"A RANDOMIZED CONTROLLED STUDY ON EFFICACY OF HOME–BASED YOGA THERAPY VERSUS CONVENTIONAL CONSERVATIVE THERAPY IN CHRONIC LOW BACK PAIN"

BY

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DISSERTATION SUBMITTED TO SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH, KOLAR, KARNATAKA

In partial fulfilment of the requirements for the degree of

MASTER OF SURGERY
IN
ORTHOPAEDICS

Under the Guidance of

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A RANDOMIZED CONTROLLED STUDY ON EFFICACY OF HOME-BASED YOGA THERAPY VERSUS CONVENTIONAL CONSERVATIVE THERAPY IN CHRONIC LOW BACK PAIN

ABSTRACT

Introduction

Chronic low back pain implies to the low back, lumbosacral as well as sacroiliac pain longer than 3 months. Many studies have described about the beneficial effect of both Yoga therapy and Muscle Strengthening exercise in reducing the outcomes of Chronic Low back pain.

Objective

To estimate pain using the Visual Analog Scale and disability using the Modified Oswestry Disability Scale and to compare the efficacy of home-based yoga therapy and conventional conservative therapy among the patients diagnosed with chronic low back pain.

Materials and Methods

A Randomized controlled Trial was among 140 patients presented with Chronic low back pain to RLJ hospital attached to Sri Devaraj Urs Academy of Higher Education and Research Tamaka, Kolar from November 2018 to October 2020. The participants were randomized into two groups by online random generator software. Group A received Yoga therapy both in morning and evening for at least 30 minutes for 3 months with Hot fomentation - morning and night (twice daily) and Tablet Paracetamol 650 mg if patient complained of pain. Group B received back strengthening exercises 15 minutes 4 times a day for 3 months with Hot fomentation - morning and night (twice daily) and Tablet Paracetamol 650mg if patient complained of pain. Patient in both the groups were followed up at 2nd and 6th and 12th week following intervention.

Results

The mean age of the participants was 40.66 ± 8.33 in the study. About 57% of the samples were female and 43% were male. The Chronic Low Back pain in both the yoga therapy group and Back Strengthening exercise group was not associated with the age, gender and return to work but association was seen with occupation.

The pain relief was improved with Yoga therapy at 2nd week (22.6%), 6th week (47%), and 12th week (72.9%) when compared to baseline. The pain relief was improved with back strengthening exercises at 2nd week (15%), 6th week (25%) and 12th week (37.9%) when compared to baseline. The functional disability was improved with Yoga therapy at 2nd week (26%), 6th week (51.75%), and 12th week (69.50%) when compared to baseline. The functional disability was improved with back strengthening exercises at 2nd week (20%), 6th week (33.7%), and 12th week (54.5%) when compared to baseline. The superiority of Yoga therapy was observed at all levels of assessment and also before and after comparison was made to evaluate the advantage of both interventions concerning the duration of therapies.

Conclusion

Yoga therapy was better than back strengthening exercises when supplemented with hot fomentation and paracetamol tablets in the control of Chronic Low Back Pain.

Keywords: Yoga therapy, Back Strengthening exercise, Chronic Low Back Pain, functional disability, the Visual Analog Scale, Modified Oswestry Disability Scale

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ABBREVIATION

CLBP – Chronic Low Back Pain

LBP – Low Back Pain

CAM - Complementary and Alternative Medicine

RLJ - RL Jalappa Hospital

TrA - Transversus Abdominis

MODS - Modified Oswestry Disability Scale

VAS - Visual Analog Scale

NSAID - Non-Steroidal Anti-Inflammatory Drug

DALY - Disability Adjusted Life Years

HIV - Human Immunodeficiency Virus

COPD - Chronic Obstructive Pulmonary Disease

WHO - World Health Organization

IHME - Institute of Health Metrics and Evaluation

IAYT - Integrated Approach of Yoga Therapy

MODQ - Modified Oswestry Disability Questionnaire

RCT - Randomized Controlled Trial

PT - Physical Therapy

ESR - Erythrocyte Sedimentation Rate

SPSS - Software Package for Social Sciences

SD - Standard Deviation

SES - Socio Economic Status

RM ANOVA - Repeated measures Analysis of Variance

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INTRODUCTION

INTRODUCTION

Chronic low back pain implies to the low back, lumbosacral as well as sacroiliac pain longer than 3 months which is occasionally associated with radiation pain in the lower limbs, and ill-defined lower back pain is pain not ascribed to an identifiable pathology.[1]

Low back pain is a widespread as well as expensive health enigma; almost 51 to 84 % of adults are affected by this condition occasionally in their life-time[2,3], expenses ascribed to spinal complications were $2580 per person. The prevalence rate of Chronic low back pain was 42%.[4] Additionally, CLBP was found to be associated with augmented psychological distress[5], amplified disability, besides decreased health-related quality of life[6,7]. Low back pain was spotted by the Pan American Health Organization as among the top three occupational diseases[8]. The multifaceted character of the CLBP necessitates the multidimensional method to management.[9]

In the current decade yoga has developed as one of the proven Complementary and Alternative Medicine in Chronic low back pains, which is broadly applied across the world. Yoga is considered as mind-body workout occasionally used for ill-defined low back pain[10]. For experts as well as patients managing CLBP, there is a necessity to distinguish whether effective yoga exercises compared to other therapies like usual medical care, workouts, established physical therapy.

Diverse schools of yoga have variable extents of physical, breathing, as well as mind activities implemented through mixed practices. Most of these experiments found a diverse range of positive values on Chronic Low Back Pain. Literature review

shows that, Viniyoga, Hatha yoga, Iyengar yoga, as well as Integrated yoga are the most frequently employed forms to manage CLBP[11–13]. Stress linked chronic LBP appears to be more suitable suggestion for yoga treatment as hefty number of sources strengthens the same.[14]

Unluckily, former analyses have specified lesser amount of evidence pertaining to the results of yoga on CLBP patients when related with non-exercise.[15] Yoga offered better enhancement in pain diminution as well as augmentation in the quality of life in CLBP patients than conventional exercise settings.[16,17] Though, not many authors inferred that yoga therapy bestowed comparable improvement compared with physical treatment in patients with CLBP. [18–20]

In evaluation of yoga for CLBP, they were unsure whether yoga provided any benefits over conventional exercise programs.[21,22]It was indefinite if there was somewhat difference between yoga as well as other exercises for back allied function or pain, and the experiment offered inadequate support on determines of quality life owing to deficient studies for assessing effect sizes.[10]

One significant determinant for CLBP is fragility of superficial trunk in addition to abdominal muscles[23–27] and reinforcement of these muscles is often related with substantial developments of CLBP, besides with reduced functional disability[28–33]. Additional independent determinants for CLBP is the fragility along with absence of motor control of deep trunk muscles, e.g. the lumbar multifidus as well as transversus abdominis (TrA) muscles.[34] It was concluded that the TrA had inadequate control as well as speed of muscle contraction deferred in individuals with CLBP.[35,36]

Kinesio-therapeutic protocols delivering both the superficial as well as the deep muscles appear to be useful in the management of CLBP.[37,38] The majority clinical practices pool diverse exercises as well as techniques, making it tough to segregate the effectiveness of detailed strategies.[28,29] This is of great clinical value and desires to be added illuminated through explorative studies.

Present literature review suggests that there is a lacunae in literature comparing home based yoga therapy with back strengthening exercise,with this background knowledge the current randomized controlled study was undertaken to compare the efficacy of home-based yoga therapy and conventional conservative therapy using a visual analog scale for pain and disability using a modified oswestry disability scale among the patients diagnosed with chronic low back pain.

AIM & OBJECTIVES

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AIM

To compare the efficacy of home-based yoga therapy and conventional conservative therapy on pain and disability among the patients diagnosed with chronic low back pain.

OBJECTIVES

1. To estimate pain using the Visual Analog Scale and disability using the Modified Oswestry Disability Scale among the clinico-radiologically diagnosed patients with chronic low back pain.
2. To assess the efficacy of home-based yoga therapy as an adjuvant to hot fomentation and non-steroidal anti-inflammatory drug among the patients diagnosed with chronic low back pain.
3. To assess the efficacy of conventional conservative therapy which includes back strengthening exercises as an adjuvant to hot fomentation, and non-steroidal anti-inflammatory drug among the patients diagnosed with chronic low back pain.
4. To compare the efficacy of home-based yoga therapy and conventional conservative therapy using a visual analog scale for pain and disability using a modified Oswestry disability scale among the patients diagnosed with chronic low back pain.

RESEARCH QUESTION

Whether the home-based yoga therapy combined with hot fomentation and NSAID is an effective therapy in controlling pain and reduce the disability among the patients diagnosed with chronic low back pain when compared to conventional conservative therapy which includes back strengthening exercises, hot fomentation and NSAID ?

NULL HYPOTHESIS

Home-based yoga therapy combined with hot fomentation and NSAID is less effective in controlling pain and reduce the disability among the patients diagnosed with chronic low back pain when compared to conventional conservative therapy which includes back strengthening exercises, hot fomentation and NSAID.

ALTERNATE HYPOTHESIS

Home-based yoga therapy combined with hot fomentation and NSAID is more effective in controlling pain and reducing the disability among the patients diagnosed with chronic low back pain when compared to conventional conservative therapy which includes back strengthening exercises, hot fomentation, and NSAID.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Introduction

Low back pain is the most frequent health dilemma and concerns all sorts of people, though, its incumbrance is frequently deemed insignificant. LBP ensues in comparable magnitudes in all societies, intervenes with quality of life as well as work functioning, and is documented as the most familiar cause for medical talks. A smaller number of cases are attributable to definite causes; the maximum number of cases are ill-defined causes.

Given the Global Burden of Disease Study in 2010, the Professional Group exhibited that LBP is amongst the leading ten distinguished burden diseases along with grievances, with a mean number of DALYs greater than HIV, road traffic accidents, carcinoma lung, TB, COPD besides preterm birth complications.[39]

Conventional symptoms suffered by people with CLBP

Low back pain is well-defined as pain as well as distress inferior to the costal margin and overhead the inferior gluteal folds, with or short of referred leg ache. It may be felt as aching, scorching, piercing, strident or dull, distinct, or indefinite with strength varying from mild to severe. The pain may commence abruptly or develop gradually.

Non-specific low back pain is well-defined as LBP which is not ascribed to identifiable, well-known definite pathology (e.g. infection, tumor, osteoporosis, fracture, inflammatory process, etc). This contextual paper does not deal with explicit as well as attributable LBP that fall out from trauma, infections, neoplasms, besides other mechanical disorders for itself sources can be acknowledged and must be

managed appropriately.

Low back pain subtypes

Considerable heterogeneity occurs amongst LBP that can be grouped into three types: chronic, acute as well as subacute back pain.[39]

- **Chronic Low back pain** is defined as "LBP continuing for prolonged than 7 to 12 weeks, or later the stage of healing or recurrent back pain that occasionally disturbs an individual over an extended period".
- **Acute Low back pain** is defined as "LBP persisting for fewer than 12 weeks."
- **Subacute pain** is defined as "LBP persisting between 6 weeks and 3 months."

Even though many patients with low back pain improve rapidly, Low Back Pain usually follows a repeated course, with exacerbations arising over time.

Causes of low back pain

LBP can be owing to numeral factors containing: individual characters, working settings such as hefty physical labour, difficult fixed and forceful working positions, besides physical operating as well as uplifting, daily life factors in addition to psychological aspects.

A small portion of cases of LBP outcomes from injury to the back, osteoporosis, or extended corticosteroid use. Moderately less frequent are vertebral infectivity, tumors besides bone metastasis.

The particular cause of LBP is frequently hard to recognize. Non-specific LBP is thus a foremost delinquent for finding besides therapy. LBP can be generated by various tissues involving muscles, joint capsules, cartilage, soft connective tissue, ligaments, besides blood vessels. These matters may be dragged, stressed, overextended, or twisted and hastily create inflammation with the discharge of inflammatory elements for instance cytokines and/or chemokines. These elements excite the adjacent nerve fibers ensuing in the impression of pain. The inflammatory course spreads the development of swelling. A drop in the blood supply to the disturbed area may happen so that nutrients, as well as oxygen, are not favourably distributed and deletion of infuriating derivatives of inflammation is weakened, generating thereby a feedback circle of inflammation besides pain.[40]

The diagnosis of LBP is difficult due to the multifaceted nature of pain as well as the non-regimented method by physicians for clinical assessment.

Risk Factors

About 5 to 15% of LBP can be ascribed to a definite source for example an osteoporotic fracture, Carcinoma, or infection.[39,40]For the leftover 85 to 95% of cases, the definite cause of LBP is uncertain.[5,41]

Psychological factors

Psychosocial determinants play a considerable part in the occurrence of LBP. Persons with unhelpful affectivity, lesser community care in the workroom, lesser job oversee, greater psychological needs as well as work frustration in addition to tension, nervousness, depression are more likely to LBP.

Body height and weight

Studies established a relationship between body height and low back pain. Findings recommend that being tall is a forecaster for back surgical treatment[40]. Taller persons seem to have added possible risk for disk variability under external stacking[5]. Corrections of facet joints in patients plus lumbar disc hernia were appeared to be more obvious in taller patients.[41]

Numerous studies have revealed that people with elevated body mass index are more susceptible to Low Back Pain. A meta-analysis involving 33 studies presented that obesity was correlated with the improved prevalence of low back pain in the earlier 12 months (combined odds ratio, OR = 1.33 (95% CI: 1.14 to1.54).[42]

Occupational factors

In the biosphere, 37% of low back pain is ascribed to occupation[43]. Specialists who are subjected to vibrations, or long-standing positions, for example, health-care

workforces, occupational motorists, and construction employees are more likely to Low Back Pain.

LBP is related to labouring postures which involved bending profoundly with one's trunk, bending as well as twirling at once with one's trunk, a bend in addition to twirled posture for lengthy periods, and causing tedious movements with the trunk. This result was coherent with more studies.[1,44–48]Tiresome twirling or bending with the trunk, in addition to extended twirling or bending, can increase the chance of low back pain owing to unrecovered exhaustion. Slightly, these findings reveal that low back pain risk may be greater in some industries, in which the employees demand to take hefty physical work or work with uncomfortable posture.

Social and demographic factors, such as age, daily life factors, such as smoking besides physical acclimatizing are other possible determinants for LBP[1].

Magnitude and Nature of Disease Burden

Incidence and prevalence

LBP is identified to be a widespread health delinquent; WHO, whose Community Oriented Programme for the Management of Rheumatic Disease presented influentially that it is existing in equivalent magnitudes in numerous countries. Till recently it was mostly understood as a problem limited to western nations but the study completed during the last decade exhibited that LBP is also the foremost dilemma is low as well as middle-income nations[49].

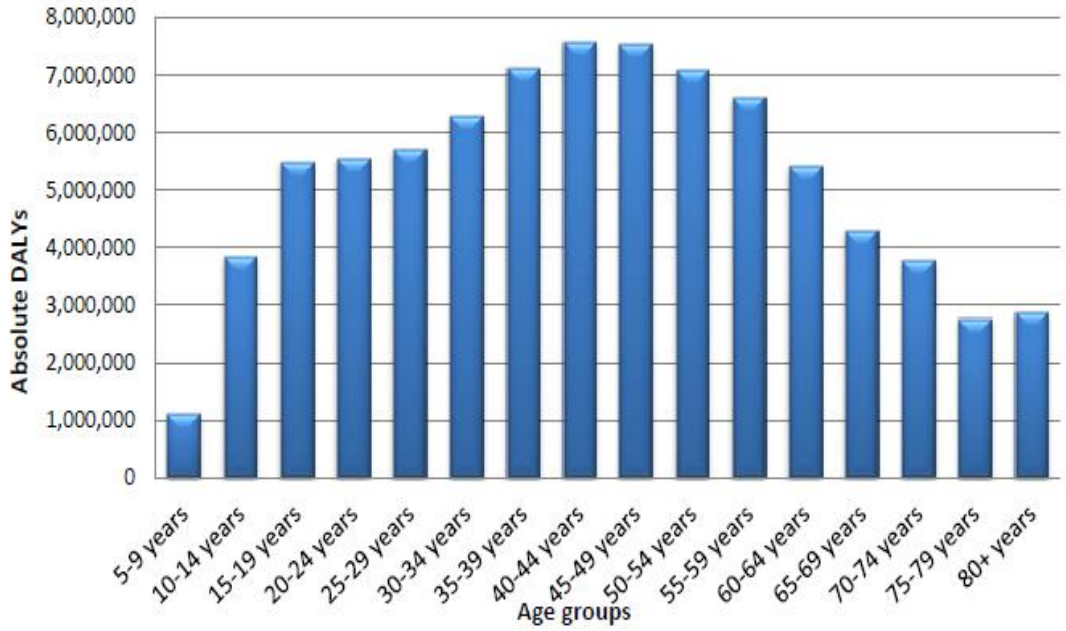

Figure 1: Absolute DALYs instigated by low back pain in the world, by age group [Source: Institute of Health Metrics and Evaluation (IHME)]

While significant heterogeneity occurs among LBP epidemiological researches indicate that LBP nation prevalence extends from 1.0% to 58.1% (average: 18.1%; median: 15.0%), and one year prevalence ranges from 0.8% to 82.5% (average: 38.1%; median: 37.4%)[50]. Owing to the heterogeneity of the data, average estimations ought to be taken with care. Longitudinal researches, which determines incidence, are more costly than cross-sectional researches, which evaluates prevalence. Consequently, there is a considerable sum of literature on the prevalence of LBP, but much less data on LBP occurrence as well as remission.

On several occasions, people with LBP will carry on to have recurrent incidents that may persist longer and instigate more disability. Therefore, LBP turns out to be chronic. Mostly exact remission in the sense that an only episode of LBP never recurs, is infrequent.

Researchers have observed the incidence of LBP is maximum in the third decade, besides total prevalence rises with age till the 60 to 65-year age group and subsequently drops slowly.

China is the world's leading developing nation with a vast number of working populations. The prevalence rates of Low Back Pain amongst the Chinese occupational residents were ranging from 26.4% to 84.6%. The newest LBP statistics in the mainland of China displayed that the 1-year prevalence of Low Back Pain in rural employed residents was 64%.[51]

YOGA

Back pain is the foremost cause of using Complementary and Alternative Medicine treatments. Yoga is an even more trendy "mind-body" CAM treatment frequently employed for alleviating back pain and numerous reports have realized that yoga is valuable for this illness.[52]

Yoga comprises physical exercise combined with the emphasis on special breathing practices to spread recognition. Yoga was applied in ancient times to overwhelm these impairments in grounding for reaching the goal of self-realization as well as freedom from distress. Though the prehistoric prophets documented the health as well as curative effects of Yoga, they were not the chief goal of the procedure as is the case in India today.

Yoga is nowadays considered in the west as a complete method to health and in recent times has been categorized by the National Institutes of Health as a system of CAM.

In India, though, Yoga is not an unorthodox healing approach but a fragment of conventional medicine. This beneficial therapy of Yoga necessitates the traditional

postures to be acclimatized to deal with the given problems related to each medical illness.

The Goal of Yoga Therapy for Low Back Pain

The chief goal of Yoga treatment for LBP is the release of pain and functional control instigated by CLBP. This is accomplished by minimalizing, curative, and eventually rectifying basic physical faults through a sequence of anatomically accurate postures.[52]

Yoga therapy acts to rectify fundamental internal breakdowns that influence mechanical sources of ill-defined LBP. It is through the method of assisting people with LBP to relax the zone of pain and then instructing them the inappropriate position of bones, muscles, plus connective tissue as well as movements that the curing befalls and modifies the basic root cause of the distress.

The training of Yoga is planned to teach students the habit of a daily routine of self-care that shows to control and finally avert the recurrence of CLBP through healthful postural as well as movement patterns. There are numerous objects for executing a curative version of Yoga for somebody with LBP.[52]

Conventional postures necessitate endeavour and competence to be health-improving and curative, while a person in pain necessitates the bruised area to rest preceding to initiating remedial action. It also needs time to create the understanding as well as neuromuscular harmonization to accomplish the poses in a style that rectifies imbalances causative to Low Back Pain.

The yoga positions act to release constricted superficial back muscles, intensify circulation to the hurt area, in addition to decline inflammation. The muscles need to release as well as coming back to their usual position concerning tissues, bones, as well as organs preceding a more lively phase of remedying fundamental imbalances.[53]

Mechanism of yoga

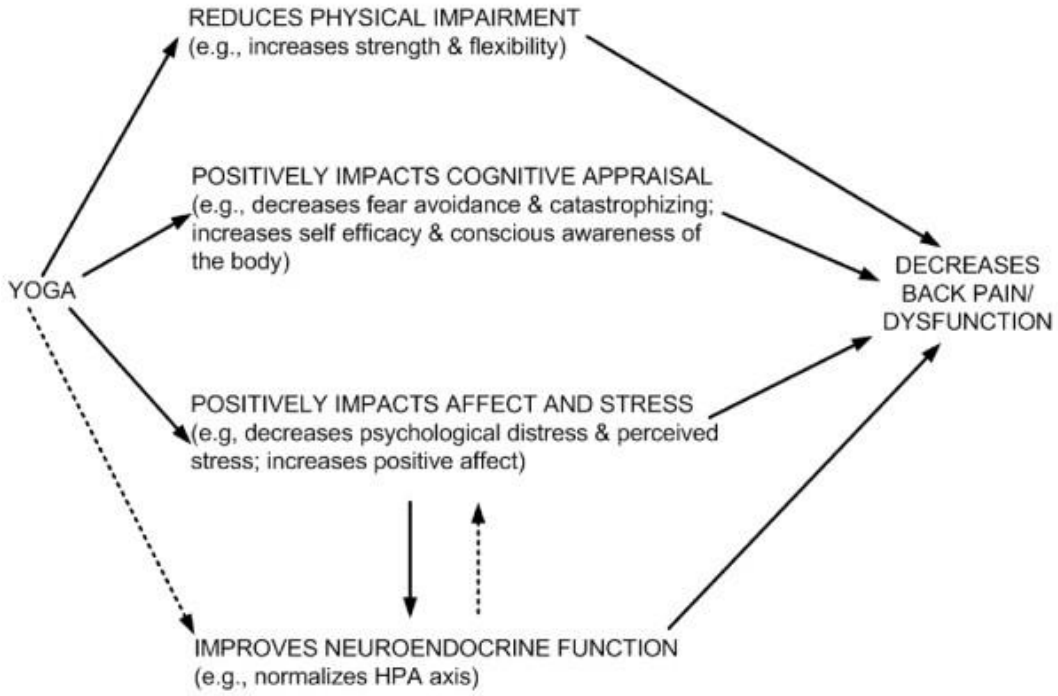

Figure 2: Model explaining probable mechanisms underlying the usefulness of yoga for chronic low back pain.

The means of action accountable for Yoga's conceivable positive outcome on back pain are physical effort, the reprieve of physical along with mental stress, and improved body cognizance to decrease maladaptive arrangements and position. Yoga may decline the ache and/or dysfunction of an individual with LBP via one or more of the three chief pathways; physical working of the back, cognitive assessment about LBP, and commonly affect besides stress.[52]

Reasons for Implementing Therapeutic Yoga for Low Back Pain

Although the habitual practice of Iyengar Yoga is observed to be cured as well as health preserving, there are numerous explanations for executing a healing type of Yoga for somebody with LBP. Conventional positions necessitate effort and talent to be health boosting as well as remedial, while the person in ache entails the wounded area to relax before initiating remedial action.[54,55] Moreover, Yoga treatment depends on external assist through the usage of supports. This external assistance allows the student to relax the hurt area and accomplish the right postural placement as well as movement in the postures. Definite body setting for every Yoga position opens, besides, makes space longitudinally, horizontally, besides circumferentially short of infuriating wounded areas.

CORE STABILIZATION

What is the core?

The core is well-defined as the lumbopelvic-hip composite. It is the site in which our core of gravity is situated.

Such core can be defined as a muscular 'box' with

Front: The abdominals - Transversus Abdominis, Rectus Abdominis, Internal Obliques and External Obliques.

Back: The paraspinals - Erector Spinae, Quadratus Lumborum, Multifidi, Deep Transverso-spinalis, and the Gluteals

Roof: Diaphragm

Floor: Pelvis

Bottom: Hip girdle musculature.

Inside this box are 29 duos of muscles that aided to steady the spine, pelvis as well as kinetic chain throughout working activities. Short of these muscles, the spine would turn mechanically unbalanced with compressive forces. This core works via the thoracolumbar fascia called, “nature’s back belt”.

The transversus abdominis has a hefty addon to the middle as well as posterior covers of the thoracolumbar fascia. Besides, the deep lamina of the posterior cover affixes to the lumbar spinous processes.

In the core the thoracolumbar fascia assists as a portion of a “hoop” around the trunk that delivers a link of both the lower limb as well as the upper limb. With tightening of the muscular matters, the thoracolumbar fascia also works as a proprioceptor, offering a response about trunk positioning.

The Inner Unit

The inner unit delivers the essential joint steadiness for the spine. If this unit doesn’t work suitably our spine, pelvis, as well as joint constitutes, are put under excessive stress. This pressure generates an environment that results in several grievances. The indispensable inner unit contains Transversus Abdominis, Multifidus, Pelvic Floor along with Diaphragm[56].

