger than protraction, retraction, posterior tilt¹⁰. Another study done by on isometric strength reference values in physically active collegiate males and females with hand held dynamometer concludes that strength is significantly reduced in dominant and non-dominant side for internal rotation, abduction and prone flexion¹¹.

As the above studies were done with manual muscle testing and hand held dynamometer this study aimed to find the effect of isometric shoulder elevators strength in three different scapular positions (protraction, neutral, and retraction) and to find in which scapular position the strength was maximum. Five hundred young healthy subjects of the age group 18-25 years were included in the study. Subjects fulfilling the above mentioned inclusion criteria were

recruited. Then the mean of all 3 positions were calculated and the highest reading was noted. Out of the 3 scapular positions “neutral” position had maximum strength. Cynthia C Norkin and Pamela K. Levangie state that neutral position is the best because of isometric “length-tension relationship” which means direct relationship between isometric tension development in a muscle fiber and the length of the sarcomeres in a muscle fiber. Muscle fibers develop maximal isometric tension at optimal sarcomere length because the thick and thin filaments are positioned so that the maximum number of cross-bridges within the sarcomere can be formed. If the muscle fiber is lengthened or shortened beyond optimal length, the amount of active tension that the muscle fiber is able to generate when stimulated decreases. Hence, isometric tension decreases as the muscle is lengthened because fewer cross-bridges are able to be formed and tension decreases as the muscle is shortened because of interdigitation of the thin filaments¹. So in neutral position the length of upper trapezius is maintained. Hence, neutral position should be advised during the rehabilitation of shoulder patients and for postural corrections.

CONCLUSION

This study shows that neutral position has maximum isometric shoulder elevator strength as compared to other two positions.

ACKNOWLEDGEMENT

I take this opportunity to thank our principal Dr. Mrs. Nilima Bedekar for her support.

I would also like to thank Dr. Suroshree Mitra (PT), my guide for her valuable guidance and constant encouragement which have motivated me to accomplish this project successfully. I also extend my sincere thanks and appreciation to Dr. Rachna Dabaghav (PT), for her valuable expertise that she shared during statistical analysis. I would also like to thank my colleague Shruti Patel and my other colleagues for their constant support throughout the project.

Lastly, I extend my warm gratitude to all the subjects who have participated in this project.

CLINICAL APPLICATION

Neutral position can be used for shoulder rehabilitation patients.

Isometric strengthening of shoulder musculature is beneficial in shoulder injury patients.

SCOPE OF FURTHER STUDY

Along with strength range of motion could also be compared.

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TO STUDY EFFECT OF PAIN AND STIFFNESS ON QUALITY OF LIFE IN PATIENTS WITH RHEUMATOID ARTHRITIS

Tanvi Deodhar¹, Savita Rairikar², Rachana Dabadghav³, Nilima Bedekar⁴, Ashok Shyam⁵, Parag Sancheti⁶

1. *BPTH, Sancheti Institute College of Physiotherapy*
2. *Professor And Director, Sancheti Institute College of Physiotherapy*
3. *Lecturer and research coordinator, Sancheti Institute College of Physiotherapy*
4. *Professor and principal, Sancheti Institute College of Physiotherapy*
5. *MS Ortho, Research Officer, Sancheti Institute Orthopedics And Rehabilitation*
6. *MS Ortho, Chairman of Sancheti Institute Orthopedics and Rehabilitation*

ABSTRACT

Objective: To investigate relationship between pain, stiffness and quality of life in RA patients.

Methodology: 200 patients of rheumatoid arthritis between age group of 20-65 were included in this study. Inclusion criteria was patients with minimum 3 joints involvement and both males and females were included. Exclusion criteria was patients with any other inflammatory arthropathy. Health assessment quality of life questionnaire was given to these population, procedure were explained to the patients consent was taken and results were obtained.

Result: walking .It has showed correlation with neurological components as well.

Conclusion: There is effect of pain on quality of life in patients with RA but there is no effect of stiffness on the same component.