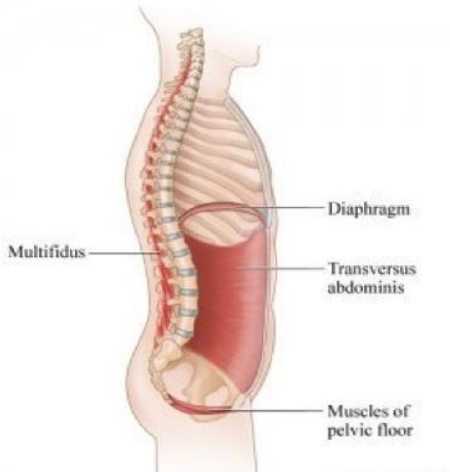

Figure 3: Inner unit of Core Muscles

Transversus Abdominis:

It has the power to deliver rigidity to the sections of the spine all through a functional position as well as movements. It is selectively made active earlier to limb movement at a diverse rate, but instigation is subdued in a patient with a history of LBP. It is believed to be a chief part of spinal stability as it upsurges intra-abdominal pressure as well as seat pressure on the thoracolumbar fascia when contracting.

Multifidi:

It is a primary stabilizer due to its attachment directly to the spine and its ability to control intersegmental spinal motions.

Diaphragm and the Pelvic floor:

Their main influence on lumbar stability is owing to co-contraction with the abdominals to raise intra-abdominal pressure, thus generating a stiff cylinder or anatomical back support to decline the freight on the spine.[57,58]

The Outer Unit

The outer unit helps in movement as well as function. These unit muscles are fundamentally the chief goers of the core as well as extremities such as the Rectus Abdominis, Internal Oblique, External Oblique, Rectus Abdominis, back, legs, shoulder girdle and to spare.[59]

They each hold crucial performance movement. An outer unit comprises exercises that permit for multi-joint as well as multi-plane actions.

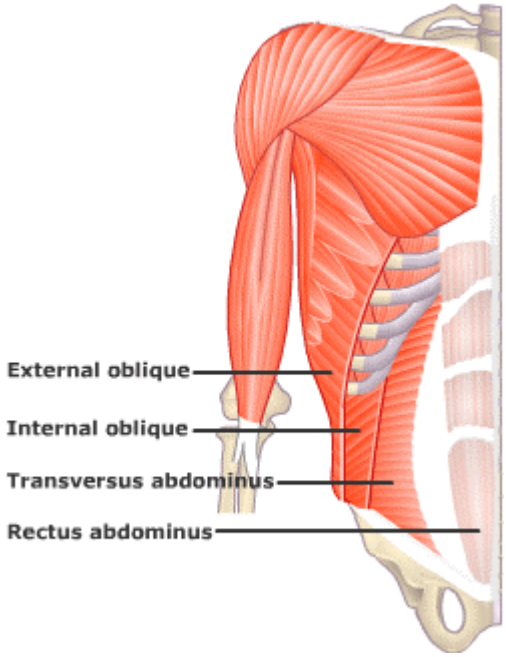

Figure 4: Core Muscles of the outer unit

The Rectus Abdominis:

The very superficial muscle cluster of the core area and operates to flex the spine. It acts with all of the additional core muscles to steady the pelvis when moving.

It inaugurates from the pubic symphysis plus pubic crest and attaches at the xiphoid process along with 5th to 7th costal cartilages. The dual muscles are divided by linea alba.

The internal and external obliques

They are positioned in the core zone. When obliques are stimulated at one side of the body, they work to turn the trunk besides laterally flex the body. When these muscles contract on both sides simultaneously, they help in flexing the vertebral column besides constricting the abdominal wall.

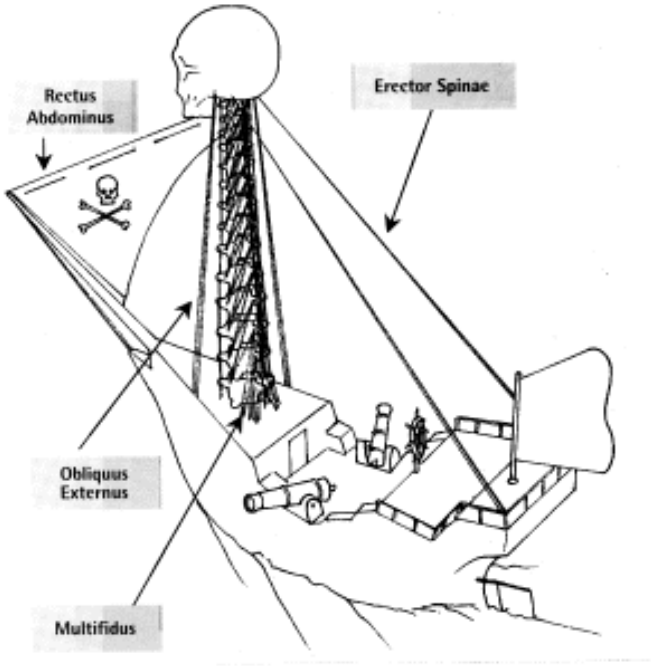

Figure 5: Relationship between Inner and Outer unit.

The outer unit turns into tougher as well as tauter, the subtle balances between the inner and outer units happen to disturbed. This perception is simpler to comprehend by the pirate ship model.

Even though the larger guy wires (outermost) aid the utmost of the pirate ship, its functionality is entirely reliant on the sustenance offered by small guy wires which signify the multifidus along with the inner unit muscles in this similarity.

When the inner along with outer unit functions collectively as an organized unit we significantly enhance our daily lives by decreasing the chances of joint injuries, ligamentous plus muscular strain as well as low back pain.

Principles of core training:

Stage 1: Core Stabilization

Stage 2: Core Strengthening

Stage 3: Core Power

Core Stabilization:

It is depicted as the capacity to influence the position as well as the movement of the trunk over the pelvis in addition to the leg to agree for optimal generation, transfer, and regulation of force and movement to the terminal section in combined dynamic chain events.[60]

Core Stability Exercises:

It is explained as a range of exercise methods that have the communal goal to enhance lumbopelvic control, rebuilding the capability of the neuromuscular system to influence and to defend the spine from hurt or re-injury.

In common, it can be segregated into two major groups:

1) Those that target to reinstate the harmonization as well as control of the trunk muscles to enhance control of the lumbar spine plus pelvis.

2) Those that target to reinstate the power of the trunk muscle to meet the needs. [61]

Advantages of core training:

- Enhancement in posture, balance besides peripheral mobility.
- Augmented durability, power, and dexterity.
- Less risk of injury.
- Reduction in or deterrence of low back pain.
- Improved functioning.
- Permits working more with less struggle.
- Intensify flexibility.

Significance of core training:[62]

- A solid core is a base for all human mobility.
- If the core is solid and steady, all extra movements are more competent and more operative.
- Weak core stability signifies that power is misused. Rather than forces being directed by arms or legs to the mobility, it is engrossed by a feeble, sloppy trunk.
- A solid core decreases the stress on particular muscle sets plus joints.
- Weak core stability enhances the possibility of hurt in these areas. Additional stress is cited in these areas if the trunk is frail.

BACK CARE EDUCATION

One of the significant parts of mechanical LBP therapy is back care teaching. This comprises adjustment in happenings of daily living, ergonomic back attention as well as the do's & don't's.[63–65]

Experiments have demonstrated that yoga as well as core stabilization are independently successful in alleviating low back pain.[13,52,53,58,61,66–69]

Disability

As stated by W.H.O in 1976 disability is well-defined as "Any restraint or lack (ensuing from a damage) of capacity to complete an activity in the way or inside the range judged normal for a human being."[70]

LBP is categorized foremost as a root of disability plus incapability to work, and anticipated to influence up to 90% of the world's inhabitants at some part of their

live[71]. It is the universal and expensive musculoskeletal dilemma distressing the working people.

The aftermath of injured employees range from transient discomfort to enduring disability. It is also the foremost basis of disability in individuals below 45 years of age and reports for approximately 40% of all disability calls in the West. In India, roughly 35% of people experience CLBP, which considerably hinders their everyday routine.[72]

Essentials of physiotherapy application that have been recommended as determinants involve therapies that mandate recurring movements or uninterrupted bending, lifting/ transferring reliant patients, retorting to unexpected or abrupt activities by patients, carrying out manual therapy, controlled workplace, understaffing, age as well as sex. Scientific researches from several parts of the world have also described a significant relationship between occupational determinants linking excessive repetition rates, extreme forces and uncomfortable postures as well as musculoskeletal disorders.[73]

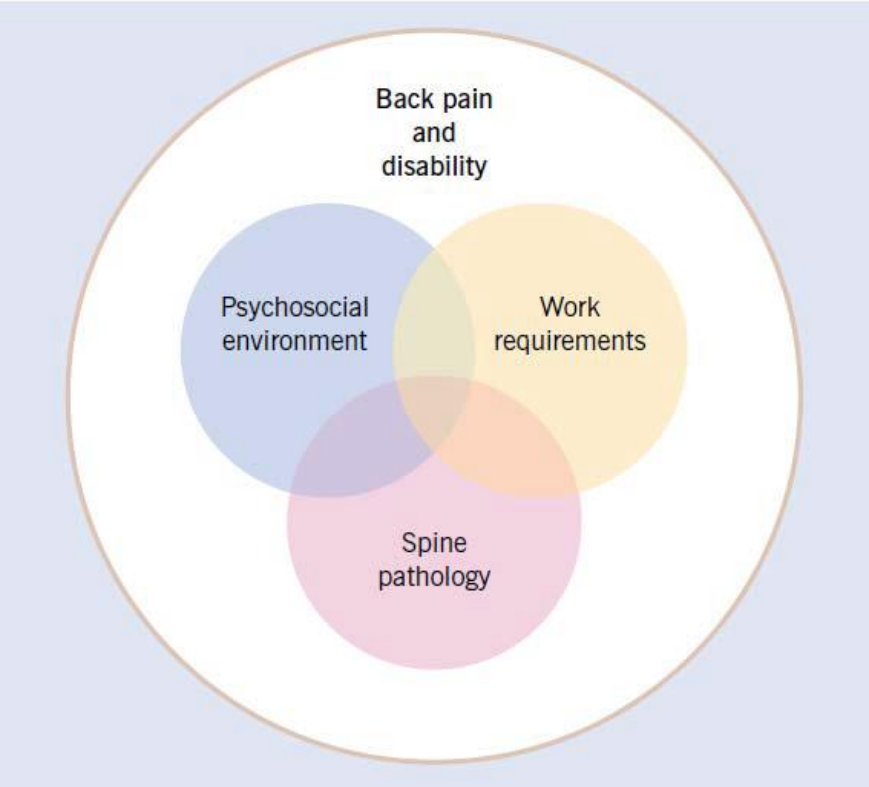

Figure 6: Model envisaging the interaction of spine pathology, work necessities and psychosocial determinants in the origin of back pain and its ensuing disability

Oswestry Disability Index

The Oswestry disability index is grounded on 10 questions, fundamentally linked to "pain strength, personal care, lifting, walking, sitting, standing, sleeping, social life, traveling and employment/ homemaking each followed by six alternatives."

Each inquiry is recorded from 0 to 5, and the aggregate of the scores is then stated as a percentage.[74]

The Oswestry index appears to be competent in distinguishing a patient's functional disability in diverse spinal disorders.

This Index establishes good consistency in test-retest presentation clinically at preliminary assessment as well as up to 6 weeks of subsequent interventions. Questionnaires have comparable receptiveness rates from 0.76 to 0.78 but two studies state a receptiveness rate of about 0.94 for the Oswestry.[75]

Various research works comparing the efficacy of Yoga therapy with conventional conservative therapy in decreasing Chronic Low back pain

1. A randomized controlled trial was conducted at Hungary[76] by 2015 amongst 137 nurses diagnosed with chronic ill-defined LBP syndrome. Samples were randomized into an experimental as well as control group (67 in the experimental group, 70 in the control group). Nurses in the experimental group appeared "the Spine Care for Nurses program" for three months. This course comprised of didactic teaching, spine-strengthening maneuvers, and instruction on protected patient handling methods. The control group only got a short-term inscribed lifestyle control. The pre-intervention average chronic nonspecific LBP syndrome strength score on VAS reduced from 49.3 to the postintervention count of 7.5.
2. A randomized controlled trial was conducted at Sweden[77] by 2012 among 159 samples with mainly (90%) chronic back plus neck pain. After selection, the samples were randomized to kundalini yoga, strength exercise, or evidence-based guidance. The goal was to assess the outcomes of an initial intervention of yoga contrasted to strength exercise or evidence-based guidance - on average absenteeism, back plus neck pain, and disability amongst employed people. They inferred that conducted exercise in the practices of kundalini yoga or strength exercise does not decrease sickness absenteeism higher than

evidence-based guidance solitary. Though, secondary analyses show that amongst those who follow kundalini yoga or strength exercise no less than twice a week, a considerable drop in sickness absenteeism was observed.

3. A randomised Controlled Trial was conducted at Italy[78] by 2019 of online databases which assessed the usefulness of yoga for patients with CLBP on pain, disability, as well as the quality of life. They inferred that Yoga might decline pain from immediate to intermediate-term besides enhancing functional disability condition from immediate to longer period contrasted to non-exercise. Yoga had a similar effect on pain as well as a disability as any more exercise or physical remedy.
4. The randomized controlled trial was conducted at Brazil[79] by 2010 amongst 30 samples randomly allotted to one of two therapy groups: segmental stabilization in which training centered on the transversus abdominis and lumbar multifidus, and superficial intensifying, in which training centered on the rectus abdominis, abdominus obliquus Internus, abdominus obliquus Externus, and erector spinae. Categorises were scrutinized to determine whether the training fashioned differences concerning pain, functional disability, besides transversus abdominis muscle activation ability. As judged to reference point, both therapies were successful in easing pain and enhancing disability ($p<0.001$). Samples in the segmental stabilization cluster had significant improvements for all factors when related to the ST group ($p<0.001$), including Transversus Abdominis stimulation, where relative advantages were 48.3% and 5.1%, correspondingly.
5. A prospective, randomized, controlled trial was conducted at Serbia[80] amongst 80 CLBP patients diagnosed with lumbar radiculopathy of both genders with a

mean age of 48.45 ± 10.22 years old, parted into two clusters that completed several arrays of exercises. Samples were provided with laser therapy, transcutaneous electrical nerve stimulation and 8-week kinesiotherapy that comprised training to reinforce the deep lumbar spine stabilizers. The assessment was made after 4 and 8 weeks respectively. This study inferred that samples who completed the lumbar stabilization, as well as thoracic mobilization workout program in a closed kinetic sequence, had the most successful drop of pain strength as well as functional disability.

6. A prospective randomized, parallel, active-controlled study was conducted in Bangalore, India[81] amongst 120 participants with CLBP in the age between 18 and 75 years old. They were randomly allocated into two groups: a yoga cluster and a control cluster to obtain an Integrated Approach of Yoga Therapy or remedial exercises subsequently occasional lumbar traction along with ultrasound (20 minutes per day). Both clusters performed observed interventions for 3 weeks at the facility and afterward, for 12 weeks, at their dwellings after the end of treatment. There were substantial differences within (RMANOVA, $p<0.001$) as well as between the groups (RMANOVA, $p<0.001$) in pain, back debility, tenderness, besides spinal flexibility with better enhancement in the yoga cluster compared to the control group. They inferred that the Integrated Approach of Yoga Therapy a supplementary to standard physiotherapy delivers expressively greater improvement than curative exercises alone in patients experiencing CLBP.
7. The Prospective study was conducted in Korea[82] by 2010-2011 to evaluate the influence of Swiss ball stabilization exercise on reducing pain and influence on the bone mineral density of samples with CLBP. 36 samples with CLBP

were separated into a traditional treatment cluster, floor exercise cluster as well as ball exercise cluster. The pain was determined by VAS along with DEXXUMT (DEXA scanner bone densitometer) which was employed to witness the variations in bone mineral density. VAS score was decreased in floor exercise cluster as well as ball exercise cluster with therapy; it was not decreased in the traditional treatment group. The bone mineral density was augmented in the floor exercise cluster as well as the ball exercise cluster while it was decreased conservative treatment cluster. Lumbar stabilization workouts by a ball are considered to be the successful interventional treatment for the prevention of CLBP and to reduce the bone mineral density of participants.

8. A quasi- experimental study was conducted in karnataka,south india to establish the role of back strengthening work out on CLBP and functional working among nursing students. Amongst the 393 nursing students,237 of them diagnosed with mechanical low back pain by employing the diagnostic checklist. One cluster pre-test, post-test design was employed for the experiment. The intervention was executed everyday for thirty minutes for 30 days. The degree of lowback pain and functional working before as well as after the intervention was evaluated by employing a numerical pain scale along with MODS correspondingly. The experiment inferred that 129(54%) samples had mild low back pain and 108(46%) had a moderate lowback pain. Almost 145 (61%) had a lesser disability while 92(39%) had a modest disability. Back strengthening exercise was observed to be successful in decreasing low back pain and enchancing the functional working among participants.[83]

9. A systematic review was done in Australia[84] by 2006 to find out the effect of trunk strengthening exercises for CLBP. They comprised 13 high-quality RCTs. 2 autonomous reviewers stuck to Cochrane back review cluster as well as quorum statement guidelines to accomplish this systematic review. The inference of the review was trunk strengthening was more efficient than no exercise on CLBP (SMD = 0.95) [0.35-1.55] rigorous trunk strengthening is more successful than lesser intensive on performance. Trunk strengthening related to aerobic exercises displayed no clear advantage of strengthening
10. A Randomized Controlled Trial was conducted in Korea by[85] to find out the role of lumbar stabilization exercises as well as lumbar dynamic strengthening exercises inpatient with CLBP and compared. In this trial samples experiencing vague LBP for <3 months were involved prospectively besides randomized into lumbar stabilization exercise cluster or lumber dynamic strengthening exercise group. Exercises were completed for 1 hour, two times a week, for about 8 weeks. The strength of the lumbar extensors was assessed at many angles varying from 0 to 72^{o} at intervals of 12^{o} employed a MedX. The VAS and MODQ were applied to quantify the intensity of LBP and functional disability before and after the intervention. The study inferred that both exercises improved the lumber extensors as well as decreased low back pain. The progress was expressively better in the lumbar stabilization exercise cluster.
11. A randomized controlled study was conducted in Karnataka, India[86] from March 2016 to Feb 2017 amongst 44 samples experiencing vague Low Back Pain for <3 months were randomly assigned into the lumbar stabilization cluster, the dynamic strengthening cluster, as well as the Pilates cluster. 10

sittings of workouts for three weeks were recommended together with interferential current plus hot moist pack. There was a decrease of pain, development in a range of motion, functional ability as well as core strength in all the three exercise clusters. The enhancement was expressively superior in the lumbar stabilization cluster for all the result variables when related to the post-treatment following the 10th session. Pairwise comparison displayed that there was a larger decrease in disability in the pilates group compared to the dynamic strengthening group.

12. A systematic review done in Portland[87] by 2006 to evaluate non-pharmacologic remedies for Acute as well as CLBP noticed sound evince that cognitive-behavioral treatment, exercise, spinal manipulation, besides interdisciplinary rehabilitation is all ascetically effectual for chronic or subacute LBP. They observed reasonable proof that acupuncture, Viniyoga, massage, as well as functional rebuilding are also successful for CLBP.
13. A Multi-centered randomized controlled trial was conducted in York, United Kingdom[88] by 2012 to assess the cost-effectiveness of yoga interference along with usual care related to usual care lonely for chronic or recurrent LBP. From the perception of the people, yoga interference was the leading treatment related to usual care lonely. They inferred that 12 weekly cluster classes of specialized yoga are possibly to be a cost-effective interference for managing patients with chronic or recurrent LBP.
14. A Randomized Clinical Trial was conducted in Denmark[89] by 2008 amongst 286 patients with CLBP were randomized to either a group-based 12-week package of therapist experience; hard physical exercise, gentle exercise/ occupational treatment, besides education (group A) or a 12-week package

individual training weekly twice, (group B). At baseline as well as at 3, 6, 12, and 24 months, samples completed questionnaires on pain. Both groups revealed long-term advances in pain as well as disability tallies, with only slight statistically significant dissimilarities between the two groups.

15. A Descriptive, longitudinal study was conducted in southeast United States[90] by 2008 amongst 53 Yoga samples that appeared a 6-week, once in a week, and two-hour yoga class. Physical Therapy (PT) samples undertook two times a week, 1-hour personalized PT. The aim was to relate clinical as well as demographic features of persons self-selecting yoga or physical therapy healing of CLBP. At baseline, yoga samples were significantly not as much disabled, had improved health status, better ache self-efficacy, and lesser means pain worrisome related to Physical Therapy samples. Yoga samples with low as well as high pain self-efficacy had comparable disability results. The results reinforce the indication that self-efficacy is linked with chronic Low Back pain results, particularly in persons self-selecting Physical therapy.
16. A systematic review and meta-analysis were conducted in Australia[91] by 2014 in which 45 trials fulfilled the inclusion criteria, as well as 39, were involved in the meta-analysis. Pooled meta-analysis exposed suggestively lesser CLBP with intervention groups by exercise related to a control cluster or any other treatment clusters. Discrete exploratory subgroup analysis displayed a noteworthy influence for strength/ resistance as well as coordination/ stabilization programs.
17. Two systematic reviews noticed a solid indication that paracetamol was not more useful than NSAIDs.[92] There is a solid indication from a systematic

review in further situations that analgesics (paracetamol and feeble opioids) deliver temporary pain relief.[93,94]

18. Six Randomized Controlled Trials (total n=329) were described on acute LBP. 3 RCTs associated analgesics with NSAIDs. 2 RCTs of these (n=110) observed that meptazinol, paracetamol, as well as diflunisal decreased pain equally. The third RCT discovered that mefenamic acid decreased pain greater than paracetamol, but that aspirin as well as indomethacin were equally useful[93,94].

19. A meta-analysis was conducted in British Columbia[95] by 2011 in which 8 Randomized Controlled Trials fulfilled the criteria for inclusion (8 evaluating functional disability besides 5 evaluating pain) and comprised a whole of 743 samples. At post-treatment, yoga had a moderate to the greater outcome on functional disability (d=0.645) as well as pain (d=0.623). Despite an extensive range of yoga methods and treatment extents, heterogeneity in post-treatment effect magnitudes was less. Follow-up effect magnitudes for functional disability as well as pain were lesser, but endured significant (d=0.397 and d=0.486, correspondingly); though, there was a modest to a greater level of unpredictability in these effect sizes.

20. The validation study was conducted at the SVYASA Yoga University, Bengaluru, South India by 2015[112]. The IYTM for CLBP was designed, validated, and later tested for feasibility in patients with CLBP. A total of 20 yoga practices with CVR ≥0.33 were included, 6 yoga practices with CVR ≥0.33 were excluded from the designed IYTM. The feasibility study with validated IYTM showed significant reduction in numerical pain rating scale (P = 0.02), Oswestry disability scale (P = 0.02), and Perceived Stress Scale

(P = 0.03). This study has shown that the validated IYTM is feasible, had no adverse effects and was useful in alleviating pain, disability, and perceived stress in patients with CLBP.

21. A Randomized Trial was conducted in India[113] between 2015 and 2016 among 88 women nurses in the tertiary care teaching hospital in Kolar district of Karnataka state with yoga and exercise intervention. All participants were assessed at baseline and after 6 weeks with the World Health Organization Quality of Life-brief (WHOQOL-BREF) questionnaire. Within-group analysis for QOL revealed a significant improvement in physical, psychological, and social domains (except environmental domain) in both groups. Between-group analysis showed a higher percentage of improvement in yoga as compared to exercise group except environmental domain.

22. The Clinical trial study was conducted in Iran[114] by 2014 among 87 patients randomly assigned to three (thermotherapy and cryotherapy as intervention, and naproxen as control) groups of 29 each. All patients were examined on 0, 3rd, 8th, and 15th day after the first visit and the data gathered by McGill Pain Questionnaire. Thermotherapy patients reported significantly less pain compared to cryotherapy and control ($p \leq 0.05$). In thermotherapy and cryotherapy groups, mean pain in the first visit was 12.70±3.7 and 12.06±2.6, and on the 15th day after intervention 0.75±0.37 and 2.20±2.12, respectively.

23. A multicenter, parallel-group, double-blinded, randomized controlled trial[115] was conducted in South Korea by 2015 among eighty participants with chronic low back pain. Enrolled patients will be randomly divided into a treatment group and a sham group. Patients in both groups will be given 10 treatments (15 min per treatment) over 4 weeks. The protocol will consist of

five cycles of heating/cooling therapy (maximum: 45 °C, minimum: 15 °C) in the treatment group, and five cycles of sham therapy (maximum: 1°C above skin temperature, minimum: 1°C below skin temperature) in the sham group. The primary outcome measure is change from baseline in the 100 mm Visual Analogue Scale (VAS) for pain after 4 weeks. There are six secondary outcome measures that consider disability or range of motion (ROM).

MATERIALS AND METHODS

MATERIALS AND METHODS

STUDY DESIGN:

The Randomized Controlled Trial was conducted in clinico-radiologically diagnosed patients with chronic low back pain.

STUDY AREA:

The study was done with the patients who presented with low back ache to RLJ hospital attached to Sri Devaraj Urs Academy of Higher Education and Research Tamaka, Kolar. Patients residing within 15 kilometres radius of RL Jalappa hospital were selected for the study.

STUDY PERIOD AND DURATION:

From November 2018 to October 2020 and 2 years

STUDY POPULATION:

All patients admitted to RLJ hospital and diagnosed with chronic back pain during the period between November 2018 to October2020.

SAMPLE SIZE CALCULATION

$$n = \frac{2s_p^2 [Z_{1-\alpha/2} + Z_{1-\beta}]^2}{\mu^2_d}$$

$$S_p^2 = \frac{S_1^2 + S_2^2}{2S_1^2}$$

Where

S_1^2 - standard deviation in the first group

S_2^2 - standard deviation in the second group

$\mu^2 d$ - mean difference between the samples

α - Significance level

1-β - Power

S_1^2 - 6.03

S_2^2 - 5.14

$\mu^2 d$ - 2.8

α - 5%

Power - 80%

Sample difference based on difference on conventional conservative therapy and home-based yoga therapy by taking environmental domain reported in average estimation of 30.7 with 80% power, 95% confidence interval, 5% α error.

Required sample size calculated is 63 per group.

With expected drop out of 10% in follow up

Final sample size is 70 per group.

Total sample size - 140

SAMPLING METHOD:

The first 140 consecutive patients admitted to RLJ hospital and diagnosed with chronic back pain during the period between November 2018 to October 2020 were selected.

INCLUSION CRITERIA:

1. Patients with chronic low back pain
2. Patients 25-50 years of age.

EXCLUSION CRITERIA:

1. History of recent trauma to spine
2. X-ray showing spondylotic changes.
3. Infective cause of low back ache
4. Postural back pain, psychosomatic back pain
5. Spinal deformities.
6. History of any spinal surgery.
7. Neurological compromise
8. Pregnancy.
9. Low back ache with radiating pain.

STUDY TOOLS

1.Visual Analog Scale

A tool used to help a person rate the intensity of certain sensations and feelings such as pain. The visual analog scale for pain is a straight line with one end (0) meaning no pain and the other end (10) meaning worst pain imaginable as

mentioned in Annexure-IV. A patient marks a point on the line that matches the amount of pain he/she feels.

2.Modified Oswestry Low back Disability Questionnaire

This questionnaire has been designed to give the therapist information as to how the back pain has affected the ability to manage in everyday life. Functional disability was estimated by using this questionnaire.

Other questionnaires are available for the measurement of the evaluation of low-back pain, but McGill and Oswestry were considered the most appropriate in the context of this project.

The score was calculated by the addition of the values assigned for each of the 10 individual questions and is used to categorize disability as: mild or no disability (0-20%); moderate disability (21%-40%); severe disability (41% to 60%); incapacity (61% to 80%); restricted to bed (81% to 100%) as mentioned in Annexure-V.

METHOD OF DATA COLLECTION

Detailed history was taken from all patients admitted to RLJ hospital and diagnosed with chronic back pain. Following investigations were done for diagnosis:

- Xray lumbosacral spine – Antero posterior and lateral views.
- Hematological investigations: Complete blood count and ESR

RANDOMIZATION

140 random numbers having 1 and 2 digits were generated by using www.randomizer.org. Patients were recruited as per the following table. 1 number patients were recruited to yoga group and 2 number patients were recruited to back strengthening exercises group

1, 1, 2, 1, 2, 1, 1, 1, 1, 1, 2, 1, 2, 2, 1, 2, 1, 2, 2, 2, 1, 1, 1, 2, 1, 1, 2, 2, 1, 2, 2, 2, 2, 1, 2, 2,
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2, 1, 1, 1, 1, 2, 2, 1, 2, 1, 2, 2, 2, 2, 2, 1, 1, 1, 1, 1, 2, 2, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1

Where 1- Yoga group, 2 – Back strengthening exercises group

All the subjects were interviewed and examined and subjects were unaware of their group allocation and to ensure that the criteria were fulfilled.

This trial was a single-blind study in which the participants did not aware of the intervention they received. The yoga leader and physiotherapist were not blinded.

Subjects were assessed through patient information sheet (Annexure No I), informed consent (Annexure No II) and case proforma (Annexure No III) was taken . Pain and disability was assessed by using VAS and Modified Oswestry Low back Disability Questionnaire respectively at baseline. Assessment were repeated after 2 weeks, 6 weeks and 12 weeks of intervention.

INTERVENTION

1. **Group A (YOGA)**

This group received Yoga therapy - *Pavanamuktasana, Setu bandhasana, Salabhasana, Bhujangasana, Nadishuddi Pranayama* was taught under the guidance of yoga therapy consultant from Department of Integrative Medicine (Yoga). Yoga practises were taught personally for 3 days (30 minutes twice daily) and provided procedural chart (Annexure VI,VII) and were asked to practice yoga at home in morning and evening for at least 30 minutes for 3 months for at least 5 days a week. Compliance of yoga intervention was monitored by regular phone calls. Physical monitoring of yoga intervention was done during their follow up periods (2^{nd} ,6^{th} and 12^{th} weeks). The yoga intervention was an adjuvant to hot fomentation[114,115] and tablet Paracetamol 650mg[93,94] was supplemented when necessary.

2. **Group B (BACK STRENGTHENING EXERCISE)**

This group received back strengthening exercises: Straight leg raising test, spine flexion and spine extension exercise. Back strengthening exercises were taught personally for 3 days (30 minutes twice daily) and provided procedural chart (Annexure VI,VII) and were asked to practice at home in morning and evening for at least 15 minutes 4 times a day for 3 months for at least 5 days a week. Compliance of back strengthening intervention was monitored by regular phone calls. Physical monitoring of back strengthening exercise was done during their follow up periods (2^{nd} ,6^{th} and 12^{th} weeks). The back-strengthening intervention was an adjuvant to Hot fomentation[114,115] and tablet Paracetamol [93,94] 650mg was supplemented when necessary.

Steps of Yoga therapy and back strengthening exercises are mentioned in (Annexure VI,VII)

STUDY VARIABLES

1. Age
2. Gender
3. Occupation
4. Return to work and the duration of return
5. Visual Analog score at first visit before intervention and 2nd week, 6th week and 12th week after intervention.
6. Modified Oswestry Low Back Pain Disability Questionnaire at first visit before intervention, 2nd week, 6th week and 12th week after intervention.

ETHICAL CONSIDERATION

Ethical approval was obtained from the Institutional Ethics Committee with **No: SDUMC/KLR/IEC/158/2018-19**(ANNEXURE-VIII). All ethical morality was adhered in the study. The collected data was used only for the proposed purpose of the study; the privacy and secrecy of participants were maintained all over the process as promised by the researchers. The researchers did not gather any forms of private identification such as address and social security numbers throughout the research work. The results obtained from the data collection were handled with privacy and the researchers will abandon entire data gathered after dissertation publication.

DATA ANALYSIS

- The collected data was entered in Ms excel and analysed using IBM.SPSS statistics software 23.0 Version.

- To describe the data in descriptive statistics frequency analysis, percentage analysis was used for discrete variables. Mean, Median and Standard deviation was used for continuous variables.

- To describe the data in inferential statistics Discrete variables in the two groups were compared for statistically significant difference using Chi Square test or Fisher's exact test. Continuous variables in the two groups was compared for statistically significant difference using Independent t test.

- To compare the efficacy of Yoga therapy and Back strengthening exercises before and after intervention, Paired t test was applied.

- In all the above statistical tools the probability value 0.05 was considered as significant level.

RESULTS

RESULTS

A randomized controlled study was conducted among 140 subjects to assess and compare efficacy of home-based yoga therapy versus conventional conservative therapy in chronic low back pain using visual analog scale for pain and disability using modified oswestry disability scale.

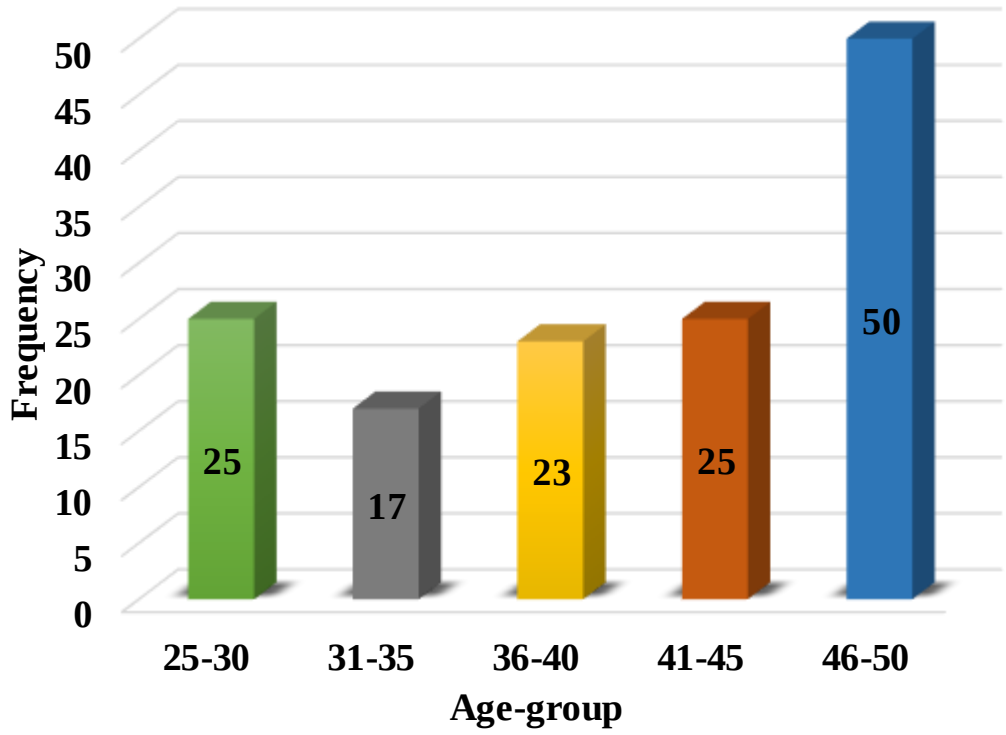
Group A received Yoga therapy both in morning and evening for at least 30 minutes for 3 months with hot fomentation - morning and night (twice daily) and tablet paracetamol 650 mg [93,94] if patient complaints of pain.

Group B received back strengthening exercises 15 minutes 4 times a day for 3 months with Hot fomentation - morning and night (twice daily) and tablet paracetamol 650mg [93,94] if patient complaints of pain.

Table 1: Age-group distribution of the participants (N=140)

Age-group	Frequency	Percentage (%)
25-30	25	17.9
31-35	17	12.1
36-40	23	16.4
41-45	25	17.9
46-50	50	35.7
Total	140	100.0

Figure 7: Age-group distribution of the participants (N=140)



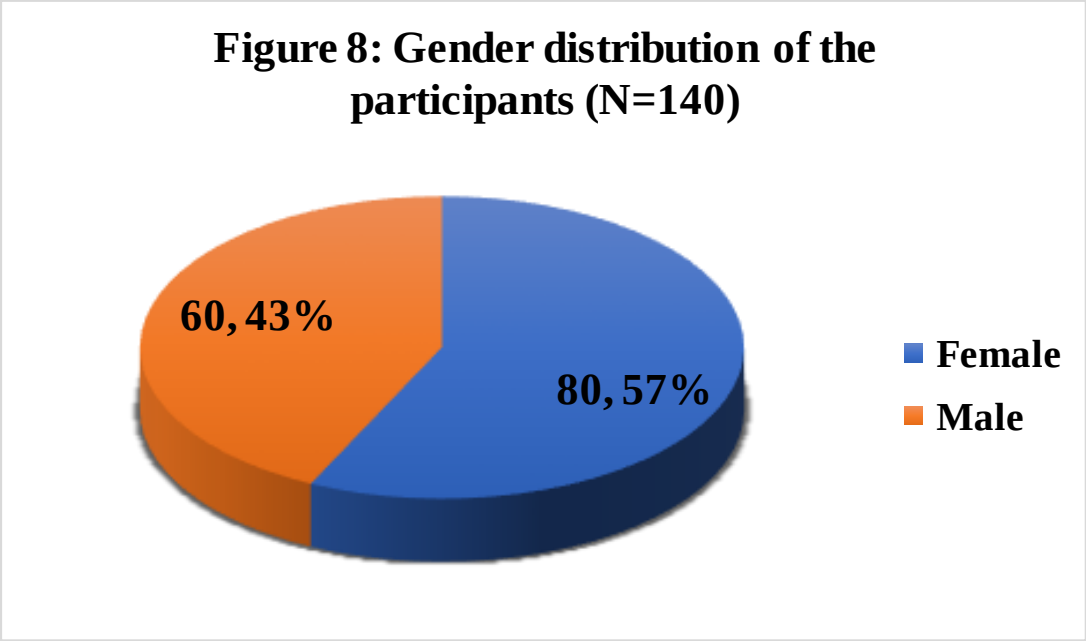
Comment: Nearly 35.7% of the samples belongs to the Age-group of 46-50 years.

Table 2: Age distribution of the participants (N=140)

Mean	40.66
Standard Deviation	8.330
Standard error of Mean	0.704
Minimum age	25
Maximum age	50

Table 3: Gender wise distribution of the participants (N=140)

Gender	Frequency	Percentage
Female	80	57.1
Male	60	42.9
Total	140	100.0

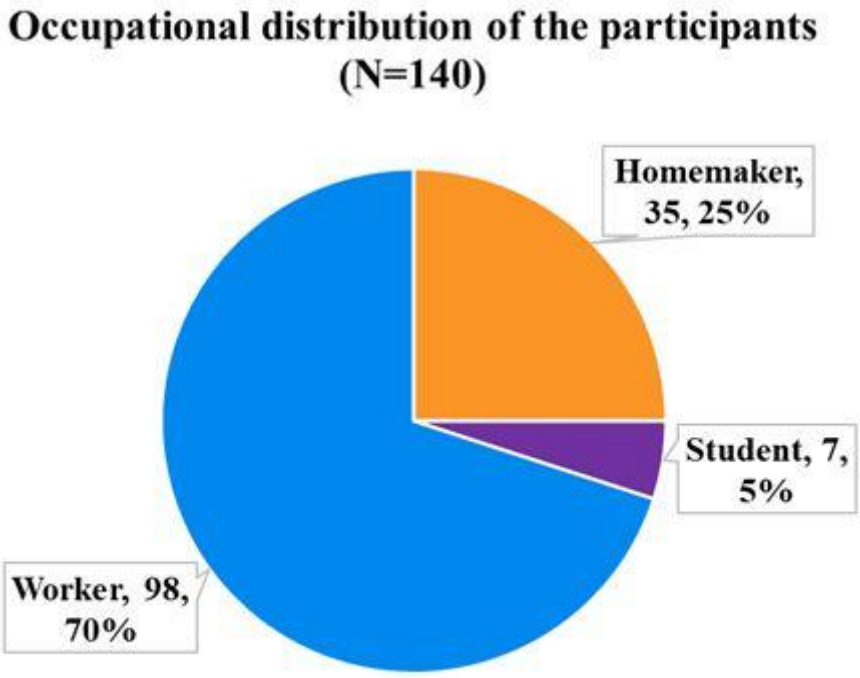


Comment: About 57% of the samples were female and 43% were male.

Table 4: Occupational distribution of the participants (N=140)

Occupation	Frequency	Percentage
Home maker	35	25
Student	7	5
Worker	98	70
Total	140	100

Figure 9:

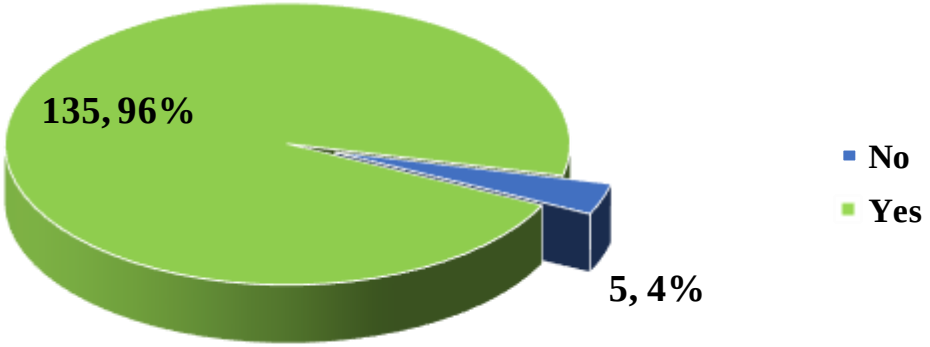


Comment: Almost 70% of the participants were workers diagnosed with Chronic Lower back Ache and only 5% were students with CLBP

Table 5: Distribution of the participants based on return to work (N=140)

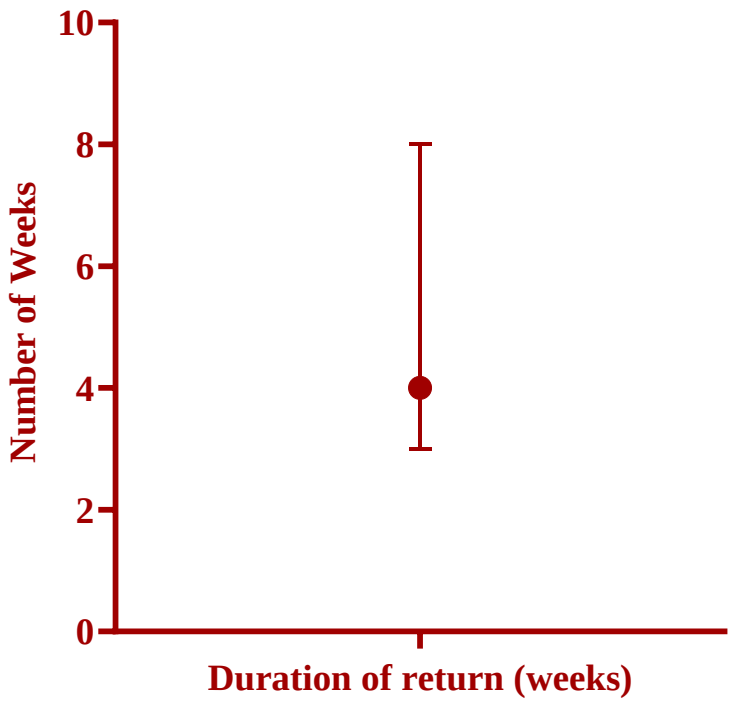
Return to work	Frequency	Percentage
Yes	135	96.4
No	5	3.6
Total	140	100.0

Figure 10: Distribution of the participants based on return to work (N=140)



Comment: Almost 96.4% of the samples returned to their work after intervention by Yoga and Back strengthening exercises.

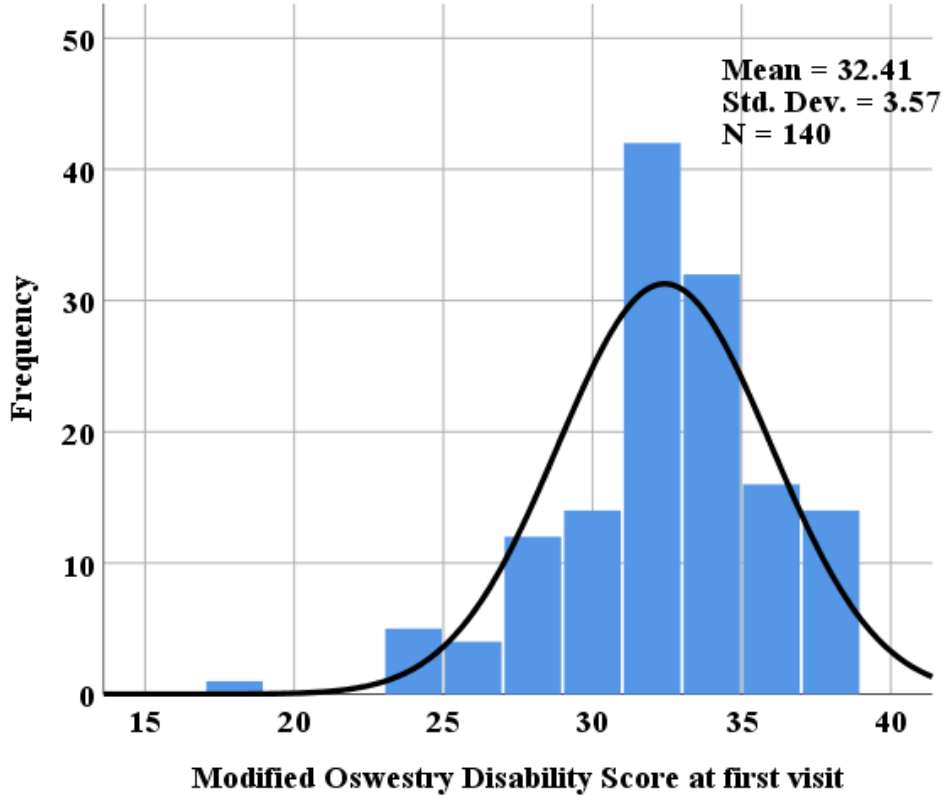
Figure 11: Distribution of the participants based on duration of return to work (N=135)



Comment: Median: 4

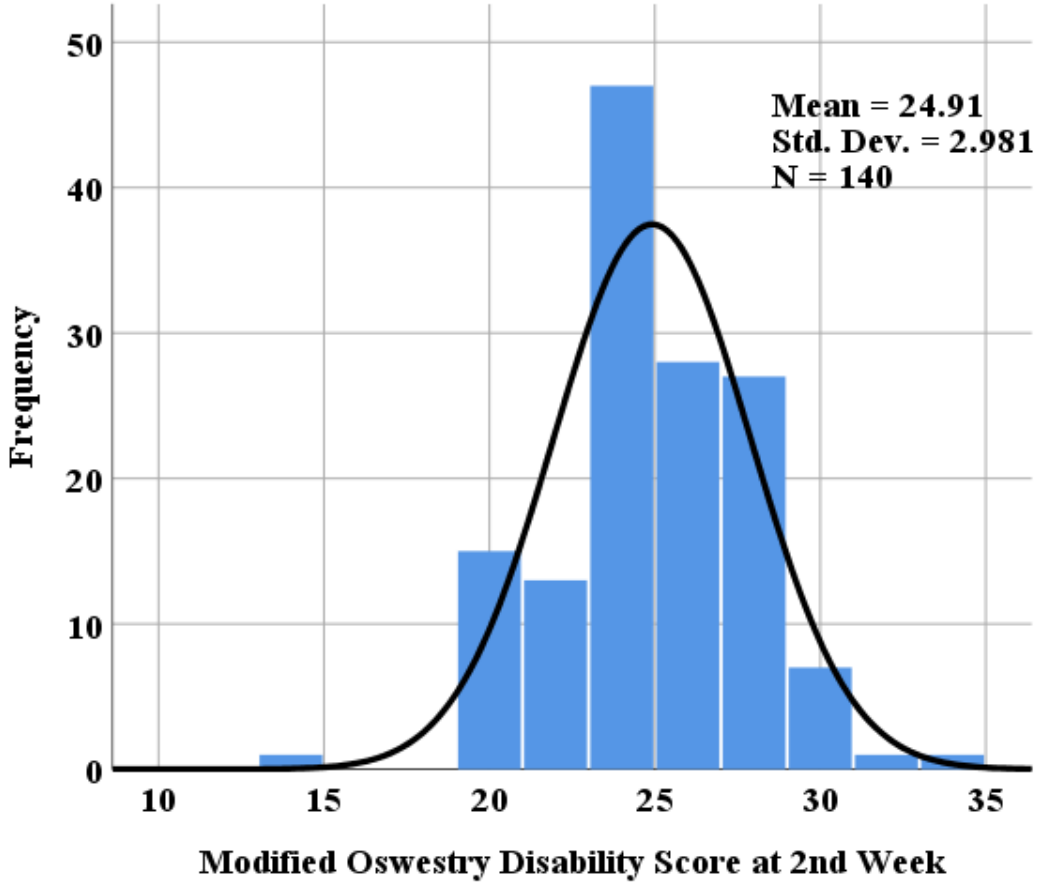
Among the participants (96.4%) those who returned to work took only 4 weeks with the range of 3 to 8 weeks after intervention in both groups.