KEYWORDS: pain; stiffness; rheumatoid arthritis

INTRODUCTION

Rheumatoid arthritis is a chronic non-inflammation of the synovial joints. The exact etiology is not known. Some factors like genetic predisposition, agents such as mycoplasma, clostridium and some viruses have been implicated in its etiology. It mainly affects small joints of the hand. It can be painful and disabling situation. Pain and stiffness in multiple joints particularly in the morning mark the beginning of the disease. Arthritis of the joints involves inflammation of the synovial membrane. Joints become swollen, tender and warm, and stiffness limits their movement. With time multiple joints are affected. Most commonly affected joins are small joints of the hand, feet and cervical spine. But large joints like shoulder and knee can also be involved. Synovitis can lead to tethering of tissues with loss of movement and erosion of the joint surface causing deformity and loss of function¹.

Pain, stiffness, fatigue, and physical disability are common features of Rheumatoid Arthritis. These problems and the way patients cope with them, can affect their quality of life. Rheumatoid Arthritis is traditionally considered to be a disease with a major impact on all aspects of Quality Of Life. Most

important effect of Rheumatoid arthritis for patients are persistent pain and loss of function attributable to the combined effect of continuing synovitis and progressive joint damage².

METHODOLOGY

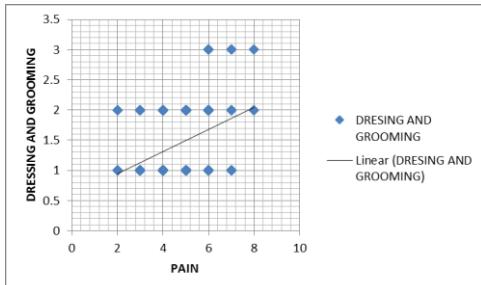
Aim of my study was to study effect of pain and stiffness on quality of life in patients with rheumatoid arthritis. Objective was to investigate relationship between pain, stiffness, and chronicity of the disease with these population. 200 Patients with rheumatoid arthritis both males and females between age of 20-65 (± 12.27) were taken which are diagnosed clinically and with diagnostic tests. Patients were selected with minimum 3 joint involvement and diagnosed with rheumatoid arthritis for at least 5 years. Patients were selected using convenient sampling technique. Population of these patients were selected from tertiary hospital centers. Patients with any other inflammatory arthropathy were excluded from the study. Type of study was descriptive analysis. Health assessment quality of life questionnaire for rheumatoid arthritis was given to these patients .This questionnaire includes various factors including dressing-rooming, getting off the bed, walking on uneven surface, stair climbing, bathing, gripping activities. It also includes involvement of various systems of the body like musculoskeletal, respiratory, gastrointestinal, skin, neurological. They were explained about this study.

For Correspondence:
Savita Rairikar,
Sancheti Institute College of Physiotherapy,
Thube Park, Shivajinagar, Pune 411005.
Email id- doc.ashoshym@gmail.com

Questions in the questionnaire were explained properly Consent was taken and results were obtained.

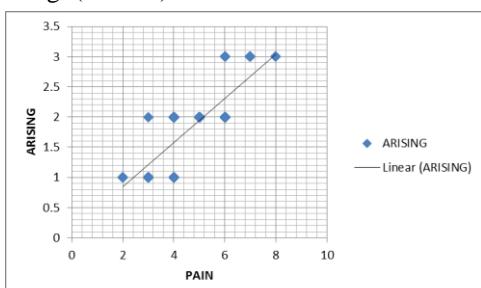
RESULTS AND GRAPHS

Data was analyzed using Spearman's Correlation test.



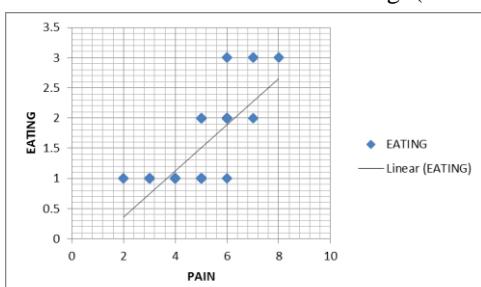
GRAPH 1: CORRELATION OF DRESSING AND GROOMING WITH PAIN

Pain shows direct correlation with dressing and grooming. ($r=0.39$)



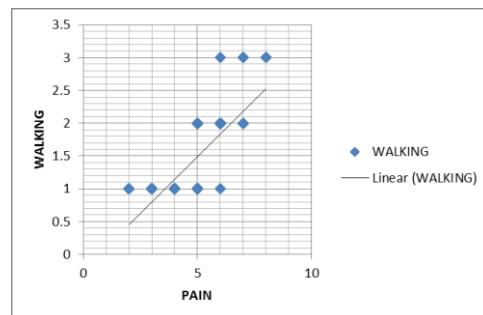
GRAPH 2: CORRELATION OF ARISING WITH PAIN