Figure 12: Histogram showing Modified Oswestry Disability Score at first visit before intervention



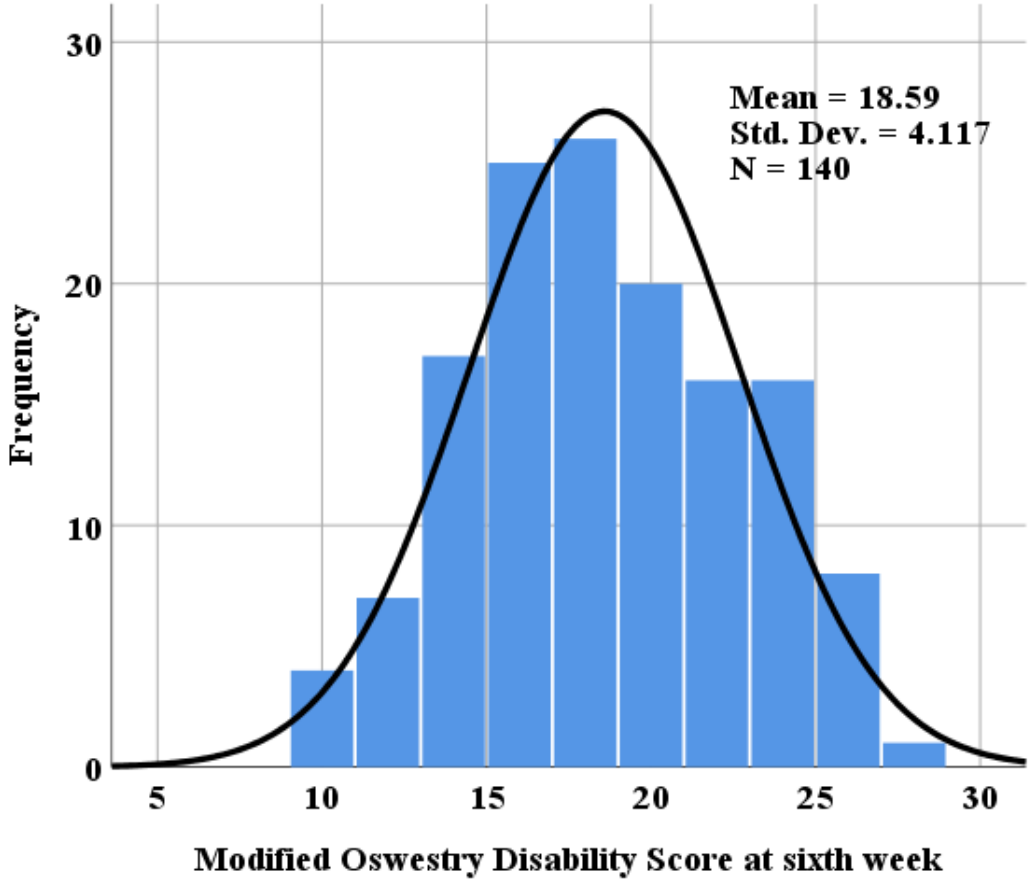
Comment: The mean score of Modified Oswestry Disability Score at first visit before intervention in both groups was 32.41.

Figure 13: Histogram showing Modified Oswestry Disability Score at second week visit after intervention



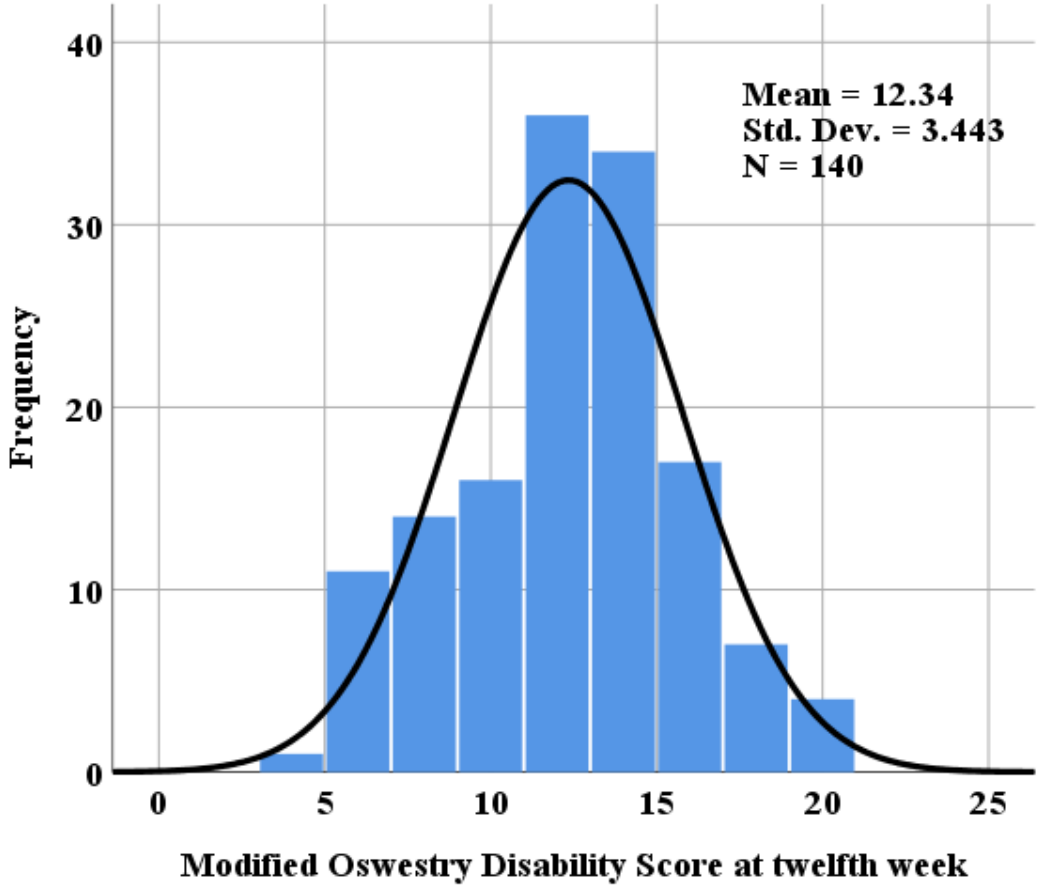
Comment: The mean score of Modified Oswestry Disability Score at second week after intervention in both groups was 24.91.

Figure 14: Histogram showing Modified Oswestry Disability Score at sixth week visit after intervention



Comment: The mean score of Modified Oswestry Disability Score at sixth week after intervention in both groups was 18.59.

Figure 15: Histogram showing Modified Oswestry Disability Score at twelfth week visit after intervention



Comment: The mean score of Modified Oswestry Disability Score at twelfth week after intervention in both groups was 12.34.

Table 6: Comparison of mean Modified Oswestry Disability Score before and after intervention by Paired t test

Time of assessment		Mean	Std. Dev	Mean difference	p value
Pair 1	At 1st visit	32.41	3.57	7.500	<0.0001
	At 2nd week	24.91	2.981		
Pair 2	At 2nd week	24.91	2.981	6.329	<0.0001
	At 6th week	18.59	4.117		
Pair 3	At 6th week	18.59	4.117	6.243	<0.0001
	At 12th week	12.34	3.443		
Pair 4	At 1st visit	32.41	3.57	13.829	<0.0001
	At 6th week	18.59	4.117		
Pair 5	At 1st visit	32.41	3.57	20.071	<0.0001
	At 12th week	12.34	3.443		

Comment: The difference between two mean of MODS at first (before intervention) and at 2^{nd} week (after intervention) was 7.50 and this difference was found to be statistically significant by Paired t test (p-value: <0.0001). Similarly, the difference between two mean of MODS at 2^{nd} week and 6^{th} week was 6.329; the difference between two mean of MODS at 6^{th} week and 12^{th} week was 6.243; difference between two mean of MODS at 1^{st} week (before intervention) and 6^{th} week (after intervention) was 13.829; difference between two mean of MODS at 1^{st} week (before

intervention) and 12th week (after intervention) was 20.071 and these difference was found to be statistically significant by Paired t test (p-value: <0.0001).

Inference: The rising trends of improvement in functional disability was observed after intervention by Yoga therapy and Back strengthening exercises at 2nd week, 6th week and 12th week respectively.

Figure 16: Comparison of mean Modified Oswestry Disability Score before and after intervention

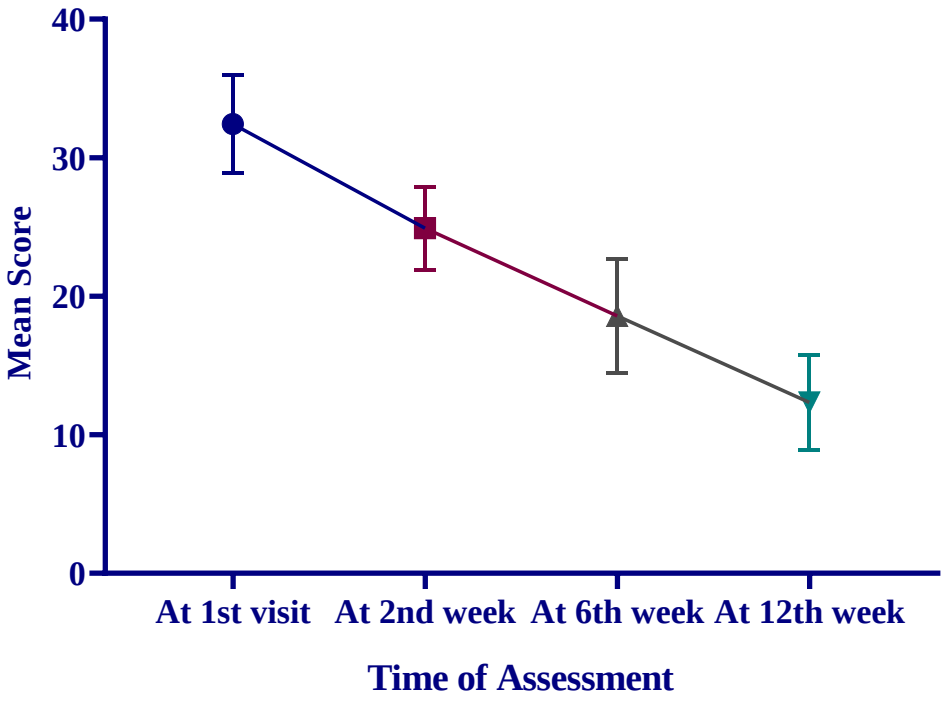


Table 7: Mean Visual Analog Scale Score before and after intervention by Paired t test

Time of assessment		Mean	Std. Dev	Mean difference	p value
Pair 1	At 1st visit	7.25	0.625	1.357	<0.0001
	At 2nd week	5.89	0.862		
Pair 2	At 2nd week	5.89	0.862	1.243	<0.0001
	At 6th week	4.65	1.211		
Pair 3	At 6th week	4.65	1.211	1.400	<0.0001
	At 12th week	3.25	1.479		
Pair 4	At 1st visit	7.25	0.625	2.600	<0.0001
	At 6th week	4.65	1.211		
Pair 5	At 1st visit	7.25	0.625	4.000	<0.0001
	At 12th week	3.25	1.479		

Comment: The difference between two mean of VAS score at first (before intervention) and at 2nd week (after intervention) was 1.357 and this difference was found to be statistically significant by Paired t test (p-value: <0.0001). Similarly, the difference between two mean of VAS score at 2nd week and 6th week was 1.243; the difference between two mean of VAS score at 6th week and 12th week was 1.400; difference between two mean of VAS score at 1st week (before intervention) and 6th week (after intervention) was 2.600; difference between two mean of VAS score at 1st

week (before intervention) and 12th week (after intervention) was 4 and these difference was found to be statistically significant by Paired t test (p-value: <0.0001).

Inference: The rising trends of liberation in pain was observed after intervention by Yoga therapy and Back strengthening exercises at 2nd week, 6th week and 12th week respectively.

Figure 17: Mean Visual Analog Scale score of the subjects before and after intervention

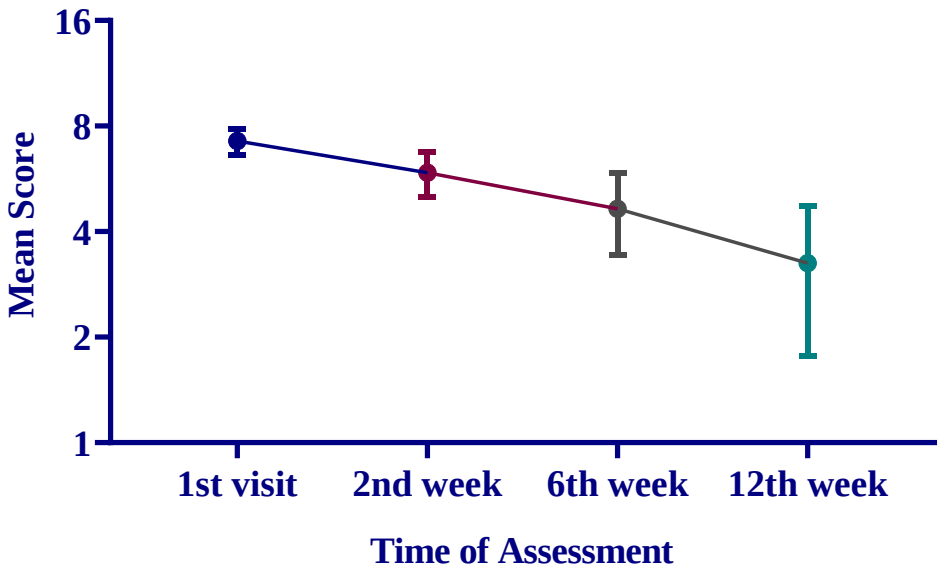


Table 8: Comparison of Group A and Group B with respect to Age distribution by Independent samples t test (N=140)

Group(N)	Mean	Std. Deviation	Std. Error Mean	p-value
A (70)	40.84	8.089	0.967	0.801
B (70)	40.49	8.619	1.03	

Comment: The mean age of Group A was 40.84 and the mean age of Group B was 40.49. The difference between the two mean was 0.35 and this difference was statistically not significant (p-value: 0.801) by Independent t test.

Inference: The Chronic Low Back pain in both yoga therapy group and Back Strengthening exercise group was not associated with age factor.

Figure 18: Comparison of Group A and Group B with respect to Age distribution by Independent samples t test (N=140)

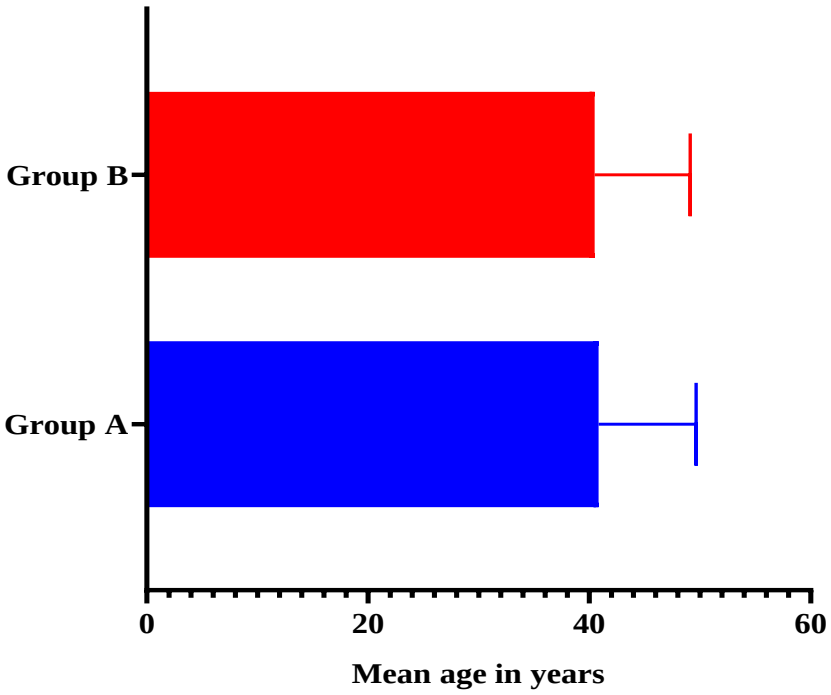


Table 9: Comparison of Group A and Group B with respect to Gender distribution by Chi square test (N=140)

Gender	Group A (N=70)		Group B (N=70)		Total (N=140)	
	N	%	N	%	N	%
Female	43	61.42	37	52.86	80	57.14
Male	27	38.58	33	47.14	60	42.86
Chi square value = 1.050			p value = 0.3055			

Comment: The proportion of female in both group A and B was higher than that of male and this difference in proportion between the two groups was statistically not significant by Chi-square test (p-value: 0.3055).

Inference: The Chronic Low Back Pain in both yoga therapy group and Back Strengthening exercise group was not associated with gender.

Figure 19: Comparison of Group A and Group B with respect to Gender distribution by Chi square test (N=140)

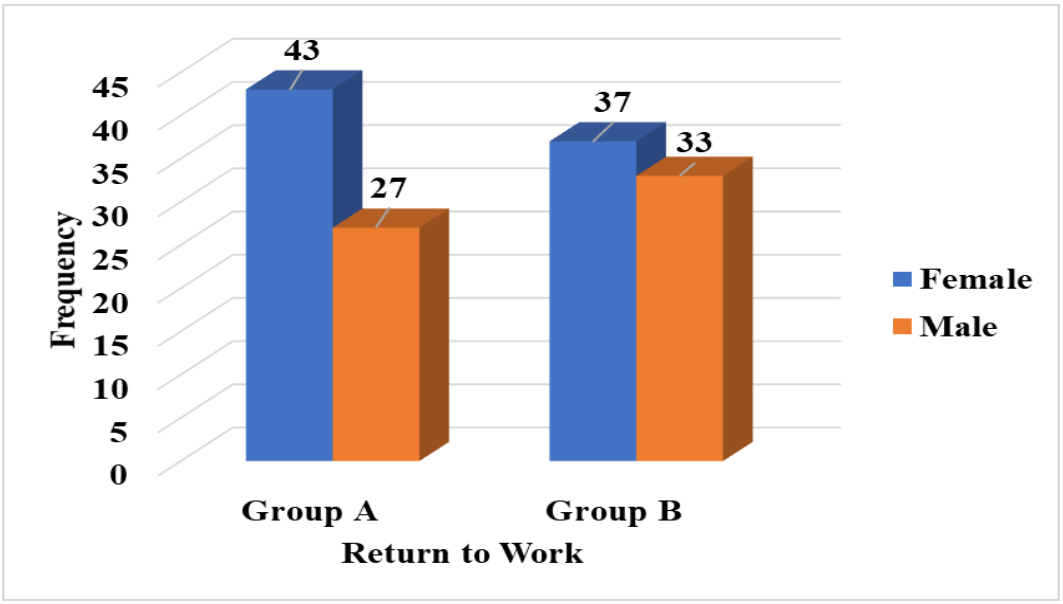


Table 10: Comparison of Group A and Group B with respect to Occupational distribution by Chi square test (N=140)

Occupation	Group A (N=70)		Group B (N=70)		Total (N=140)	
	N	%	N	%	N	%
Housewife	16	22.86	19	27.14	35	25
Student	0	0	7	10	7	5
Worker	54	77.14	44	62.86	98	70
Chi square value = 8.278			p value = 0.0159			

Comment: The proportion of workers in both group A and B was higher when compared to proportion of student and housewife. This difference in proportion between the two groups was statistically significant by Chi-square test (p-value: 0.0159).

Inference: The Chronic Low Back Pain in both yoga therapy group and Back Strengthening exercise group was associated with occupation as working group.

Figure 20: Comparison of Group A and Group B with respect to Occupational distribution by Chi square test (N=140)

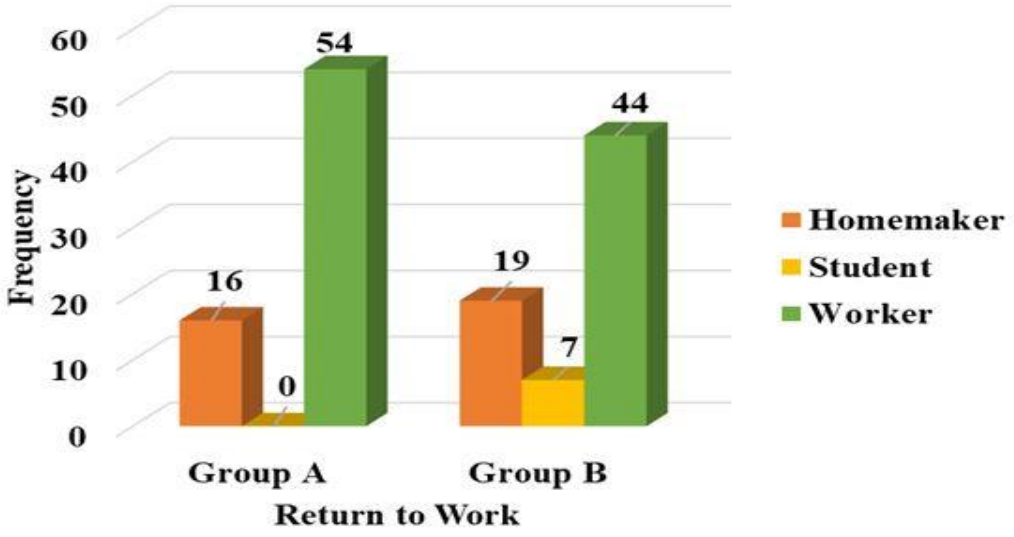


Table 11: Comparison of Group A and Group B with based on Returning to work by Fisher's exact test (N=140)

Return to Work	Group A		Group B		Total		P-value
	N	**%**	**N**	**%**	**N**	**%**	
Yes	70	100	65	92.86	135	96.42	0.0581
No	0	0	5	7.14	5	3.58	

Comment: The proportion of samples who returned to their work in both group A and B was higher when compared to who didn't returned to their work. This difference in proportion between the two groups was statistically not significant by Chi-square test (p-value: 0.0581) but closer to significant.

Inference: The CLBP in both yoga therapy group and back strengthening exercise group was not associated with returning to work after improved with intervention.

Figure 21: Comparison of Group A and Group B with based on Returning to work by Fisher's exact test (N=140)

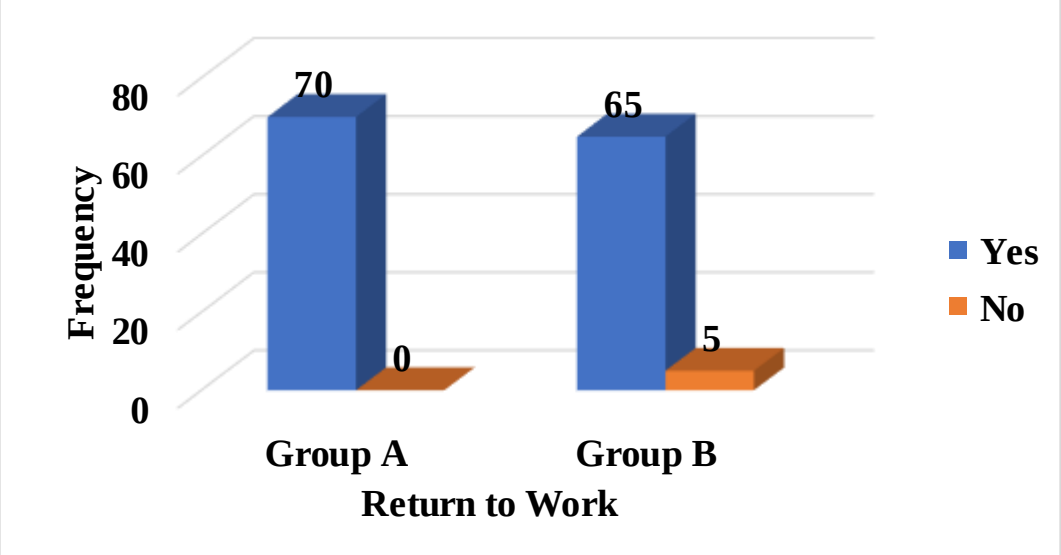


Table 12: Comparison of Group A and Group B with respect to duration of return to work by Independent samples t test (N=135)

Group(N)	Mean	Std. Deviation	Std. Error Mean	Mean difference	p-value
A (70)	2.91	0.794	0.095	5.00	<0.0001
B (65)	7.91	1.086	0.135		

Comment: The mean duration of returning to work among the group A was 2.91 and the mean duration of returning to work among the group B was 7.91 and the difference between the two mean was 5 and it was found to be statistically significant by Independent samples t test.

Inference: The Chronic Low Back Pain in both yoga therapy group and Back Strengthening exercise group was associated with duration of returning to work.

Figure 22: Comparison of Group A and Group B with respect to duration of return to work by Independent samples t test (N=135)

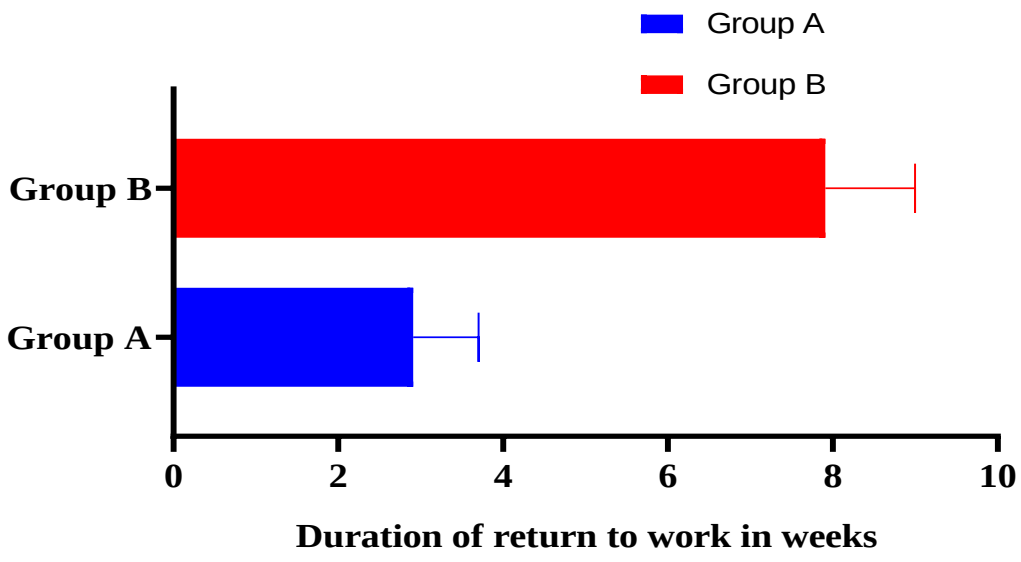


Table 13: Mean Modified Oswestry Disability Score of Group A before and after intervention by Paired t test (N=70)

Time of assessment		Mean	Std. Dev	Mean difference	P value
Pair 1	At 1st visit	32.11	3.352	8.400	<0.0001
	At 2nd week	23.71	2.935		
Pair 2	At 2nd week	23.71	2.935	8.229	<0.0001
	At 6th week	15.49	2.586		
Pair 3	At 6th week	15.49	2.586	5.686	<0.0001
	At 12th week	9.80	2.482		
Pair 4	At 1st visit	32.11	3.352	16.629	<0.0001
	At 6th week	15.49	2.586		
Pair 5	At 1st visit	32.11	3.352	22.314	<0.0001
	At 12th week	9.80	2.482		

Comment: The difference between two mean of MODS at Group A at first visit (before intervention) and at 2nd week (after intervention) was 8.400 and this difference was found to be statistically significant by Paired t test (p-value: <0.0001). Similarly, the difference between two mean of MODS of group A at 2nd week and 6th week was

8.229; the difference between two mean of MODS of group A at 6th week and 12th week was 5.686; difference between two mean of MODS of group A at 1st week (before intervention) and 6th week (after intervention) was 16.629; difference between two mean of MODS of group A at 1st week (before intervention) and 12th week (after intervention) was 22.314 and these difference was found to be statistically significant by Paired t test (p-value: <0.0001).

Inference: The functional disability was improved with Yoga therapy at 2nd week (26%), 6th week (51.75%) and 12th week (69.50%) when compared to baseline.

Figure 23: Mean Modified Oswestry Disability Score of Group A before and after intervention (N=70)

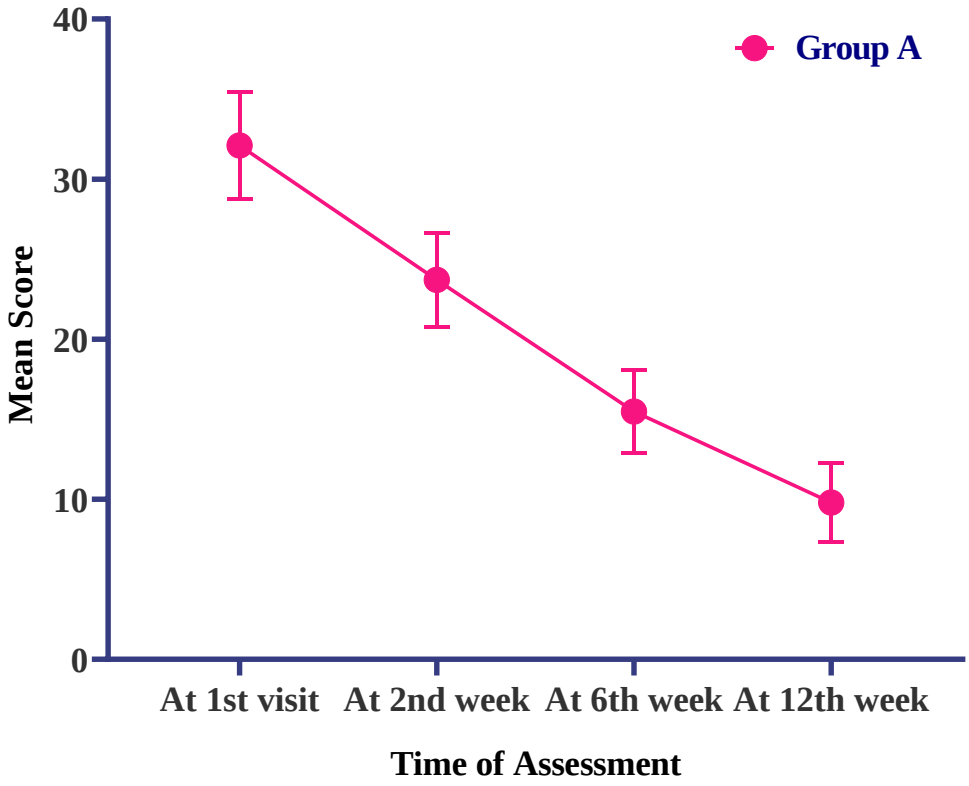


Table 14: Mean Modified Oswestry Disability Score of Group B before and after intervention by Paired t test (N=70)

Time of assessment		Mean	Std. Dev	Mean difference	P value
Pair 1	At 1st visit	32.71	3.777	6.600	<0.0001
	At 2nd week	26.11	2.523		
Pair 2	At 2nd week	26.11	2.523	4.429	<0.0001
	At 6th week	21.69	2.821		
Pair 3	At 6th week	21.69	2.821	6.800	<0.0001
	At 12th week	14.89	2.144		
Pair 4	At 1st visit	32.71	3.777	11.029	<0.0001
	At 6th week	21.69	2.821		
Pair 5	At 1st visit	32.71	3.777	17.829	<0.0001
	At 12th week	14.89	2.144		

Comment: The difference between two mean of MODS at Group B at first visit (before intervention) and at 2nd week (after intervention) was 8.400 and this difference was found to be statistically significant by Paired t test (p-value: <0.0001). Similarly, the difference between two mean of MODS of group B at 2nd week and 6th week was 8.229; the difference between two mean of MODS of group B at 6th week and 12th week was 5.686; difference between two mean of MODS of group B at 1st week

(before intervention) and 6th week (after intervention) was 16.629; difference between two mean of MODS of group B at 1st week (before intervention) and 12th week (after intervention) was 22.314 and these difference was found to be statistically significant by Paired t test (p-value: <0.0001).

Inference: The functional disability was improved with back strengthening exercises at 2nd week (20%), 6th week (33.7%) and 12th week (54.5%) when compared to baseline.

Figure 24: Mean Modified Oswestry Disability Score of Group B before and after intervention (N=70)

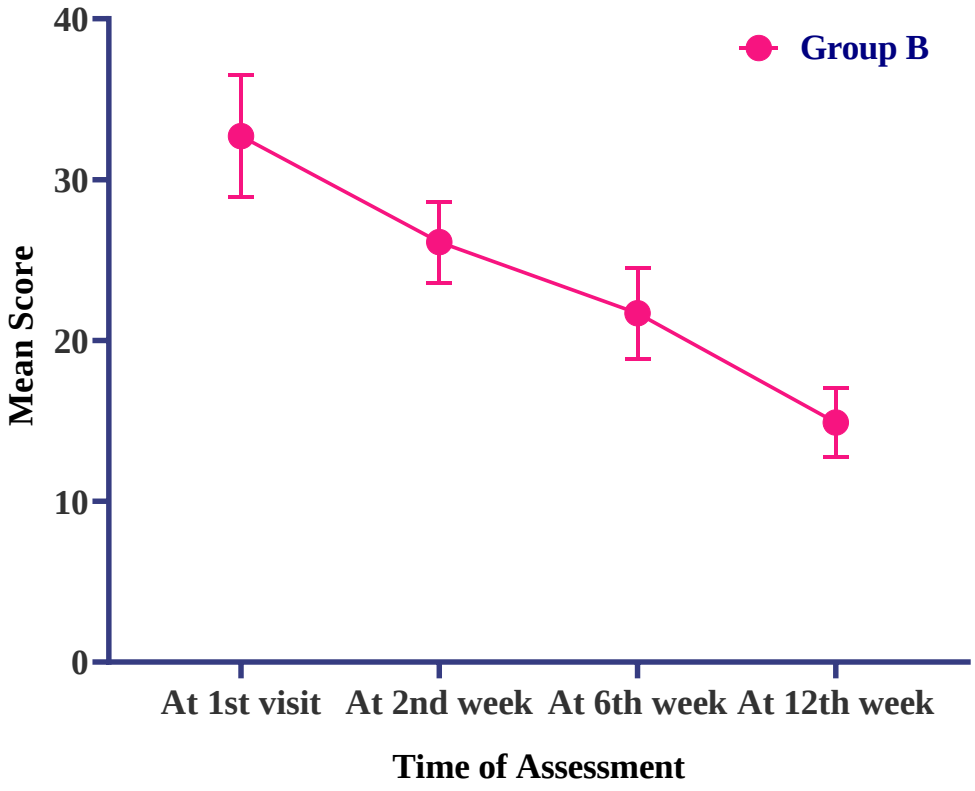


Table 15: Mean Visual Analog Scale Score of group A before and after intervention by Paired t test

Time of assessment		Mean	Std. Dev	Mean difference	P value
Pair 1	At 1st visit	7.16	0.694	1.614	<0.0001
	At 2nd week	5.54	0.943		
Pair 2	At 2nd week	5.54	0.943	1.757	<0.0001
	At 6th week	3.79	0.915		
Pair 3	At 6th week	3.79	0.915	1.843	<0.0001
	At 12th week	1.94	0.740		
Pair 4	At 1st visit	7.16	0.694	3.371	<0.0001
	At 6th week	3.79	0.915		
Pair 5	At 1st visit	7.16	0.694	5.214	<0.0001
	At 12th week	1.94	0.740		

Comment: The difference between two mean of VAS score of Group A at first (before intervention) and at 2nd week (after intervention) was 1.614 and this difference was found to be statistically significant by Paired t test (p-value: <0.0001). Similarly, the difference between two mean of VAS score of Group A at 2nd week and 6th week was 1.757; the difference between two mean of VAS score of Group A at 6th week

and 12th week was 1.843; difference between two mean of VAS score of Group A at 1st week (before intervention) and 6th week (after intervention) was 3.371; difference between two mean of VAS score of Group A at 1st week (before intervention) and 12th week (after intervention) was 5.214 and these difference was found to be statistically significant by Paired t test (p-value: <0.0001).

Inference: The pain relief was improved with Yoga therapy at 2nd week (22.6%), 6th week (47%) and 12th week (72.9%) when compared to baseline.

Figure 25: Mean Visual Analog Scale score of Group A before and after intervention

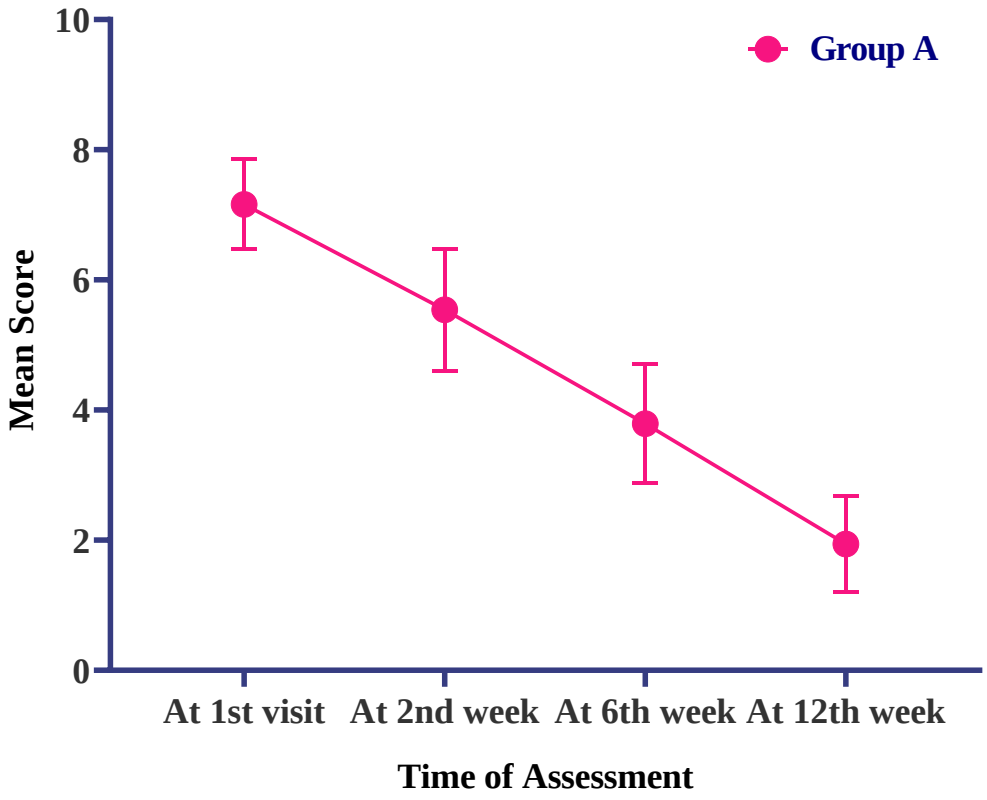


Table 16: Mean Visual Analog Scale Score of group B before and after intervention by Paired t test

Time of assessment		Mean	Std. Dev	Mean difference	P value
Pair 1	At 1st visit	7.34	0.535	1.100	<0.0001
	At 2nd week	6.24	0.600		
Pair 2	At 2nd week	6.24	0.600	0.729	<0.0001
	At 6th week	5.51	0.775		
Pair 3	At 6th week	5.51	0.775	0.957	<0.0001
	At 12th week	4.56	0.629		
Pair 4	At 1st visit	7.34	0.535	1.829	<0.0001
	At 6th week	5.51	0.775		
Pair 5	At 1st visit	7.34	0.535	2.786	<0.0001
	At 12th week	4.56	0.629		

Comment: The difference between two mean of VAS score of Group B at first (before intervention) and at 2^{nd} week (after intervention) was 1.100 and this difference was found to be statistically significant by Paired t test (p-value: <0.0001). Similarly, the difference between two mean of VAS score of Group B at 2^{nd} week and 6^{th} week was 0.729; the difference between two mean of VAS score of Group B at 6^{th} week and 12^{th} week was 0.957; difference between two mean of VAS score of Group B at

1st week (before intervention) and 6th week (after intervention) was 1.829; difference between two mean of VAS score of Group B at 1st week (before intervention) and 12th week (after intervention) was 2.786 and these difference was found to be statistically significant by Paired t test (p-value: <0.0001).

Inference: The pain relief was improved with back strengthening exercises at 2nd week (15%), 6th week (25%) and 12th week (37.9%) when compared to baseline.

Figure 26: Mean Visual Analog Scale score of Group B before and after intervention

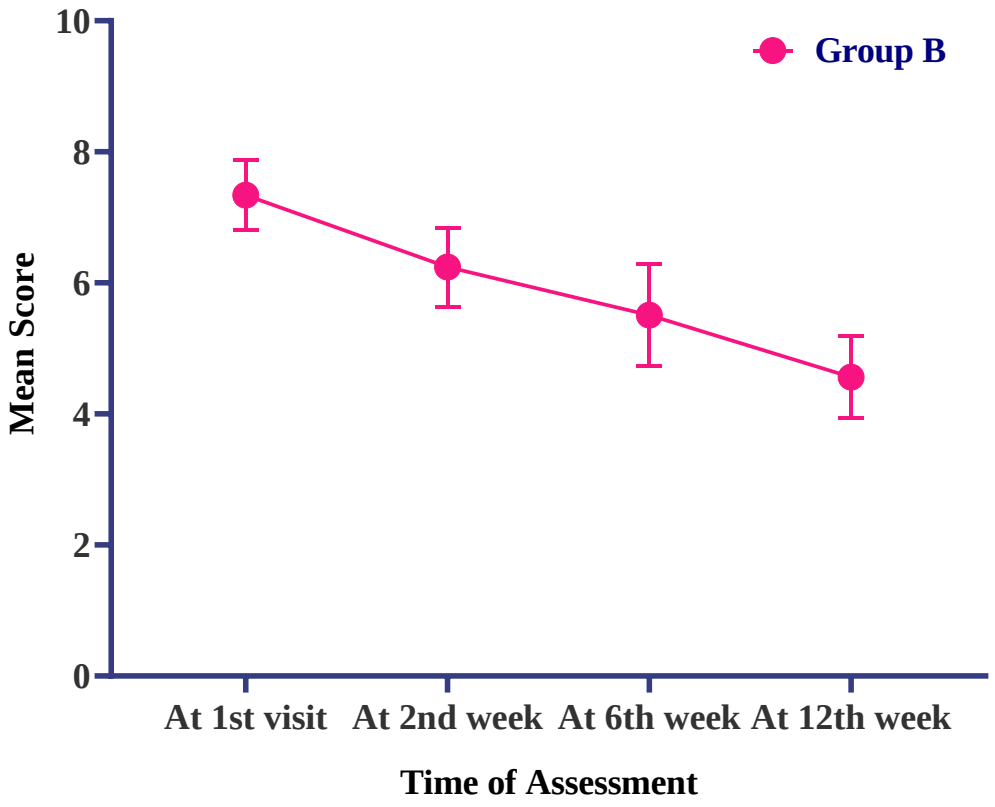


Table 17: Comparison of Group A and Group B with respect to Modified Oswestry Disability Score by Independent samples t test (N=140)

Time of assessment	Group	Mean	Std. Dev	Mean difference	p-value
At 1st visit	A	32.11	3.352	0.600	0.322
	B	32.71	3.777		
At 2nd week	A	23.71	2.935	2.400	<0.0001
	B	26.11	2.523		
At 6th week	A	15.49	2.586	6.200	<0.0001
	B	21.69	2.821		
At 12th week	A	9.80	2.482	5.086	<0.0001
	B	14.89	2.144		

Comment: The difference between two mean of MODS of Group A and Group B at first visit (before intervention) was 0.600 and such a difference between two mean was found to be statistically not significant by Independent samples t test (p-value: <0.322). Similarly, the difference between two mean of MODS of Group A and Group B at 2nd week (after intervention) was 2.400; the difference between two mean of MODS of Group A and Group B at 6th week (after intervention) was 6.200; the difference between two mean of MODS of Group A and Group B at 12th week (after intervention) was 5.086 and these difference was found to be statistically significant by Independent samples t test (p-value: <0.0001).

Inference: The functional disability was improved with Yoga therapy at 2nd week (26%), 6th week (51.75%) and 12th week (69.50%) when compared to baseline. The functional disability was improved with back strengthening exercises at 2nd week (20%), 6th week (33.7%) and 12th week (54.5%) when compared to baseline. The improvement in functional disability was greater in Yoga therapy when compared to back strengthening exercises at all levels of assessment by Modified Oswestry Disability Score.

Figure 27: Comparison of Group A and Group B with respect to Modified Oswestry Score by Independent samples t test (N=140)

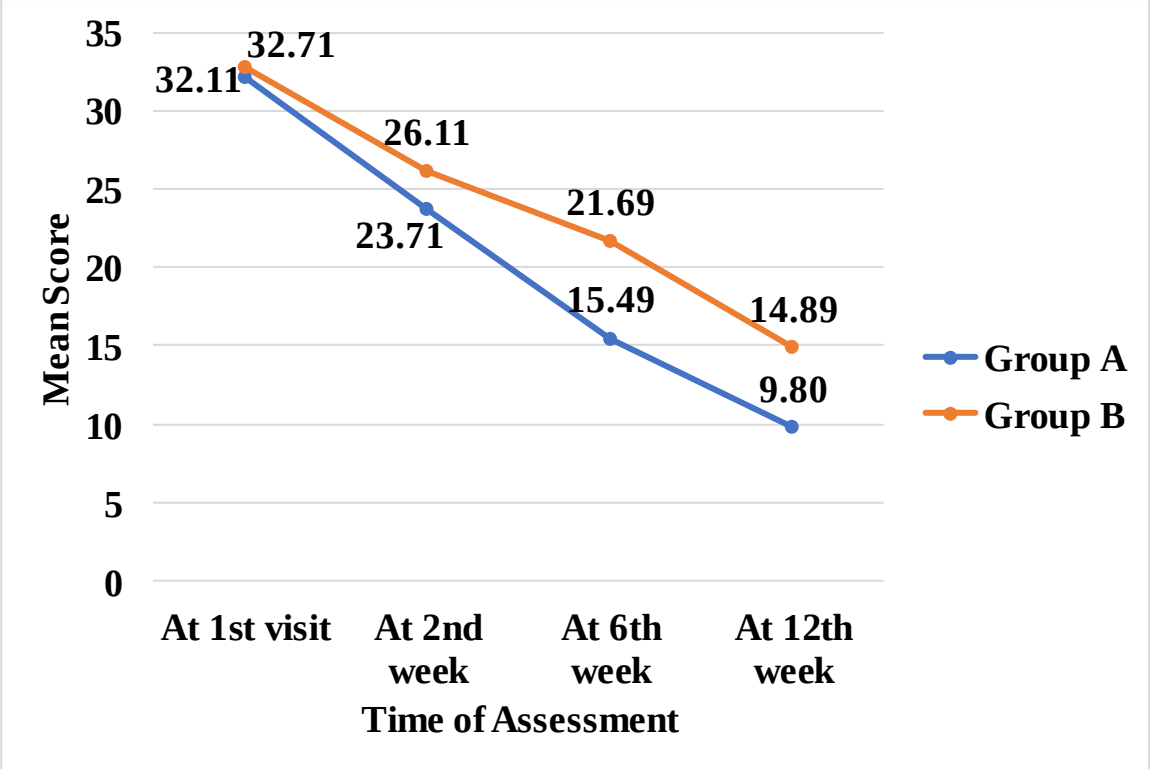


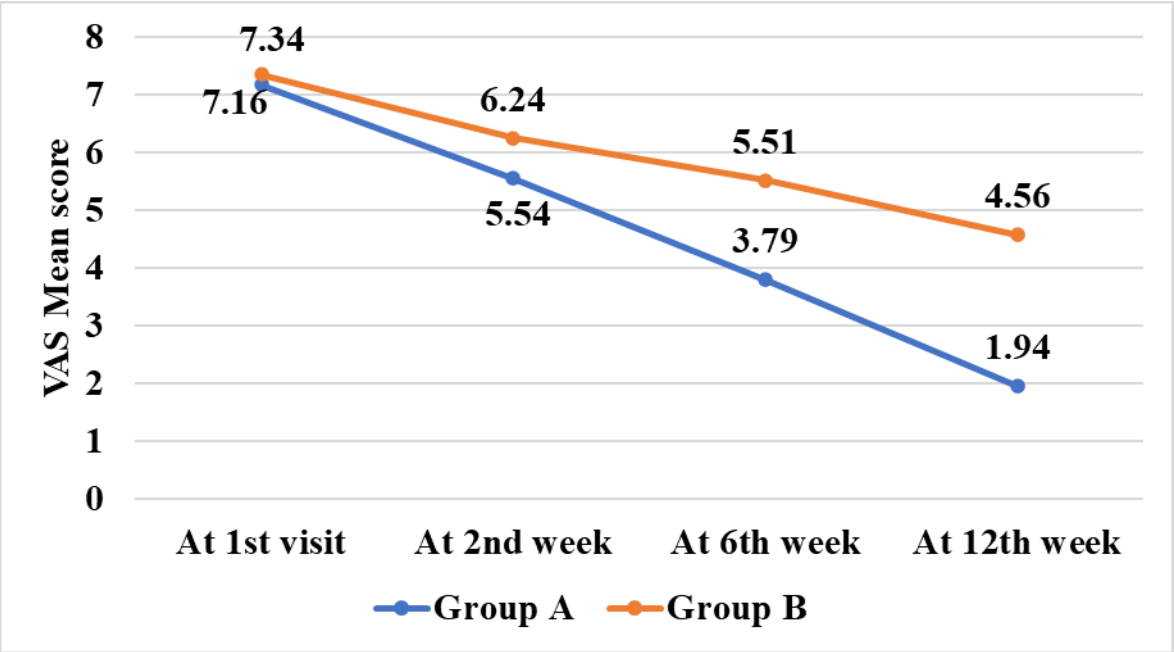
Table 18: Comparison of Group A and Group B with respect to Visual Analog Scale Score by Independent samples t test (N=140)

Time of assessment	Group	Mean	Std. Dev	Mean difference	p-value
At 1st visit	A	7.16	0.694	0.186	0.079
	B	7.34	0.535		
At 2nd week	A	5.54	0.943	0.700	<0.0001
	B	6.24	0.600		
At 6th week	A	3.79	0.915	1.729	<0.0001
	B	5.51	0.775		
At 12th week	A	1.94	0.740	2.614	<0.0001
	B	4.56	0.629		

Comment: The difference between two mean of VAS score of Group A and Group B at first visit (before intervention) was 0.186 and such difference between two mean was found to be statistically not significant by Independent samples t test (p-value: <0.079). Similarly, the difference between two mean of VAS score of Group A and Group B at 2nd week (after intervention) was 0.700; the difference between two mean of VAS score of Group A and Group B at 6th week (after intervention) was 1.729; the difference between two mean of VAS score of Group A and Group B at 12th week (after intervention) was 2.614 and these difference was found to be statistically significant by Independent samples t test (p-value: <0.0001).

Inference: The pain relief was improved with Yoga therapy at 2nd week (22.6%), 6th week (47%) and 12th week (72.9%) when compared to baseline. The pain relief was improved with back strengthening exercises at 2nd week (15%), 6th week (25%) and 12th week (37.9%) when compared to baseline. The improvement in pain relief was greater in Yoga therapy when compared to back strengthening exercises at all levels of assessment by Visual Analog Scale Score.

Figure 28: Comparison of Group A and Group B with respect to Visual Analog Scale Score by Independent samples t test (N=140)



DISCUSSION

DISCUSSION

A Randomized controlled Trial was conducted among 140 patients who presented with low back pain to RLJ hospital attached to Sri Devaraj Urs Academy of Higher Education and Research Tamaka, Kolar.

Group A received Yoga therapy both in morning and evening for at least 30 minutes for 3 months with Hot fomentation - morning and night (twice daily) and tablet Paracetamol when patient complaints of pain.