Pain shows direct correlation with arising. ($r=0.79$)



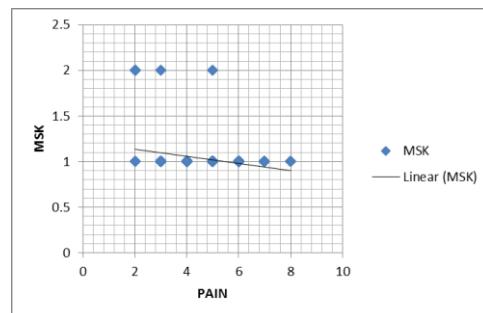
GRAPH 3: CORRELATION OF EATING WITH PAIN

Pain shows direct correlation with eating. ($r=0.77$)



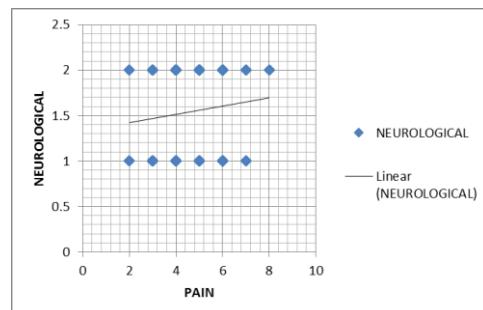
GRAPH 4: CORRELATION OF WALKING WITH PAIN

Pain shows direct correlation with walking. ($r=0.78$)



GRAPH 5: CORRELATION OF MUSCULOSKELETAL WITH PAIN

Pain shows negative weak correlation with musculoskeletal components. ($r=-0.10$)



GRAPH 6: CORRELATION OF NEUROLOGICAL WITH PAIN

Pain shows direct correlation with neurological components. ($r=0.10$)

DISCUSSION

Quality of life is the quality of an individual's daily life which includes physical, emotional, social aspects. Rheumatoid arthritis is a disease which affects above aspects due to its chronic course and progression of the disease process mainly due to pain

and stiffness. In this study components of pain and stiffness were compared with different components in health assessment quality of life questionnaire. They were dressing grooming, arising, dressing, grooming, walking, hygiene, reach, grip, systemic involvement. Study done by Sarah Philips and Lara Dow on impact of morning function and quality of life found out that impaired morning function adversely affects daily activities, quality of life and work, which increases significantly with severity of morning stiffness⁷. But in my study components of dressing grooming, arising, eating, walking, hygiene, reach grip doesn't show significant correlation with stiffness. The reason for this could be the degree of stiffness, duration of stiffness and individuals daily activity demands. Hence according to above study stiffness is not the major contributing factor of impaired quality of life in these population. Components of dressing, grooming, arising, eating, walking showed positive correlation with pain. As pain was increasing difficulty in performing above task increased. Studies done by Lame IE, Peters ML, Vlaeyen JW, Kleef Mv, patijn J on relation of pain and quality of life found out that pain has showed significant affection on quality of life⁶. The previous studies showed that RA is associated with higher disease burden, reflected on pain, impact on global health, and functional and working status, as well as the physical and emotional dimensions⁴. Studies done by Steven J. Linton and William S.Shaw on impact of psychological factors and pain showed that pain has clear behavioral and emotional consequences that influence the development of persistent problems⁸. In this study pain showed direct effect on neurological components like depression, sadness etc. ($r=.102$) Some studies performed on depression and health related quality of life in patients with rheumatoid arthritis stated that depression is one of the important aspect which affects QOL in RA patients⁵. In this study other systems like involvement of GIT, respiratory system, skin did not show significant correlation with pain and stiffness.

CONCLUSION

There is effect of pain on quality of life in patients with RA but there is no effect of stiffness on the same component.

ACKNOWLEDGEMENT

We extend our warm gratitude to all the people who have participated in this project.

CLINICAL APPLICATION

This study is showing significant correlation of pain with activities of daily living. Hence pain management is the mainstay for treatment in patients with RA.