Group B received back strengthening exercises 15 minutes 4 times a day for 3 months with Hot fomentation - morning and night (twice daily) with Tablet Paracetamol 650mg when patient complaints of pain.

Table 19: Comparison of age distribution.

Author	Mean age of Yoga therapy group	Mean age of conventional conservative therapy group
Present study	40.84 ± 8.08	40.49 ± 8.61
Sherman et al[96] (2005)	44 ± 12	42 ± 15
Tekur et al[17] (2012)	49 ± 3.6	48 ± 4

The mean age of the participants was 40.66 ± 8.33 in the study with a range of 25 -50 years. But the mean age of samples in the RCT conducted by Williams et al[97] was 48.3 ± 1.5 with a range of 23–67 years. The mean age of samples in the cross sectional study conducted by Salvetti et al[98] was 46.9 ± 9.6 to estimate disability related to chronic low back pain. The mean age of the samples was 45.7 years (standard deviation 10.3) in the study conducted by Bramberg et al.[77] This difference in age means can be explained by different study settings and sampling techniques.

The Chronic Low Back pain in both the yoga therapy group and Back Strengthening exercise group was not associated with the age factor. But associated could be appreciated in several studies in contrast to our study.[99,100] This difference may be due to the sampling technique followed in various studies.

Table 20: Comparison of Gender distribution.

Author	Year	Male: Female
Present study	2020	3: 4
Bramberg et al[77]	2012	3: 7
Sherman et al[96]	2005	2:3

About 57% of the samples were female and 43% were male. The Chronic Low Back Pain in both yoga therapy group and Back Strengthening exercise group was not associated with gender. Contrast finding was observed in the study conducted by Husky et al.[99] This difference may be due to study settings, nature of the occupation, and sampling technique followed in various studies.

Table 21: Comparison of Occupation distribution.

Author	Year	Employed	Unemployed
Present study	2020	70%	30%
Bramberg et al[77]	2012	88%	12%

Almost 70% of the participants were workers with lower back ache and only 5% were students. The Chronic Low Back Pain in both yoga therapy group and Back

Strengthening exercise group was associated with occupation as a working group. A similar association was observed in the study conducted by Husky et al.[99]

Comparison of the participants based on the return to work

Almost 96.4% of the samples returned to their work after intervention by Yoga and back strengthening exercises. Among the participants (96.4%) those who returned to work took only 4 weeks after intervention in both groups within the range of 3 to 8 weeks. The Chronic Low Back Pain in both yoga therapy group and Back Strengthening exercise group was not associated with returning to work after improved with intervention but associated with the duration of returning to work.

The Systematic review carried out by Pengel et al[101] inferred that quick improvements in pain (mean reduction 58% of initial scores), disability (58%), as well as return to work (82% of those at first off work) befallen in the first month after an early episode of LBP. Further development was seeming until about three months. Thereafter levels for pain, disability, as well as return to work remained almost constant. 73% of patients had at least one recurrence within 12 months. But our study didn't mention about recurrence.

Table 22: Comparison of Mean Analog Visual score.

Author	Year	Before Intervention	After Intervention of 12 weeks	Mean difference
Present study	2020	7.25 ± 0.625	3.25 ± 1.479	4
Tekur et al[17]	2012	6.68 ± 1.82	3.40 ± 1.88	6.34

The mean VAS score in this study was 7.25 ± 0.625 and a similar finding was observed in the study conducted by Imamura et al[102] in which the mean VAS score was 7.31 ± 1.53.

The pain relief was improved with Yoga therapy at 2nd week (22.6%), 6th week (47%), and 12th week (72.9%) when compared to baseline. The pain relief was improved with back strengthening exercises at 2nd week (15%), 6th week (25%), and 12th week (37.9%) when compared to baseline. The improvement in pain relief was greater in Yoga therapy when compared to back strengthening exercises at all levels of assessment by the Visual Analog Scale Score.

This study showed there is a decrease in pain to 37.9% by the end of 3 months. But in the study conducted by Franca et al[79] showed the effect of segmental stabilization of core muscle on CLBP pain, which decreased 99% on a visual analog scale. They explained that the improvement could be because this technique addressed two muscles (primary stabilizers) that get affected in low back pain.

There were 9 studies[16–19,96,103–105] probing the outcomes of yoga practices on pain compared to physical therapy exercise. Out of the total 1466 participants was included in the 9 studies that 738 participants were in the yoga group, besides 728 participants in the exercise or physical therapy group.

After 7 days of rigorous yoga intervention, yoga could significantly decrease pain (MD = -2.36, 95% CI = -3.15 to -1.56, $p<0.00001$, $I2 = 0\%$) (Fig 4) compared to physical therapy exercise. The comparable finding was observed in George et al[106] in 2010. There were no studies examining pain in long term.

Table 23: Comparison of Mean Modified Oswestry Disability score.

Author	Year	Before Intervention	After Intervention of 12 weeks	Mean difference
Present study	2020	32.41 ± 3.57	12.34 ± 3.44	20.071
Fritz et al[107]	2001	45.46 ± 15.54	28.03 ± 20.73	17.45

The functional disability was improved with Yoga therapy at 2nd week (26%), 6th week (51.75%), and 12th week (69.50%) when compared to baseline. The functional disability was improved with back strengthening exercises at 2nd week (20%), 6th week (33.7%), and 12th week (54.5%) when compared to baseline. The improvement in functional disability was greater in Yoga therapy when compared to back strengthening exercises at all levels of assessment by Modified Oswestry Disability Score.

The mean ODI score observed indicates moderate disability, similar to findings in a study of a population with CLBP.[98]

The disparity found between the disability occurrence recognized in this and other studies can be elucidated by the dissimilar definitions of disability. It should be emphasized, however, that the greater disabling potential of chronic low back pain was established.

The high occurrence of moderate to severe disability found can be elucidated by the element that the sample entirely covered people with CLBP, a condition with an exceedingly disabling potential. Besides, this sample entailed of people who attended health services.

A greater trend on the road to disability was also witnessed among participants with more severe pain. The fact that pain strength did not disclose to be a factor independently related with disability supports the importance of psychosocial factors like beliefs and emotional factors in pain-related disability. Depression, fear, occupation is also associated with disability as described in various studies.

Pain-related disability disturbs various aspects of daily life and incites mental suffering. Individuals who face problems to complete daily activities and are incapable to keep up their professional activities tend to take distance from social contact and evade leisure activities. Social isolation and avoidance of pain-related activities can reduce self-efficacy and increase the chance of developing depressive and disability symptoms.

Individuals who feel incapacitated by pain go through many sessions, examinations, as well as surgeries, in search of answers and often without reaching the anticipated results. Disability-related social costs are also huge, considering that people disabled by pain present decreased efficiency, leave from work and sickness absenteeism, determinants that put a significant strain on the social security system.

Related articles providing evidence for the effectiveness of Yoga therapy for chronic low back pain

Cramer et al[21] conducted a systematic review that observed solid evidence for short-term effectiveness as well as moderate evidence for long-term effectiveness of yoga for chronic low back pain in the most imperative patient-cantered outcomes.

Williams et al[108] conducted a Randomized Controlled Trial that inferred that Yoga progresses functional disability, pain intensity, as well as depression in adults with

CLBP. There was also a clinically significant trend for the yoga group to lessen their pain medication use when compared to the control group.

One higher-quality trial (101 patients) found 6 weeks of Viniyoga (a therapeutically oriented style) to be somewhat superior to conventional exercise (mean the difference in RDQ scores, -1.8 [CI, -3.5 to -0.1]). Yoga was also associated with decreased medication use at week 26 (21% of patients) compared with exercise (50%).[96]

One trial observed Iyengar yoga more effective than exercise instruction for decreasing disability through 3 months after treatment, influences on pain were small and were statistically significant only when adjusted for baseline differences.[97] The other, smaller trials found no significant differences between Iyengar yoga and standard exercise.[109]

An intervention that has established promising effects on decreasing low back pain, enhancing back disability is Yoga and it was demonstrated in various studies[21,95,110,111].

Tekur et al[105] inferred that 7 days of an intensive yoga intervention decreased pain as well as disability in patients with CLBP better than a physical exercise regimen.

In a review of 17 non-pharmacological treatments for low back pain that forms the base of clinical practice strategies issued by the American Pain Society and the American College of Physicians, Chou[87] observed "fair evidence" (i.e., the intensity of the evidence was limited by the number, quality, size, or uniformity of the included evidence) that yoga is an useful treatment for this condition.

Yoga has engendered plenty of interest and consideration among the public, and the public health community suggested it as an alternate treatment for some chronic health conditions.

Both interventions were effective in reducing pain and disability among patients diagnosed with chronic Low Back pain. Based on the results it was inferred that Yoga therapy was better than back strengthening exercises when supplemented with hot fomentation and paracetamol tablets in the control of chronic Low Back pain. The superiority of Yoga therapy was observed at all levels of assessment and also before and after comparison was made to evaluate the advantage of both interventions concerning the duration of therapies.

CONCLUSION

CONCLUSION

The pain relief was improved with Yoga therapy at 2nd week (22.6%), 6th week (47%), and 12th week (72.9%) when compared to baseline. The pain relief was improved with back strengthening exercises at 2nd week (15%), 6th week (25%), and 12th week (37.9%) when compared to baseline. The functional disability was improved with Yoga therapy at 2nd week (26%), 6th week (51.75%), and 12th week (69.50%) when compared to baseline. The functional disability was improved with back strengthening exercises at 2nd week (20%), 6th week (33.7%), and 12th week (54.5%) when compared to baseline. The difference between the effect of both Yoga therapy and back strengthening exercises in the improvement of Chronic Low Back pain patients was found to be statistically significant.

Based on the results it was inferred that Yoga therapy was better than back strengthening exercises when supplemented with hot fomentation and paracetamol tablets in decreasing pain and to improve functional disability. The superiority of Yoga therapy was observed at all levels of assessment and also before and after comparison was made to evaluate the advantage of both interventions concerning the duration of therapies.

RECOMMENDATION

The current trial poses comparatively little evidence on the effectiveness of yoga on pain, as well as disability in chronic Back pain. Also, maximum trials testing yoga against exercise controls have been conducted in well-educated, middle, as well as upper socioeconomic status inhabitants. So, there is a necessity for additional trials in a range of populations, comprising low SES peoples, elder people, and populations with comorbidities. Ultimately, there is inadequate evidence on the comparative outcomes of yoga as well as non-yoga exercise regimens, and added high-certainty studies examining yoga versus non-yoga exercise would be helpful in illuminating the comparative benefits of these treatments, what sections of yoga might be of most beneficial, and what sorts of people might be most appropriate for using yoga to manage back pain. These studies should be of low risk of bias and must include stating on adverse events. Trials should also contain measurement of depression besides quality of life, to examine whether the mind component of yoga is successful in improving these patients' important outcomes, and should include long-term follow-up to establish whether yoga is about to be satisfactory and valuable in regular clinical practice. There is also a need for additional methodological research in this field of the potential influence of people's penchants and hopes on results within RCTs of yoga.

SUMMARY

SUMMARY

Chronic low back pain implies to the low back, lumbosacral as well as sacroiliac pain longer than 3 months which is occasionally associated with radiation pain in the lower limbs, and ill-defined lower back pain is pain not ascribed to an identifiable pathology. Many studies have described about the beneficial effect of both Yoga therapy and Muscle Strengthening exercise in reducing the outcomes of Chronic Low back pain.

The objective of the study was to estimate pain using the Visual Analog Scale and disability using the Modified Oswestry Disability Scale among the clinico-radiologically diagnosed patients with chronic low back pain. To compare the efficacy of home-based yoga therapy and conventional conservative therapy using a visual analog scale for pain and disability using a modified Oswestry disability scale among the patients diagnosed with chronic low back pain.

A Randomized controlled Trial was among 140 patients presented with low back pain to RLJ hospital attached to Sri Devaraj Urs Academy of Higher Education and Research Tamaka, Kolar from November 2018 to October 2020.

Patients with chronic low back pain aged from 25 to 50 years were included and patients with traumatic, infective, psychosomatic cause, deformities, pregnancy, and neurological compromise were excluded. Xray lumbosacral spine – Antero posterior and lateral views and Haematological investigations were done. The participants were randomized into two groups by online random generator software. Subjects were assessed through Proforma and informed consent was taken.

Group A received Yoga therapy both in morning and evening for at least 30 minutes for 3 months with Hot fomentation - morning and night (twice daily) and tablet Paracetamol whenpatient complaints of pain.

Group B received back strengthening exercises 15 minutes 4 times a day for 3 months with Hot fomentation - morning and night (twice daily) and Tablet Paracetamol 650mg when patient complaints of pain.

Patient in both the groups were followed up at 2nd and 6th and 12th week following intervention.

The mean age of the participants was 40.66 ± 8.33 in the study with a range of 25 -50 years. About 57% of the samples were female and 43% were male. Almost 70% of the participants were workers with Lower back Ache and only 5% were students. Almost 96.4% of the samples returned to their work after intervention. Among the participants (96.4%) those who returned to work took only 4 weeks after intervention in both groups within the range of 3 to 8 weeks. The Chronic Low Back pain in both the yoga therapy group and Back Strengthening exercise group was not associated with the age, gender and return to work but association was seen with occupation.

The pain relief was improved with Yoga therapy at 2nd week (22.6%), 6th week (47%), and 12th week (72.9%) when compared to baseline. The pain relief was improved with back strengthening exercises at 2nd week (15%), 6th week (25%), and 12th week (37.9%) when compared to baseline. The improvement in pain relief was greater in Yoga therapy when compared to back strengthening exercises at all levels of assessment by the Visual Analog Scale Score.

The functional disability was improved with Yoga therapy at 2nd week (26%), 6th week (51.75%), and 12th week (69.50%) when compared to baseline. The functional

disability was improved with back strengthening exercises at 2nd week (20%), 6th week (33.7%), and 12th week (54.5%) when compared to baseline. The improvement in functional disability was greater in Yoga therapy when compared to back strengthening exercises at all levels of assessment by Modified Oswestry Disability Score.

Based on the results it was inferred that Yoga therapy was better than back strengthening exercises when supplemented with hot fomentation and paracetamol tablets in the control of chronic Low Back pain. The superiority of Yoga therapy was observed at all levels of assessment and also before and after comparison was made to evaluate the advantage of both interventions concerning the duration of therapies. There is a need to explore the usefulness of Yoga therapy in chronic illness with long term follow up considering the various factors associated with the back pain.

LIMITATION

LIMITATION

- The sample was drawn from patients attending Hospital, the results cannot properly be generalized to the national population.
- Selection bias has not been ruled out by using any of the methods such as Allocation concealment.
- Our study did not include a control group that received no treatment, which limited our ability to refute the argument that the observed improvement from pre to post intervention occurred naturally.
- No blinding of therapists or outcome assessors was performed
- The economic evaluation of the use of 12 weekly group classes of specialized yoga and Back Strengthening Exercises for treating patients with chronic Low Back Pain could be added
- Moreover, biopsychosocial factors were not observed in this study.
- Even though we included some standard outcome variables in our analyses, many significant outcome variables were not included such recurrence of Back pain, adherence to both therapy, duration of illness, depression, threshold of pain etc.

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ANNEXURES

ANNEXURE - I

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH, TAMAKA, KOLAR - 563101.

PATIENT INFORMATION SHEET

This information is to help you understand the purpose of the study "**A RANDOMISED CONTROLLED STUDY ON EFFICACY OF HOME -BASED YOGA THERAPY VERSUS CONVENTIONAL CONSERVATIVE THERAPY IN CHRONIC LOWBACK PAIN"** You are invited to take part voluntarily in this research study, it is important that you read and understand the purpose, procedure, benefits and discomforts of the study.

What is the purpose of this study?

What are the various investigations being used? Are there any associated risks?

Absolutely no risks are associated with various investigations involved in this study such as

Complete blood count.

ESR.

X ray- lumbosacral spine- anteroposterior and lateral view.

What is the benefit for me as a participant?

Participation in this research study may not change the final outcome of your chronic low back pain. However, patients in the future may benefit as a result of knowledge gained from this study. You will not be charged extra for any of the procedures performed during the research study. Your taking part in this study is entirely

voluntary. You may refuse to take part in the study or you may stop your participation in the study at any time, without a penalty or loss of any benefits to which you were otherwise entitled before taking part in this study.

CONFIDENTIALITY

Your medical information will be kept confidential by the study doctor and staff and will not be made publicly available. Your original records may be reviewed by your doctor or ethics review board. For further information/ clarification please contact Dr. JOE LOURDU PRADEEP, SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH, TAMAKA, KOLAR - 563101.Contact no: 8524980201 to Dr Joe Lourdu Pradeep

ಶ್ರೀದೇವರಾಜ್ ಅರಸ್ ಅಕಾಡೆಮಿ ಆಫ್ ಹೈಯರ್ ಎಜುಕೇಶನ್ ಅಂಡ್

ರಿಸರ್ಚ್, ತಮಕಾ, ಕೋಲಾರ - 563101

ರೋಗಿಯ ಮಾಹಿತಿ ಹಾಳೆ

ಅಧ್ಯಯನದ ಶೀರ್ಷಿಕೆ: - "ದೀರ್ಘಕಾಲದ ಕೆಳ ಭಾಗ ಬೆನ್ನುನೋವುಗಾಗಿ ಮನೆ ಆಧಾರಿತ ಯೋಗ ಚಿಕಿತ್ಸೆ ಮತ್ತು ಸಂಪ್ರದಾಯವಾದಿ ಸಾಂಪ್ರದಾಯಿಕ ಚಿಕಿತ್ಸೆ ನಡುವೆ ಪರಿಣಾಮಕಾರಿಯಾದ ಅಧ್ಯಯನ- ಒಂದು ಯಾದೃಚ್ ನಿಯಂತ್ರಿತ ಪ್ರಯೋಗ"

ಈ ಮಾಹಿತಿಯು ಅಧ್ಯಯನದ ಉದ್ದೇಶವನ್ನು ಅರ್ಥಮಾಡಿಕೊಳ್ಳಲು ನಿಮಗೆ ಸಹಾಯ ಮಾಡುತ್ತದೆ. ಈ ಸಂಶೋಧನಾ ಅಧ್ಯಯನದಲ್ಲಿ ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ಪಾಲ್ಗೊಳ್ಳಲು ನಿಮ್ಮನ್ನು ಆಹ್ವಾನಿಸಲಾಗಿದೆ, ನೀವು ಉದ್ದೇಶಗಳನ್ನು, ಕಾರ್ಯವಿಧಾನಗಳನ್ನು ಓದುವುದು ಮತ್ತು ಅರ್ಥಮಾಡಿಕೊಳ್ಳುವುದು ಬಹಳ ಮುಖ್ಯ.

ಈ ಅಧ್ಯಯನದ ಉದ್ದೇಶವೇನು?

ವಿವಿಧ ತನಿಖೆಗಳನ್ನು ಬಳಸಲಾಗುತ್ತಿದೆ? ಯಾವುದೇ ಸಂಬಂಧಿತ ಅಪಾಯಗಳಿವೆಯೇ?

ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಒಳಗೊಂಡಿರುವ ವಿವಿಧ ತನಿಖೆಗಳೊಂದಿಗೆ ಯಾವುದೇ ಅಪಾಯಗಳು ಸಂಬಂಧಿಸಿಲ್ಲ.

ನಡೆಸಲಾಗುವ ಪರೀಕ್ಷೆಗಳು ಕೆಳಗಿವೆ

- ಸಂಪೂರ್ಣ ರಕ್ತದ ಎಣಿಕೆ
- ಇಎಸ್ಆರ್.
- ಎಕ್ಸ್ ರೇ- ಲುಂಬೊಸ್ಯಾಕ್ರಲ್ ಬೆನ್ನು- ಆಂಟರೊಪೊಸ್ಟೀರಿಯರ್ ಮತ್ತು ಲ್ಯಾಟರಲ್ ವ್ಯೂ

ಪಾಲ್ಗೊಳ್ಳುವವರಾಗಿ ನನಗೆ ಏನು ಪ್ರಯೋಜನ?

ಈ ಸಂಶೋಧನಾ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವುದರಿಂದ ನಿಮ್ಮ ದೀರ್ಘಕಾಲದ ಕಡಿಮೆ ಬೆನ್ನುನೋವಿನ ಅಂತಿಮ ಫಲಿತಾಂಶವು ಬದಲಾಗುವುದಿಲ್ಲ. ಆದಾಗ್ಯೂ, ಈ ಅಧ್ಯಯನದಿಂದ ಪಡೆದ ಜ್ಞಾನದ ಪರಿಣಾಮವಾಗಿ ಭವಿಷ್ಯದಲ್ಲಿ ರೋಗಿಗಳು ಪ್ರಯೋಜನ ಪಡೆಯಬಹುದು.ಸಂಶೋಧನಾ ಅಧ್ಯಯನದ ಸಮಯದಲ್ಲಿ ನಿರ್ವಹಿಸುವ ಯಾವುದೇ ಕಾರ್ಯವಿಧಾನಗಳಿಗೆ ನಿಮಗೆ ಹೆಚ್ಚುವರಿ ಶುಲ್ಕ ವಿಧಿಸಲಾಗುವುದಿಲ್ಲ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ನೀವು ಭಾಗವಹಿಸುವುದು

ಸಂಪೂರ್ಣವಾಗಿ ಸ್ವಯಂಪ್ರೇರಿತವಾಗಿದೆ. ನೀವು ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ನಿರಾಕರಿಸಬಹುದು ಅಥವಾ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಪಾಲ್ಗೊಳ್ಳುವ ಮೊದಲು ನಿಮಗೆ ಅರ್ಹತೆ ದೊರೆತ ಯಾವುದೇ ಪ್ರಯೋಜನಗಳ ದಂಡ ಅಥವಾ ನಷ್ಟವಿಲ್ಲದೆ ನೀವು ಯಾವುದೇ ಸಮಯದಲ್ಲಿ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವುದನ್ನು ನಿಲ್ಲಿಸಬಹುದು.

ಗೌಪ್ಯತೆ:

ನಿಮ್ಮ ವೈದ್ಯಕೀಯ ಮಾಹಿತಿಯನ್ನು ಅಧ್ಯಯನ ವೈದ್ಯರು ಮತ್ತು ಸಿಬ್ಬಂದಿ ಗೌಪ್ಯವಾಗಿಡುತ್ತಾರೆ ಮತ್ತು ಸಾರ್ವಜನಿಕವಾಗಿ ಲಭ್ಯವಾಗುವುದಿಲ್ಲ. ನಿಮ್ಮ ಮೂಲ ದಾಖಲೆಗಳನ್ನು ನಿಮ್ಮ ವೈದ್ಯರು ಅಥವಾ ನೈತಿಕ ಪರಿಶೀಲನಾ ಮಂಡಳಿಯು ಪರಿಶೀಲಿಸಬಹುದು. ಹೆಚ್ಚಿನ ಮಾಹಿತಿಗಾಗಿ / ಸ್ಪಷ್ಟೀಕರಣಕ್ಕಾಗಿ ದಯವಿಟ್ಟು ಡಾ.ಜೋ ಲೂರ್ದು ಪ್ರದೀಪ್, ಶ್ರೀ ಶಿಕ್ಷಣ ದೇರಾಜ್ ಅರಸ್ ಅಕಾಡೆಮಿ ಆಫ್ ಹೈಯರ್ ಎಜುಕೇಶನ್ ಅಂಡ್ ರಿಸರ್ಚ್, ತಮಕಾ, ಕೋಲಾರ್ - 563101

ಹೆಚ್ಚಿನ ವಿವರಗಳಿಗಾಗಿ ಸಂಪರ್ಕಿಸಿ.

ಡಾ. ಜೋ ಲೂರ್ದು ಪ್ರದೀಪ್

ಮೊಬೈಲ್ ಸಂಖ್ಯೆ: 8524980201

ANNEXURE - II

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH, TAMAKA, KOLAR - 563101.

INFORMED CONSENT FORM

Case no:

IP no:

TITLE: A RANDOMISED CONTROLLED STUDY ON EFFICACY OF HOME-BASED YOGA THERAPY VERSUS CONVENTIONAL CONSERVATIVE THERAPY IN CHRONIC LOWBACK PAIN

I, the undersigned, agree to participate in this study and authorize the collection and disclosure of personal information as outlined in this consent form.

I understand the purpose of this study, the risks and benefits of the technique and the confidential nature of the information that will be collected and disclosed during the study. The information collected will be used only for research.

I have had the opportunity to ask questions regarding the various aspects of this study and my questions have been answered to my satisfaction.

I understand that I remain free to withdraw the participation from this study at any time and this will not change the future care.

Participation in this study does not involve any extra cost to me.

Name	Signature	Date	Time
Patient:			
Witness:			
Primary Investigator/ Doctor:			

ಶ್ರೀದೇವರಾಜ್ ಅರಸ್ ಅಕಾಡೆಮಿ ಆಫ್ ಹೈಯರ್ ಎಜುಕೇಶನ್ ಅಂಡ್ ರಿಸರ್ಚ್, ತಮಕಾ, ಕೋಲಾರ – 563101

ಮಾಹಿತಿ ಒಪ್ಪಿಗೆ ಪತ್ರ

ಪ್ರಕರಣ ಸಂಖ್ಯೆ:

ಐಪಿ ಸಂಖ್ಯೆ:

ಅಧ್ಯಯನದ ಶೀರ್ಷಿಕೆ: - "ದೀರ್ಘಕಾಲದ ಕೆಳ ಭಾಗ ಬೆನ್ನುನೋವುಗಾಗಿ ಮನೆ ಆಧಾರಿತ ಯೋಗ ಚಿಕಿತ್ಸೆ ಮತ್ತು ಸಂಪ್ರದಾಯವಾದಿ ಸಾಂಪ್ರದಾಯಿಕ ಚಿಕಿತ್ಸೆ ನಡುವೆ ಪರಿಣಾಮಕಾರಿಯಾದ ಅಧ್ಯಯನ- ಒಂದು ಯಾದೃಚ್ ನಿಯಂತ್ರಿತ ಪ್ರಯೋಗ"

ನಾನು, ಸಹಿ ಮಾಡದವರು, ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಒಪ್ಪುತ್ತೇನೆ ಮತ್ತು ಈ ಒಪ್ಪಿಗೆಯ ರೂಪದಲ್ಲಿ ವಿವರಿಸಿರುವಂತೆ ವೈಯಕ್ತಿಕ ಮಾಹಿತಿಯ ಸಂಗ್ರಹಣೆ ಮತ್ತು ಬಹಿರಂಗಪಡಿಸುವಿಕೆಯನ್ನು ಅಧಿಕೃತಗೊಳಿಸುತ್ತೇನೆ. ಈ ಅಧ್ಯಯನದ ಉದ್ದೇಶ, ತಂತ್ರದ ಅಪಾಯಗಳು ಮತ್ತು ಪ್ರಯೋಜನಗಳು ಮತ್ತು ಅಧ್ಯಯನದ ಸಮಯದಲ್ಲಿ ಸಂಗ್ರಹಿಸಿ ಬಹಿರಂಗಪಡಿಸುವ ಮಾಹಿತಿಯ ಗೌಪ್ಯ ಸ್ವರೂಪವನ್ನು ನಾನು ಅರ್ಥಮಾಡಿಕೊಂಡಿದ್ದೇನೆ. ಸಂಗ್ರಹಿಸಿದ ಮಾಹಿತಿಯನ್ನು ಸಂಶೋಧನೆಗೆ ಮಾತ್ರ ಬಳಸಲಾಗುತ್ತದೆ.

ಈ ಅಧ್ಯಯನದ ವಿವಿಧ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳುವ ಅವಕಾಶ ನನಗೆ ಸಿಕ್ಕಿದೆ ಮತ್ತು ನನ್ನ ಪ್ರಶ್ನೆಗಳಿಗೆ ನನ್ನ ತೃಪ್ತಿಗೆ ಉತ್ತರಿಸಲಾಗಿದೆ.

ಈ ಅಧ್ಯಯನದಿಂದ ಭಾಗವಹಿಸುವಿಕೆಯನ್ನು ಯಾವುದೇ ಸಮಯದಲ್ಲಿ ಹಿಂತೆಗೆದುಕೊಳ್ಳಲು ನಾನು ಮುಕ್ತನಾಗಿರುತ್ತೇನೆ ಮತ್ತು ಇದು ಭವಿಷ್ಯದ ಆರೈಕೆಯನ್ನು ಬದಲಾಯಿಸುವುದಿಲ್ಲ ಎಂದು ನಾನು ಅರ್ಥಮಾಡಿಕೊಂಡಿದ್ದೇನೆ.

ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವಿಕೆಯು ನನಗೆ ಯಾವುದೇ ಹೆಚ್ಚುವರಿ ವೆಚ್ಚವನ್ನು ಒಳಗೊಂಡಿರುವುದಿಲ್ಲ.

ಹೆಸರು	ಸಹಿ	ದಿನಾಂಕ	ಸಮಯ
ರೋಗಿ:			
ಸಾಕ್ಷಿ:			
ಪ್ರಾಥಮಿಕ ತನಿಖಾಧಿಕಾರಿ / ವೈದ್ಯರು:			

ANNEXURE -III

CASE PROFORMA

NAME OF PATIENT -

AGE -

SEX - DATE –

PHONE NUMBER:- OCCUPATION:

ADDRESS:-

HISTORY OF PRESENTING ILLNESS - 1. Back pain

A. Site -

B. Mode of onset -

C. Nature of pain -

D. Radiation -

E. Aggravating factors -

F. Relieving factors

1. Trauma
2. Deformity
3. Stiffness of back
4. Other symptoms

FAMILY HISTORY -

PAST HISTORY -

PERSONAL HISTORY -

GENERAL EXAMINATION

Pulse rate -

BP -

RR - Pallor - Edema -

SYSTEMIC EXAMINATION

CVS -

RS -

P/A -

CNS -

LOCAL EXAMINATION

A. INSPECTION -

A. Attitude and deformity -

B. Gait -

C. Swelling –

B. PALPATION -

A. Tenderness

B. Swelling

C. Wasting and rigidity

C. PERCUSSION

D. MOVEMENT OF SPINE

E. MEASUREMENT

F. STRAIGHT LEG RAISING TEST

G. FEMORAL NERVE STRETCH TEST

H. NAFFZIGER's TEST

I. LHERMITTE'S SIGN

J. SACROILIAC JOINT

A) Inspection -

B) Palpation -

C) Movements -

D) Genslen's test -

E) Straight leg raising test –

INVESTIGATION -

X-RAY LS SPINE -

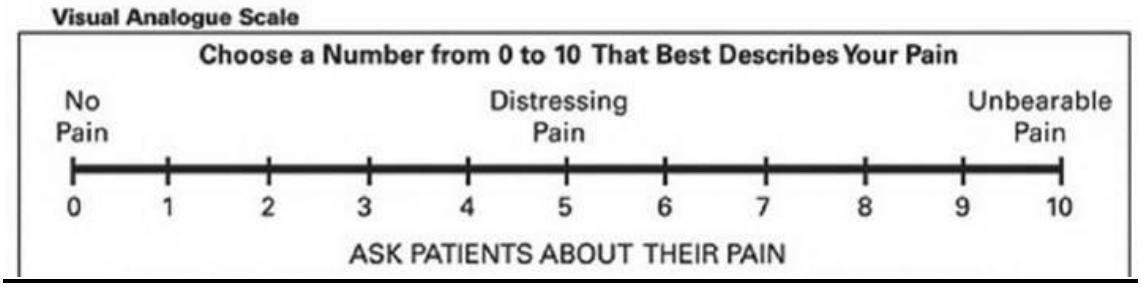
Complete blood count

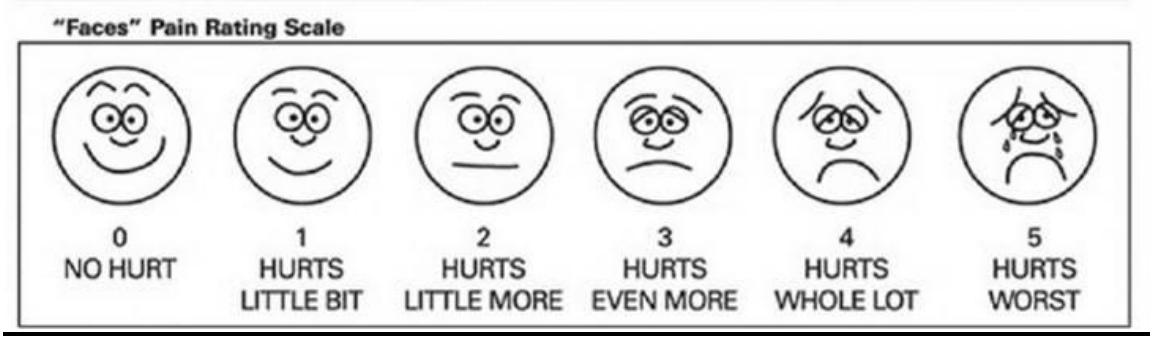
ESR

ANNEXURE- IV

VISUAL ANALOGUE SCALE

A tool used to help a person rate the intensity of certain sensations and feelings such as pain. The visual analog scale for pain is a straight line with one end (0) meaning no pain and the other end (10) meaning worst pain imaginable. A patient marks a point on the line that matches the amount of pain he/she feels. It may be used to help choose the right dose of pain medicine.





ANNEXURE- V

OSWESTRY DISABILITY QUESTIONNAIRE

This questionnaire has been designed to give us information as to how your back or leg pain is affecting your ability to manage in everyday life. Please answer by checking one box in each section for the statement which best applies to you. We realize you may consider that two or more statements in any one section apply but please just shade out the spot that indicates the statement which most clearly describes your problem.

SECTION 1: PAIN INTENSITY

□ I have no pain at the moment

□ The pain is very mild at the moment

□ The pain is moderate at the moment

□ The pain is fairly severe at the moment

□ The pain is very severe at the moment

□ The pain is the worst imaginable at the moment

SECTION 2: PERSONAL CARE (EG. WASHING, DRESSING)

□ I can look after myself normally without causing extra pain

□ I can look after myself normally but it causes extra pain

□ It is painful to look after myself and I am slow and careful

 I need some help but can manage most of my personal care

 I need help every day in most aspects of self-care

 I do not get dressed, wash with difficulty and stay in bed

SECTION 3: LIFTING

 I can lift heavy weights without extra pain

 I can lift heavy weights but it gives me extra pain

 Pain prevents me lifting heavy weights off the floor but I can manage if they are conveniently placed eg. On a table

 Pain prevents me lifting heavy weights but I can manage light to medium weights if they are conveniently positioned

 I can only lift very light weights

 I cannot lift or carry anything

SECTION 4: WALKING

 Pain does not prevent me walking any distance

 Pain prevents me from walking more than 2 kilometres

 Pain prevents me from walking more than 1 kilometre

 Pain prevents me from walking more than 500 meters

 I can only walk using a stick or crutches

 I am in bed most of the time

SECTION 5: SITTING

 I can sit in any chair as long as I like

 I can only sit in my favourite chair as long as I like

 Pain prevents me sitting more than one hour

 Pain prevents me from sitting more than 30 minutes

 Pain prevents me from sitting more than 10 minutes

 Pain prevents me from sitting at all

SECTION 6: STANDING

 I can stand as long as I want without extra pain

 I can stand as long as I want but it gives me extra pain

 Pain prevents me from standing for more than 1 hour

 Pain prevents me from standing for more than 30 minutes

 Pain prevents me from standing for more than 10 minutes

 Pain prevents me from standing at all

SECTION 7: SLEEPING

 My sleep is never disturbed by pain

 My sleep is occasionally disturbed by pain

 Because of pain I have less than 6 hours sleep

 Because of pain I have less than 4 hours sleep

 Because of pain I have less than 2 hours sleep

 Pain prevents me from sleeping at all

SECTION 8: SEX LIFE (IF APPLICABLE)

 My sex life is normal and causes no extra pain

 My sex life is normal but causes some extra pain

 My sex life is nearly normal but is very painful

 My sex life is severely restricted by pain

 My sex life is nearly absent because of pain

 Pain prevents any sex life at all

SECTION 9: SOCIAL LIFE

 My social life is normal and gives me no extra pain

 My social life is normal but increases the degree of pain

 Pain has no significant effect on my social life apart from limiting my more energetic interests e.g. sport

 Pain has restricted my social life and I do not go out as often

 Pain has restricted my social life to my home

 I have no social life because of pain

SECTION 10: TRAVELLING

 I can travel anywhere without pain

 I can travel anywhere but it gives me extra pain

 Pain is bad but I manage journeys over two hours

 Pain restricts me to journeys of less than one hour

 Pain restricts me to short necessary journeys under 30 minutes

 Pain prevents me from travelling except to receive treatment

Interpretation:

Score: / x 100 = %

Scoring:

For each section the total possible score is 5: if the first statement is marked the section score = 0, if the last statement is marked it = 5. If all ten sections are completed the score is calculated as follows:

Example: 16 (total scored)

---------- X 100 = 32%

50 (total possible score)

Modified Oswestry Disability Index scoring:

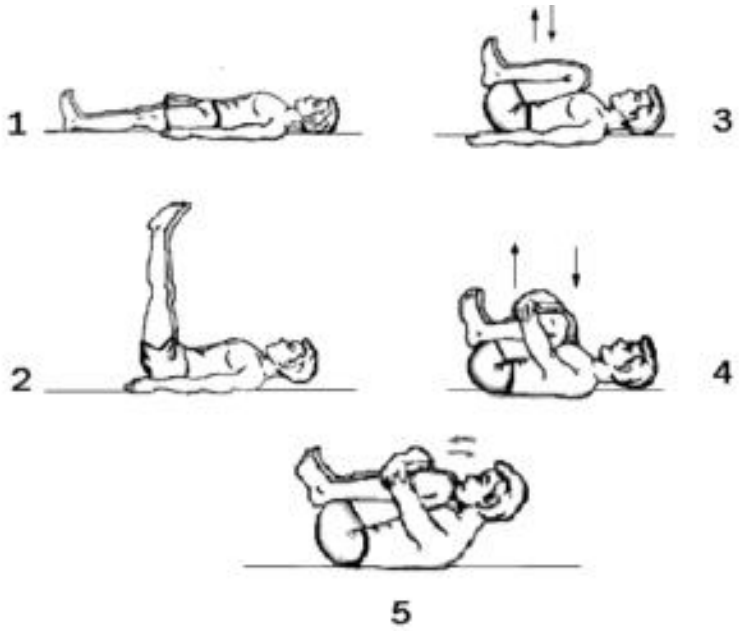
- **0%-20% (minimal disability):** Patients can cope with most activities of daily living. No treatment may be indicated except for suggestions on lifting, posture, physical fitness and diet. Patients with sedentary occupations may experience more problems than others.
- **21%-40% (moderate disability):** patients may experience more pain and problems with sitting, lifting, standing. Travel and social life are more difficult. Patients may be off work. Personal care, sleeping and sexual activity may not be grossly affected. Conservative treatment may be sufficient.
- **41%-60% (severe disability):** pain is a primary problem for these patients, but they may also be experiencing significant problems in travel, personal care, social life, sexual activity and sleep. A detailed evaluation is appropriate.
- **61%-80% (crippled):** Back pain has an impact on all aspects of daily living and work. Active treatment is required.
- **81%-100% (bed bound):** These patients may be bed bound or exaggerating their symptoms, careful evaluation is recommended.

ANNEXURE – VI

YOGA THERAPY

PAVANMUKTASANA

Pavanmuktasana is an excellent yoga pose for the health of the abdominal region by easing stomach heaviness, increasing blood circulation, nerve stimulation, and by removing trapped abdominal gases as well as harmful toxins. It is an important yogasana for the smooth functioning of the digestive system. Pawan means air or gas, Mukta means release and asana indicates yoga pose. Basically, it's the yoga pose that helps in releasing excessive gas



Steps:

1. Lie down in a straight position on your back or in a supine position.
2. Inhale and raise your legs at 90 degree
3. Exhale, bend your legs, and try to bring your knees towards your chest.
4. Clasp your knees by interlocking your fingers.

5. Raise your head and made touch your forehead with your knees.
6. Do normal breathing while maintaining the pose.
7. First, bring your head down and followed by your legs.
8. This is the one round.
9. Do 2 to 3 rounds.

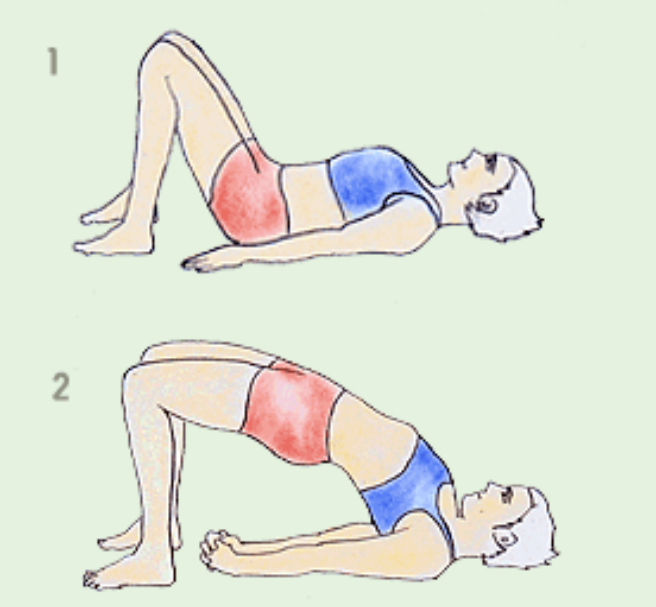
Contraindications

- Abdominal surgery: Skip the asana in case of abdominal surgery.
- Neck strain: One shouldn't practice having neck pain.
- Pregnancy: Don't practice in case of pregnancy.
- Hernia: Avoid while having hernia.
- Piles: Those who are suffering from piles shouldn't perform it.
- Menstruation: The asana should be avoided during menstruation.
- Hyperacidity
- High Blood Pressure
- Heart Problems
- Slipped Disc
- Testicular Disorders

SETU BANDHASANA

Setu bandhasana is an inverted back bending yoga pose. This supine yoga pose is beneficial in the prevention and management of many diseases and conditions. Setu bandhasana is helpful in the management of thyroid, back pain, neck pain, problems related to the nervous system, etc. Setu means bridge and bandha mean lock or bind. Since it resembles the bridge, it is also known as bridge pose. Setu bandhasana is an

effective yoga pose for the health of the spine. It helps to enhance the flexibility of the back and thus good for smooth backbends.



Steps:

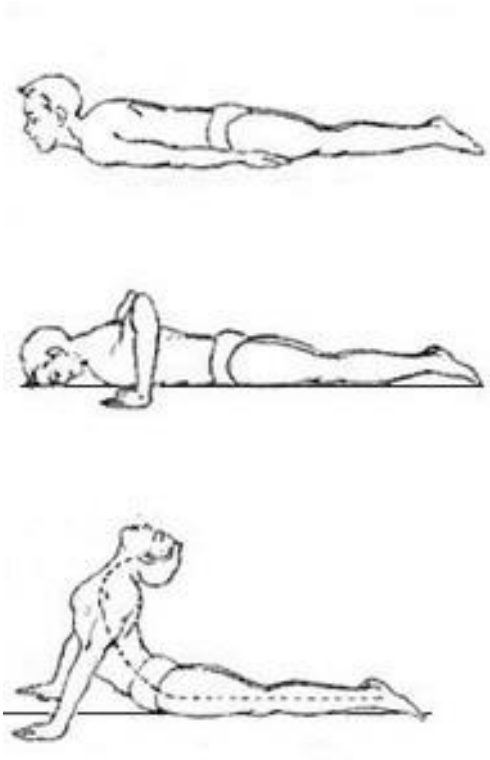
1. First, lie down as Shavasana or in a supine position.
2. Your arms should be on the sides of your thighs.
3. Now, fold your knees and clasp your ankle with your palms.
4. The distance between the feet should be 10 inches.
5. With inhaling raise your back in a relaxed manner as possible as you can. You raise your back in such a way that the neck gets stretched and massaged.
6. One can also be on toes by raising the heels. It gives more stretching to the back as well as the neck.
7. Maintain the pose initially for 30 seconds and gradually increases its duration.
8. Bring your back down with a deep exhale and have a rest.
9. Repeat this process 2-3 times.

Contraindications

- Avoid practicing if somebody has neck pain.
- In back injury, it should be skipped.
- It also shouldn't be practiced if you have knee pain.
- Avoid it during a shoulder injury.
- Avoid turning your head right or left while you are in the pose.

BHUJANGASANA

Bhujangasana where the upper trunk of the body raises just like as a Hood of Cobra or snake, that's why it is known as Cobra pose yoga. Bhujangasana is one of the few yogasanas, which gives benefits to the entire body from Toes to Head.



Steps:

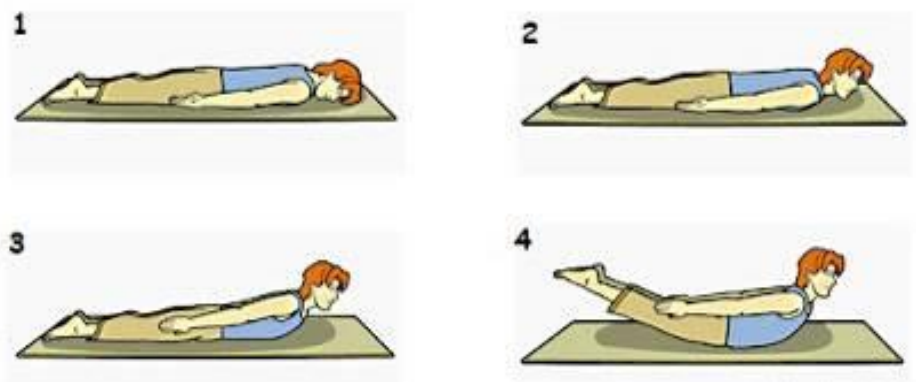
1. Lie prone with arms by your sides
2. Slowly bring your forehead to rest on the floor
3. Place your hands by the sides of your ribs with your fingertips facing inward
4. Tilt your head backward and begin raising your trunk
5. Push your hands against the floor and slowly start straightening your arms
6. Arch your back and roll your head back to gaze at the ceiling.
7. Keep your legs together and elbows alongside your body slightly bent,
8. shoulders back
9. Hold the position for as long as you can
10. Slowly tilt your head forward and lower your trunk to start coming down

Contraindications

- Peptic ulcers,
- Hernia,
- Intestinal tuberculosis
- Hypothyroidism
- Abdominal injuries
- Pregnancy

SHALABASANA

Shalabasana means locust. The pose resembles that of a locust resting on the ground, hence the name.



Steps:

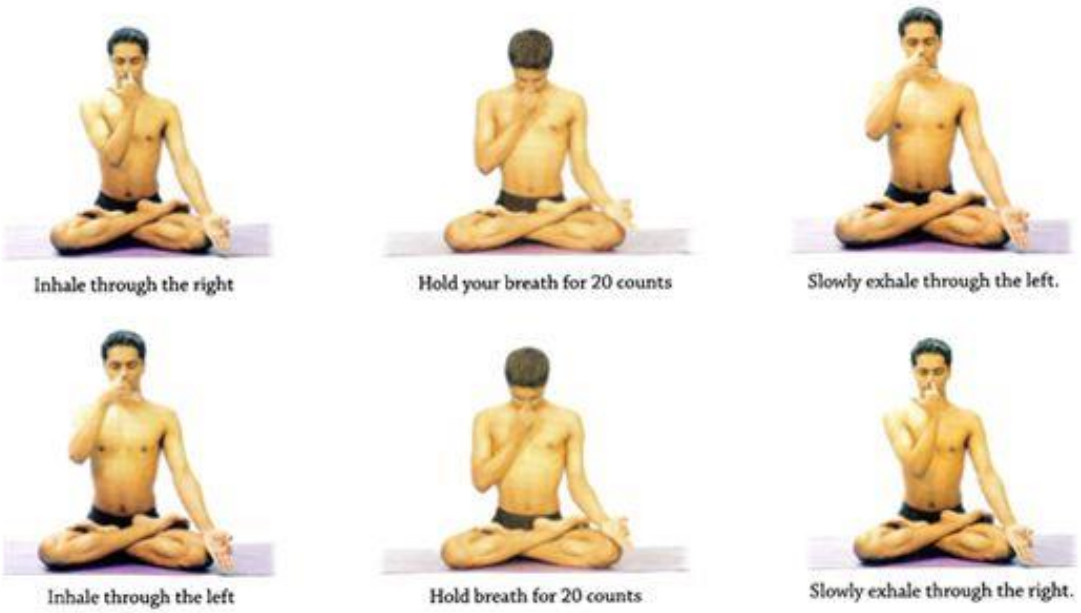
1. Lie full length on the floor on the stomach, face downwards. Stretch the arms back.
2. Exhale, lift the head, chest and legs off the floor simultaneously as high as possible. The hands should not be placed and the ribs should not rest on the floor. Only the abdominal front portion of the body rests on the floor and bears the weight of the body
3. Contract the buttocks and stretch the thigh muscles. Keep both legs fully extended and straight, touching at the thighs, knees and ankles.
4. Do not bear the weight of the body on the hands but stretch them back to exercise the upper portion of the back muscles.
5. Stay in the position as long as you can with normal breathing.
6. In the beginning it is difficult to lift the chest and the legs off the floor, but this becomes easier as the abdominal muscles grow stronger.
7.

Contraindications

- Menstruating
- Pregnant
- Headache
- Migraine
- High blood pressure
- Glaucoma
- Fatigue

NADI SHUDDHI PRANAYAMA

Nadi shuddhi is a basic and most widely used form of pranayama and means nadi comprises of energy channel and shuddhi which club to form cleanser. Often, this technique is referred to as Anulom-vilom which means inhalation-exhalation.



Steps:

1. *Sthithi* (starting) position: Sit comfortably, preferably in *padmasana* (lotus pose), *siddhasana* or *vajrasana*.