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INTERRATER AND INTRARATER RELIABILITY OF PRESSURE BIOFEEDBACK UNIT IN MEASUREMENT OF TRANSVERSES ABDOMINIS ACTIVITY

Sheshna Rathod¹, Neeta Vyas²

1. Tutor cum Physiotherapist, Government Physiotherapy College, Jamnagar.
2. Principal, SBB College of Physiotherapy, VS General Hospital, Ahmedabad.

ABSTRACT

Background – The Pressure Biofeedback Unit (PBU) is a device designed to teach and measure Transverses abdominis muscle function. The device has a role in providing biofeedback to assist in the instruction of correct Transverses abdominis muscle contraction. **Methodology –** 40 healthy subjects were selected for study. The abdominal draw in test was performed with the subject in a prone lying position, and the Pressure Biofeedback Unit (Chattanooga Stabilizer) was utilized to evaluate the ability of the subject to perform this abdominal isolation test. For intrarater reliability, the examiner carried out the test twice at the interval of 2 days. For interrater reliability, 2 examiners did the test one after the other on the same day. **Results –** Intraclass Correlation Coefficient (ICC) were calculated to determine interrater and intrarater reliability. ICC value for inter-rater reliability is 0.89 with 95% confidence interval (0.70-0.94). ICC value for intra-rater reliability is 0.87 with 95% confidence interval (0.77 – 0.93). **Conclusion -** Pressure Biofeedback unit shows good to excellent inter-rater and intra-rater reliability.

KEYWORDS: Low back pain; Pressure biofeedback; Transverses abdominis; Reliability

INTRODUCTION

Strength of Transverses abdominis muscle contraction is important in stabilizing the low back and contraction of this muscle is one factor capable of preventing and reducing low back pain¹. There are various tools to provide feedback about local low back muscle recruitment and to measure a person's ability to contract the transverses abdominis muscle. These have included ultrasound, electromyography and pressure biofeedback units. Surface EMG is a non-invasive method, but it is limited in its ability to detect fine activities of the deeply located Transverses Abdominis. Fine-wire EMG can be used to observe the fine activities, but this is an invasive method. On the other hand, Real time ultrasound imaging is a non-invasive method that enables observation of the fine activities, but it is expensive. In contrast, a Pressure Biofeedback Unit is a non-invasive method that is more economical than either of these other feedback tools, and it can be easily used anywhere since it is portable.

The pressure biofeedback unit (PBU) is a device designed to teach and measure Transverses abdominis muscle function. The device has a role in

providing biofeedback to assist in the instruction of correct Transverses abdominis muscle contraction¹. Pressure biofeedback units consist of a combined inflation bulb connected to a pressure cell. Pressure biofeedback units have been used to indicate correct contraction of the Transverses abdominis muscle during abdominal hollowing in a prone position, referred to as the 'PRONE test'. A change in pressure in the inflation bulb indicates contraction or relaxation of the muscles. This test is used clinically both for the assessment of deep local trunk muscles and as an aid in the re-education of stabilisation². By providing visual feedback, the PRONE test may enhance patients' insight into their deep abdominal muscle recruitment and thereby increase their motivation to exercise. The pressure biofeedback unit (PBU) could be considered as an alternate approach to indirectly measure Transverses Abdominis muscle activity.

The reproducibility of Pressure Biofeedback Unit in measuring Transverses Abdominis muscle activity in patients with chronic nonspecific low back pain ranged from satisfactory to excellent³. Moseley described test-retest reliability with an intra-class correlation coefficient (ICC) of 0.91 [95% confidence interval (CI) 0.71 to 0.99]⁴ and Costa et al. reported a test-retest ICC of 0.58 (95% CI 0.28 to 0.78)⁵. Crains M suggested that the pressure biofeedback unit may be considered as a useful tool to act as an indicator of deep abdominal function⁶.