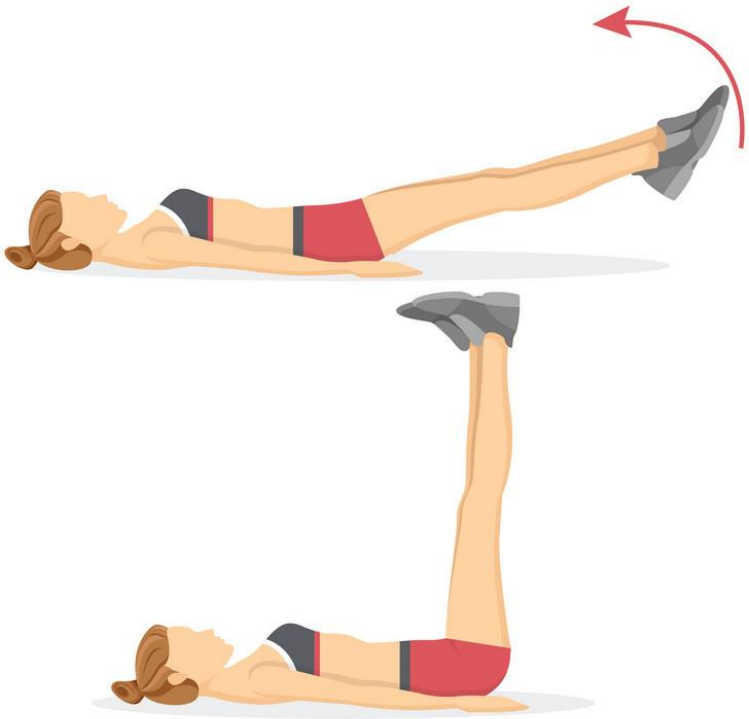
2. Place the thumb over the right nostril and the ring-finger + little finger over the left nostril, the other 2 fingers turned into the palm.
3. Close right nostril with thumb and inhale through left nostril for 4 counts.
4. Then, close both nostril for 4 counts & hold breath.
5. Release thumb from over right nostril & exhale to 6 counts, increasing to 8 counts as you become confident.
6. Close both nostrils & hold breath for 4 counts.
7. Repeat using the reverse method.
8. Inhale from right, hold, exhale through left, hold.
9. This is a round of *nadi shuddhi*.
10. Repeat to complete 5 rounds. Rest in between if required.
11. Try to increase slowly to 20 rounds.

Contraindications

- Hypertension
- Not to be done in full stomach
- Migraine
- Fever
- Cold

BACK STRENGTHENING EXERCISES

STRAIGHT LEG RAISING EXERCISE



Steps

1. Lie on your back, legs straight and together.
2. Keep your legs straight and lift them all the way up to the ceiling until your butt comes off the floor.
3. Slowly lower your legs back down till they're just above the floor. Hold for a moment.
4. Raise your legs back up and repeat the procedure

SPINE FLEXION AND EXTENSION EXERCISE

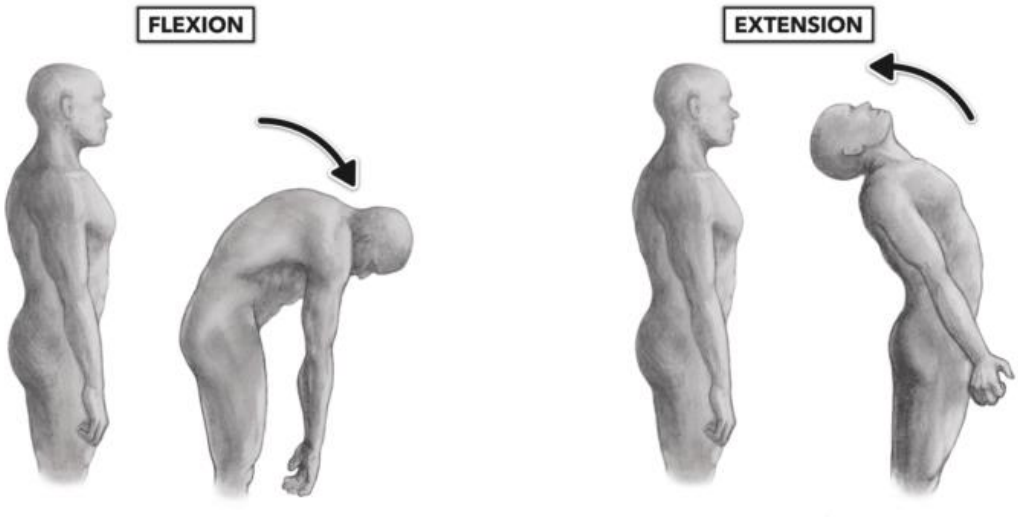
Steps

1. Stand, or sit on a firm chair or stool. If you choose to sit, place yourself so that your weight is right on top of the two sitting bones, which are located on the underside of your pelvis. Sitting right on top of these bones gives you automatic support for your low back and for overall upright body posture. Note: You can make the exercise (a lot) more challenging by sitting on the floor.
2. Begin the spinal flexion movement by dropping your head (and slightly tucking your chin). Continue by sequentially flexing your neck then your upper back, mid-back and finally your low back. Finish this part of the movement by tilting the top of your pelvis back.

   When you're completed with the movement your trunk will be in a "C" shape, and your pelvis will be in a backward tilt. The backward tilt of the pelvis tends to lessen the degree of the natural low back curve for the duration of the movement.
3. As you start to come out of the spinal flexion, inhale. At the same time, begin to move your pelvis from that backward tilt toward upright. As you do this, you may find that your spine naturally follows the moves of the pelvis. In other words, as you straighten up your pelvic position and return to upright posture, your low back will regain its natural curve.

   Continue the sequential action through your mid and upper back, neck and finally your head.

   You should end sitting right on top of your sitting bones, with your eyes gazing straight ahead.



4. Next, follow the spinal flexion movement with a spinal extension movement. Spinal extension is the opposite action to flexion; you might think of it as back-arching, but in this exercise, there's a bit of technique to employ.

   You will use your inhale to help start the movement. Inhale naturally increases spinal extension. This is pretty subtle, so pay attention. Inhale, fill your trunk up with air. As you do, allow your pelvis to roll into the forward tilt position. Your spine will sequentially follow with an arching action.

   When you're done, your body will make a "C" shape toward the back. The "C" shape won't be as pronounced as the "C" shape you made with your spine in flexion (Step 2).

5. Exhale, and release back into an upright position: Balancing right on top of your sitting bones, with an erect spine

ANNEXURE -VII

DATA COLLECTION PHOTOS

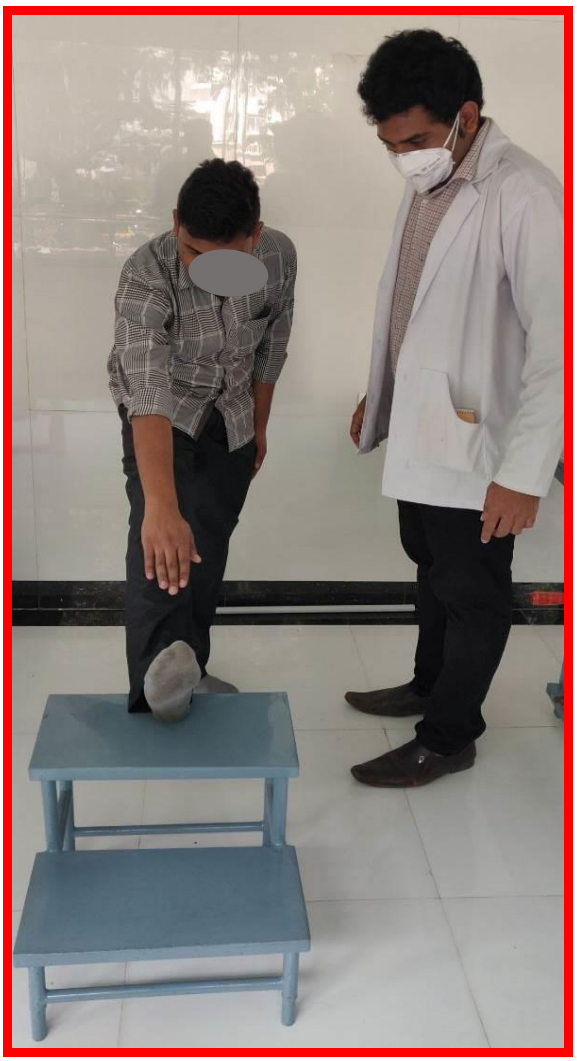
PAVANMUKTASANA

BHUJANGASANA

SETU BANDHASANA

NADI SHUDDHI PRANAYAMA

SALABHASANA



STANDING HAMSTRING STRETCH

PRONE STRAIGHT LEG RAISING

QUADRUPED ARM LEG RAISING

SPINE EXTENSION

ANNEXURE VIII

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH

SRI DEVARAJ URS MEDICAL COLLEGE

Tamaka, Kolar

INSTITUTIONAL ETHICS COMMITTEE

Members

1. **Dr. D.E.Gangadhar Rao, (Chairman)** Prof. & HOD of Zoology, Govt. Women's College, Kolar,
2. **Dr. Sujatha.M.P, (Member Secretary),** Assoc. Prof. of Anesthesia, SDUMC,
3. Dr. C.S.Babu Rajendra Prasad, Prof. of Pathology, SDUMC
4. Dr. Srinivas Reddy.P, Prof. & HoD of Forensic Medicine, SDUMC
5. Dr. Prasad.K.C, Professor of ENT, SDUMC
6. Dr. Sumathi.M.E Prof. & HoD of Biochemistry, SDUMC.
7. Dr. Bhuvana.K, Prof. & HoD of Pharmacology, SDUMC
8. Dr. H.Mohan Kumar, Professor of Ophthalmology, SDUMC
9. Dr. Hariprasad, Assoc. Prof Department of Orthopedics, SDUMC
10. Dr. Pavan.K, Asst. Prof of Surgery, SDUMC
11. Dr. Talasila Sruthi, Assoc. Prof. of OBG, SDUMC
12. Dr. Mahendra.M , Asst. Prof. of Community Medicine, SDUMC
13. Dr. Mamata Kale, Asst. Professor of Microbiology, SDUMC

No. SDUMC/KLR/IEC/158/2018-19 Date:29-11-2018

PRIOR PERMISSION TO START OF STUDY

The Institutional Ethics Committee of Sri Devaraj Urs Medical College, Tamaka, Kolar has examined and unanimously approved the Synopsis entitled **"A randomized controlled study on efficacy of home based yoga therapy versus conventional conservative therapy in chronic lowback pain"** being investigated by **Dr.Joe Lourdu Pradeep B** & Dr.Arun H S in the Department of Orthopaedics at Sri Devaraj Urs Medical College, Tamaka, Kolar. **Permission is granted by the Ethics Committee to start the study**. However, final report has to be submitted to the Ethics Committee after completion of the study for presentation in conference or for publication.

Member Secretary
Member Secretary
Institutional Ethics Committee
Sri Devaraj Urs Medical College
Tamaka, Kolar

Chairman
CHAIRMAN
Institutional Ethics Committee
Sri Devaraj Urs Medical College,
Tamaka, Kolar

ANNEXURE IX

KEY TO MASTER CHART

S.NO	-	Serial number
M	-	Male
F	-	Female
UHID. No	-	Unique hospital identification number
MODS	-	Modified Oswestry Disability Score
VAS	-	Visual Analog Score

MASTER CHART

SR NO	GROUP	CASE NO	UHID	AGE	SEX	OCCUPATION	MODIFIED OSWESTRY DISABILITY SCORE FIRST VISIT	MODIFIED OSWESTRY DISABILITY SCORE 2ND WEEK	MODIFIED OSWESTRY DISABILITY SCORE 6TH WEEK	MODIFIED OSWESTRY DISABILITY SCORE 12TH WEEK	VAS SCORE 1ST VISIT	VAS SCORE 2ND WEEK	VAS SCORE 6TH WEEK	VAS SCORE 12TH WEEK	RETURN TO WORK	DURATION OF RETURN(WEEKS)
1	A	A1	675934	43	F	HOMEMAKER	38	24	16	8	7	6	4	2	YES	3
2	A	A2	677531	25	M	WORKER	34	28	20	12	6	5	3	1	YES	3
3	B	B1	678944	50	F	HOMEMAKER	38	24	20	14	7	6	5	4	YES	6
4	A	A3	681341	36	F	WORKER	34	34	16	16	7	6	4	2	YES	4
5	B	B2	681530	30	M	WORKER	36	22	18	14	8	5	4	4	YES	7
6	A	A4	696339	38	F	HOMEMAKER	32	26	18	12	7	5	4	2	YES	3
7	A	A5	687299	46	F	WORKER	34	24	16	10	7	4	3	1	YES	2
8	A	A6	698935	37	F	WORKER	30	26	20	12	8	5	3	2	YES	3
9	A	A7	693593	45	F	HOMEMAKER	36	24	14	10	7	6	4	2	YES	3
10	A	A8	698843	45	M	WORKER	34	24	20	12	7	5	3	2	YES	4
11	B	B3	699872	35	M	WORKER	38	22	18	16	8	6	5	4	YES	7
12	A	A9	699827	50	F	HOMEMAKER	32	24	12	8	7	5	4	2	YES	3
13	B	B4	710888	39	M	WORKER	32	22	16	14	7	6	5	4	YES	6
14	B	B5	689878	50	F	WORKER	38	28	20	18	8	7	7	5	NO	
15	A	A10	715588	29	F	HOMEMAKER	28	20	10	10	6	5	3	1	YES	2
16	B	B6	715565	47	F	WORKER	34	26	20	14	7	6	6	4	YES	8
17	A	A11	717149	40	M	WORKER	26	24	12	6	6	4	3	1	YES	2
18	B	B7	722046	50	F	HOMEMAKER	38	28	24	20	8	7	6	5	NO	
19	B	B8	708398	26	F	STUDENT	32	26	20	14	7	6	5	4	YES	9
20	B	B9	663077	45	F	WORKER	30	26	22	16	7	5	5	4	YES	8
21	A	A12	727836	50	F	WORKER	32	24	18	12	7	5	3	2	YES	3
22	A	A13	709567	50	M	WORKER	28	22	14	8	6	5	3	1	YES	2
23	A	A14	729564	28	F	WORKER	36	22	18	12	8	5	3	2	YES	3
24	B	B10	729511	50	F	HOMEMAKER	36	26	18	14	8	7	6	5	YES	10
25	A	A15	724337	45	M	WORKER	30	26	14	6	7	5	3	2	YES	3
26	A	A16	679934	42	F	HOMEMAKER	34	24	16	12	8	7	5	3	YES	4

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27	B	B11	730860	35	F	HOMEMAKER	36	26	24	18	8	7	7	5	YES	8
28	B	B12	731925	48	F	HOMEMAKER	28	26	18	16	7	6	5	4	YES	9
29	A	A17	731928	34	F	WORKER	32	26	16	12	7	5	3	2	YES	3
30	B	B13	731974	25	M	WORKER	34	26	22	16	8	7	6	5	YES	9
31	B	B14	733242	25	M	WORKER	28	24	18	12	7	6	4	4	YES	8
32	B	B15	733302	25	M	STUDENT	26	24	18	12	7	6	5	4	YES	7
33	B	B16	733493	50	M	WORKER	32	28	22	14	8	7	6	5	YES	9
34	A	A18	736031	34	M	WORKER	30	24	12	8	7	4	3	1	YES	3
35	B	B17	735864	49	M	WORKER	32	28	24	14	7	6	6	4	YES	7
36	B	B18	737520	34	F	HOMEMAKER	28	26	20	10	6	5	5	4	YES	6
37	A	A19	737413	29	M	WORKER	32	24	14	10	8	7	5	3	YES	4
38	A	A20	529981	35	M	WORKER	30	24	14	6	6	5	3	1	YES	2
39	A	A21	739355	50	F	HOMEMAKER	34	24	16	10	8	7	3	2	YES	3
40	A	A22	738580	50	M	WORKER	30	20	14	8	7	5	4	2	YES	3
41	A	A23	740354	48	M	WORKER	28	20	12	6	7	4	3	1	YES	2
42	B	B19	740170	50	F	HOMEMAKER	28	24	18	14	7	5	5	4	YES	7
43	A	A24	737937	35	F	WORKER	18	14	10	4	6	4	2	1	YES	2
44	A	A25	739356	50	F	WORKER	36	28	18	12	8	6	5	3	YES	4
45	B	B20	741646	25	M	STUDENT	38	30	22	18	8	7	5	5	YES	9
46	A	A26	740960	38	F	HOMEMAKER	26	20	10	6	6	5	3	1	YES	2
47	A	A27	743188	26	M	WORKER	30	24	12	10	7	6	5	3	YES	4
48	A	A28	744498	50	M	WORKER	32	26	10	10	8	7	6	3	YES	5
49	B	B21	744407	47	M	WORKER	36	26	24	16	8	7	6	6	NO	
50	A	A29	744507	32	F	WORKER	30	20	14	12	7	6	5	3	YES	4
51	B	B22	744465	26	F	STUDENT	32	26	24	14	7	6	6	4	YES	7
52	B	B23	744455	50	M	WORKER	34	24	18	14	8	7	5	5	YES	9

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53	A	A30	745902	50	M	WORKER	34	28	14	8	8	7	4	2	YES	2
54	A	A31	745975	50	M	WORKER	28	22	12	8	7	5	4	2	YES	2
55	A	A32	529677	42	M	WORKER	38	32	16	14	8	7	6	3	YES	3
56	B	B24	748757	35	F	HOMEMAKER	24	20	18	12	7	6	6	5	YES	8
57	A	A33	722343	50	M	WORKER	32	24	16	6	7	6	4	2	YES	2
58	B	B25	654732	28	F	WORKER	36	26	24	18	8	7	6	6	YES	10
59	B	B26	537826	45	M	WORKER	32	24	22	16	7	6	5	5	YES	8
60	B	B27	748585	50	M	WORKER	32	28	26	14	7	6	5	4	YES	7
61	B	B28	749967	43	F	HOMEMAKER	32	24	22	16	7	6	4	4	YES	7
62	B	B29	748098	50	F	HOMEMAKER	34	28	26	14	7	6	6	5	YES	9
63	A	A34	744492	38	M	WORKER	32	24	14	8	8	7	5	2	YES	2
64	A	A35	592565	50	F	WORKER	34	24	16	12	8	6	5	3	YES	4
65	B	B30	751438	30	F	WORKER	32	30	28	16	7	6	5	4	YES	8
66	B	B31	659152	25	F	STUDENT	34	30	22	16	8	7	7	5	YES	10
67	A	A36	691326	49	M	WORKER	34	26	20	10	8	7	5	2	YES	2
68	B	B32	760834	50	F	HOMEMAKER	32	24	24	14	7	6	5	5	YES	8
69	B	B33	762122	42	M	WORKER	38	28	26	20	8	7	5	5	YES	10
70	A	A37	761862	50	F	WORKER	36	28	16	12	8	6	5	2	YES	3
71	B	B34	755162	25	M	STUDENT	38	24	22	16	8	6	5	4	YES	7
72	A	A38	761863	25	F	WORKER	32	22	16	6	7	6	4	2	YES	2
73	B	B35	679953	25	F	STUDENT	32	30	24	14	7	6	6	4	YES	7
74	A	A39	763544	50	F	WORKER	32	24	16	6	7	6	4	2	YES	2
75	B	B36	763662	32	M	WORKER	24	20	18	12	7	6	5	4	YES	7
76	B	B37	764177	35	F	WORKER	28	26	20	14	7	5	5	4	YES	7
77	A	A40	761876	25	F	WORKER	34	20	12	12	6	5	3	1	YES	3
78	B	B38	765006	37	F	WORKER	36	20	18	14	8	5	4	4	YES	7

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79	B	B39	766379	32	F	HOMEMAKER	38	30	26	16	8	6	5	4	YES	7
80	B	B40	688022	38	M	WORKER	34	24	22	14	7	6	6	4	YES	8
81	A	A41	768225	47	M	WORKER	34	24	18	10	7	4	3	1	YES	2
82	A	A42	770983	40	F	WORKER	34	24	20	12	7	5	3	2	YES	4
83	B	B41	771108	50	F	HOMEMAKER	32	26	20	14	7	6	5	4	YES	6
84	B	B42	771213	50	M	WORKER	34	28	20	14	7	6	6	4	YES	8
85	A	A43	771335	35	F	WORKER	32	24	16	8	7	5	4	2	YES	3
86	B	B43	767567	38	F	WORKER	32	28	24	14	7	6	6	4	YES	7
87	A	A44	627302	50	F	HOMEMAKER	32	26	20	12	7	5	3	2	YES	3
88	B	B44	771707	45	F	HOMEMAKER	34	24	20	16	8	7	7	5	YES	10
89	B	B45	774094	50	F	WORKER	36	28	18	18	8	7	6	6	YES	10
90	A	A45	773960	38	F	WORKER	30	20	16	12	7	6	5	3	YES	4
91	B	B46	775338	39	M	WORKER	34	26	20	14	8	7	5	5	YES	9
92	B	B47	776787	50	M	WORKER	24	24	22	12	7	6	6	5	YES	8
93	B	B48	776909	40	F	HOMEMAKER	32	28	24	14	7	6	5	4	YES	7
94	B	B49	778004	36	M	WORKER	32	22	18	16	7	6	4	4	YES	7
95	B	B50	778270	44	M	WORKER	34	24	18	14	7	6	6	5	YES	9
96	B	B51	770588	26	F	HOMEMAKER	34	28	22	14	7	6	6	4	YES	8
97	A	A46	775385	33	F	WORKER	26	24	14	6	6	4	3	1	YES	2
98	A	A47	782638	47	M	WORKER	36	22	16	12	8	5	3	2	YES	3
99	B	B52	663172	49	F	WORKER	36	30	22	18	8	7	7	5	YES	8
100	B	B53	873752	41	F	WORKER	32	24	20	14	7	6	5	4	YES	7
101	A	A48	782146	40	F	HOMEMAKER	30	24	16	6	7	5	3	2	YES	3
102	A	A49	723876	39	F	WORKER	34	20	14	10	8	6	4	2	YES	2
103	A	A50	811962	47	F	WORKER	26	20	16	8	7	5	3	1	YES	2
104	B	B54	873727	41	M	WORKER	30	28	22	12	7	6	5	4	YES	7

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105	B	B55	813385	44	M	WORKER	32	28	24	16	7	6	6	5	YES	8
106	B	B56	813474	40	M	WORKER	32	28	24	14	7	6	6	4	YES	7
107	B	B57	813340	45	M	WORKER	34	24	20	16	8	7	5	5	YES	9
108	B	B58	813391	40	M	WORKER	32	28	22	14	7	6	5	5	YES	8
109	A	A51	814591	30	F	HOMEMAKER	34	24	18	12	6	5	3	1	YES	3
110	B	B59	873771	45	F	WORKER	38	28	22	18	8	7	5	5	YES	9
111	A	A52	818573	40	F	HOMEMAKER	32	24	16	10	7	5	3	2	YES	2
112	A	A53	821027	48	F	HOMEMAKER	36	22	14	12	8	5	3	2	YES	3
113	A	A54	822318	40	M	WORKER	32	24	14	8	7	6	4	1	YES	2
114	A	A55	436580	42	F	WORKER	34	24	16	12	8	7	5	3	YES	4
115	B	B60	825037	49	F	HOMEMAKER	32	24	22	14	7	6	6	5	YES	9
116	B	B61	873761	42	M	WORKER	34	28	26	14	8	7	5	5	YES	8
117	A	A56	828105	29	M	WORKER	34	26	20	10	8	7	5	4	YES	4
118	B	B62	830207	50	M	WORKER	28	26	18	16	6	6	5	5	YES	8
119	A	A57	873745	50	F	WORKER	30	22	14	8	7	4	3	1	YES	3
120	B	B63	665401	48	F	HOMEMAKER	38	28	24	20	8	7	7	6	NO	
121	B	B64	655534	45	M	WORKER	24	28	20	12	7	6	6	5	YES	7
122	B	B65	826058	44	M	WORKER	32	30	26	14	7	7	6	5	YES	8
123	B	B66	826273	40	F	WORKER	30	28	26	12	7	6	5	4	YES	7
124	B	B67	622750	45	F	HOMEMAKER	32	26	24	14	7	6	6	4	YES	7
125	A	A58	833968	30	F	WORKER	36	22	16	12	8	5	3	2	YES	3
126	A	A59	680269	31	F	WORKER	34	20	16	12	8	7	5	3	YES	4
127	A	A60	669622	46	M	WORKER	28	20	16	10	6	5	3	1	YES	2
128	A	A61	638352	30	M	WORKER	32	24	14	8	7	6	4	1	YES	2
129	A	A62	638966	48	F	HOMEMAKER	32	26	18	8	7	6	5	2	YES	3
130	B	B68	856503	35	F	WORKER	28	26	24	14	7	6	6	5	YES	9

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131	B	B69	849440	40	M	WORKER	32	28	26	12	7	7	6	4	YES	8
132	B	B70	858658	50	M	WORKER	38	28	24	20	8	7	7	6	NO	
133	A	A63	859075	45	F	WORKER	34	24	18	12	8	7	5	3	YES	4
134	A	A64	859053	46	F	HOMEMAKER	32	26	18	12	7	5	3	2	YES	3
135	A	A65	859395	45	F	WORKER	36	22	18	10	7	6	4	2	YES	3
136	A	A66	859439	45	F	HOMEMAKER	38	24	16	12	8	7	4	3	YES	4
137	A	A67	859420	46	M	WORKER	32	26	18	12	7	5	3	2	YES	3
138	A	A68	865254	35	M	WORKER	30	20	14	6	6	5	3	1	YES	2
139	A	A69	869270	28	F	WORKER	34	24	16	12	8	7	5	3	YES	4
140	A	A70	869323	50	M	WORKER	32	24	14	10	7	6	4	2	YES	3