For Correspondence:
Sheshna Rathod,
Govt Physiotherapy College, Jamnagar
In Old T B Hospital Building, Near Dental College
Rameshwarnagar, Jamnagar
Email id- sheshnarathod@yahoo.com

AIMS AND OBJECTIVES

- To know the Interrater Reliability of Pressure Biofeedback Unit in measurement of transverses abdominis activity
- To know the Intrarater Reliability of Pressure Biofeedback Unit in measurement of transverses abdominis activity

METHODOLOGY

- Study design – Inter-rater and Intra-rater reliability (Correlational)
- Sample size – 40 subjects
- Sampling – Random sampling
- Nature of subject – Subjects with age group between 19-22 were taken
- Inclusion criteria:
 - Subjects between 19-22 years of age.
 - Both male and female subjects
- Exclusion criteria:
 - Low back pain - subjects who has missed work due to back pain in preceding six months
 - Lumbar spine surgery
 - Pregnancy
 - Severe kyphosis or scoliosis
 - Spinal stenosis
 - Neurological disease
 - Cancer
 - Trauma to the lumbar spine
 - Nerve root entrapment
- Materials –
 - Pressure Biofeedback Unit

PROCEDURE

As per the inclusion criteria, 40 healthy subjects were selected for study. Familiarization with the technique of test performance was done. The examiners used the palpation criteria to check if the participants were performing the abdominal hollowing technique correctly. The observer placed both hands in the recommended position to detect appropriate muscle contraction, medially and inferiorly to the anterior superior iliac spines. The abdominal draw in test was performed with the subject in a prone lying position, and the Pressure Biofeedback Unit (Chattanooga Stabilizer) was utilized to evaluate the ability of the subject to perform this abdominal isolation test. The Pressure Biofeedback Unit was placed under the abdomen with the navel in the centre and the distal edge of the pad in line with the right and left anterior superior iliac spines. The Pressure Biofeedback Unit was

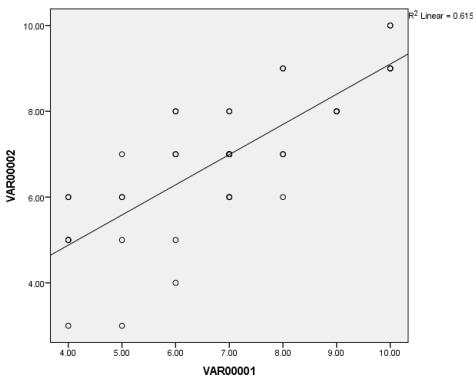
then inflated to 70 mmHg and allowed to stabilize. The instructions are given to breathe in and out and then, without breathing in, to slowly draw in the abdomen so that it lifts up off the pad, keeping the spinal position steady. Deep inspiration is to be avoided. During this test, the researcher closely monitors the pressure gauge of the Pressure Biofeedback Unit and monitors the subject to detect whether any compensatory mechanisms are employed, this included movements of the pelvis and spine, breathe holding and rib elevation. Then pressure change was noted. The same procedure was repeated for three times and pressure changes noted and the average of the three repetitions was used for analysis. After each contraction, there was an interval of 20 seconds for the participant to rest.

For intrarater reliability, the examiner carried out the test twice at the interval of 2 days. For interrater reliability, 2 examiners did the test one after the other on the same day. Following a period of instruction in the abdominal drawing-in test each subject was assessed in a randomised order during first visit by both the examiners. Both examiners and subjects were blind to the result of previous attempts.

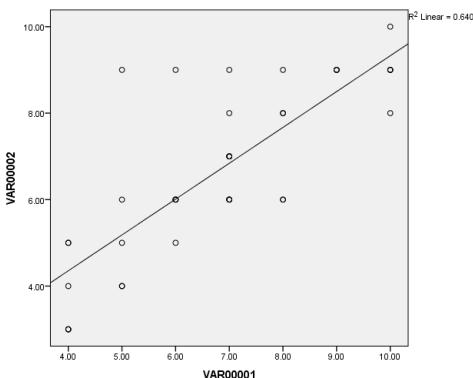
On the first test day, Examiner A measured the first set. Subsequently, the participant had a 5 minute break and was able to get up from the plinth and walk around the test room before Examiner B measured the second set. To reduce order effect, the observer sequence was randomised in advance. On the second test day (i.e. after 2 days), test sets were undertaken by Examiner A. On both test days, the participants were explicitly asked not to practice the abdominal hollowing technique beyond the tests.

RESULTS

Intraclass Correlation Coefficient (ICC) were calculated to determine interrater and intrarater reliability. ICC value for inter-rater reliability is 0.89 with 95% confidence interval (0.70-0.94). ICC value for intra-rater reliability is 0.87 with 95% confidence interval (0.77 – 0.93).



GRAPH 1:- INTRA-RATER RELIABILITY FOR PRESSURE BIOFEEDBACK UNIT IN MEASUREMENT OF TRANSVERSES ABDOMINIS ACTIVITY



GRAPH 2:- INTER-RATER RELIABILITY FOR PRESSURE BIOFEEDBACK UNIT IN MEASUREMENT OF TRANSVERSES ABDOMINIS ACTIVITY

DISCUSSION

This study found good interrater and intrarater reliability for the pressure biofeedback unit for measurement of strength of transverses abdominis. Here in the study we had considered a positive result to be when pressure reduction is of approximately 4 to 10mmHg over 10 seconds. In our study ICC value for inter-rater reliability is 0.89 with 95% confidence interval (0.70-0.94). ICC value for intra-rater reliability is 0.87 with 95% confidence interval (0.77 – 0.93).

The pressure biofeedback unit was found to meet the need for quantification of the abdominal draw in action⁷. Mills *et al.* state that lumbopelvic instability is defined as a deviation of the lumbar spine and pelvis from an arbitrarily defined neutral position, and is demonstrated by a change in cuff pressure, which is indicated on the Pressure Biofeedback Unit⁸. As the Transverses abdominis

produces narrowing of the abdominal wall, measurement of the amount of movement of the abdomen that is produced provides a method of identifying a patient's ability to perform the contraction⁷. The principle of using the Pressure Biofeedback Unit was that when the unit was placed under the abdomen, initially it conformed to the patient's shape. As the patient drew in the stomach off the pad, the pressure in the pad was indicated as reduced on the pressure dial⁷. The pressure reduction was proportional to the degree to which the subjects could elevate the abdominal wall.

Our study is in agreement with the study done by Moseley found testing strategy to be reliable (intratester ICC (95% CI) = 0.91 (0.71–0.99))⁴. Azevedo *et al* stated that trained examiners can reliably perform PBU measures for patients with chronic Low Back Pain though the patients were assessed during 6 lower limb movement tests based on Movement System Impairment classification using a Pressure Biofeedback Unit⁹. A study by Crains M indicates that a difference exists in the deep abdominal function of patients with and without low back pain. Additionally it is suggested that the pressure biofeedback unit may be considered as a useful tool to act as an indicator of deep abdominal function⁶.

The Pressure Biofeedback Unit is a reliable tool when utilised with a population of subjects that can perform the abdominal drawing-in test. Intra reliability for the three raters at the first visit were 0.589, 0.784, and 0.869 respectively. Inter tester reliability was .788, with test re -test reliability 0.766¹⁰.

However, the results did not agree with those of Storheim *et al.* reported low test-retest reliability in a study of trained physiotherapy students without a history of back pain. They concluded that the device would not be sufficiently reproducible for use 'in training of healthy people, nor in low-back-pain research as an outcome measurement or for purposes of diagnosis or patient classification'. The results cannot be compared with those of the present study due to inconsistencies in the criteria used to define the positive and negative results of the PRONE test. Storheim registered the maximum pressure reduction for at least 2 seconds within a period of at least 8 to 10 seconds¹. Grooms *et al* showed Pressure Biofeedback Unit was not the indicator of Transverses Abdominis and it is not in agreement with our study. The possible reason would be as they used supine lying position and they performed the test on patients with LBP¹¹. Most participants were unable to achieve positive test results for the complete criterion. This is in line with previous research, which found that people with a

history of low back pain had difficulty with correct execution of abdominal hollowing. von Garnier et al studied on Reliability of a test measuring Transverses abdominis muscle recruitment with a pressure biofeedback unit study found an intra-class correlation coefficient (ICC) of 0.47 [95% confidence interval (CI) 0.20 to 0.67] for inter-observer reliability, and an ICC of 0.81 (95% CI 0.67 to 0.90) for test-retest reliability. Subjects included were having at least one episode on low back pain. For this subject group, the PRONE test had relatively low inter-observer reliability but, as may be expected, higher test-retest reliability. Poor reliability of a test may be due to systematic differences in the observers' case definitions, the observers' ability to carry out the test or attitude towards the participants, or other factors².

CONCLUSION

Pressure Biofeedback unit shows good to excellent inter-rater and intra-rater reliability.

CLINICAL APPLICATION

Pressure Biofeedback unit can be used for measuring strength of Transverses Abdominis in clinical practice.

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