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Original Research Article

Comparison of Yoga versus Swiss Ball Activity Training in Peri Menopausal Females with Low Back Ache

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ABSTRACT

Purpose- Low back ache has found to be the most common and highly susceptible condition; prevalence is higher in females than males. As estrogen level tends to drop down with age rendering the bones to become more osteoporotic. Measures must be taken to improve the quality of life after menopause to avoid risk for further complication of ageing by the most beneficial treatment. Yoga helps more in improving the flexibility of the muscles whereas exercising on Swiss ball provides dynamic and immediate activation and strengthening of muscles. The study can give us the knowledge of which of the treatment is more beneficial and effective. This study can help us design a standard treatment protocol with the above techniques for low back ache females transiting towards menopause. Subjects were randomly allotted into two groups of 15 each. One group underwent yoga training whereas the other group underwent Swiss ball training exercises. Pre and post outcome measured was administered -NPRS, MENQOL questionnaire and lumbar range of motion.
Results: Significant improvement in pain relief and physical component of MENQOL scale was seen in the Swiss ball activity group compared with the group who underwent yoga training. Whereas increase of lumbar ranges of motion was seen in yoga group.
Conclusion: The result of this study showed that Swiss ball training holds the advantage of reducing pain in peri menopausal women with improvement in the physical component of MENQOL scale as well. Whereas, when it comes to improving lumbar range of motion, yoga outperformed owing to its own nature of performance.

Keywords: Menopause, Surya Namaskar, Swiss ball, low back ache.

INTRODUCTION

Low back pain is the most common and important clinical, social, economic, and public health problem affecting the population indiscriminately across the world. Low back pain is known to be one of multi-factorial causes, employment and workplace factors, both physical and psychological, such as heavy lifting, pushing, pulling, vehicle driving, and prolonged walking or standing. These were also found to be predictors of low back pain and there are similar associations with stressful and monotonous work and

dissatisfaction with work. This condition has been reported consistently in a higher proportion of females than males. The overall prevalence of low back pain is higher in women than in men. That post-menopausal woman has higher incidence of low back pain than men have been reported distinctively in a number of studies. [1]

Menopause is the permanent cessation of menstruation at the end of reproductive life due to loss of ovarian follicular activity. It is the time in a woman's life when menstruation eventually stops and the woman goes through a number of changes, physically as well as mentally. Following menopause there is loss of bone mass by about 3-5% per year. Estrogen increases absorption of calcium, stimulates calcitonin secretion which leads to increased mineralization of bones. Due to lack of estrogen secretion bones tend to get fragile and osteoporotic. Osteoporosis is condition where there is reduction in bone mass density. Thus, post-menopausal females are at high risk for fractures of bones due to osteoporosis. [2]

It is necessary for females to exercise regularly even after menopause to prevent complications. Exercising on regular basis helps to maintain stability, mobility and balance control. Activities requiring high energy level may be a risk factor for menopausal females, which can cause straining on the distal joints leading to fracture. Thus performing yoga and exercising on Swiss ball may not require higher energy levels and can be performed with ease. So, the purpose of this study is to bring out the most beneficial and effective treatment that can help older female population to get out of risk in complications of geriatric age group.

Yoga can stimulate the bones to retain calcium, provided the body gets enough calcium in the first place. It does this through weight bearing poses of yogasanas that affect the spine, arms, shoulders, elbows, legs while encouraging a full range of motion. Weight bearing yoga training has shown a positive effect on the bone by reducing the bone resorption and hence preventing the risk of osteoporosis in postmenopausal women. It also has a positive effect on improving the quality of life and balance. [3]

Surya Namaskar is an ancient method yogic method to worship Sun. By practicing these asana all the abdominal organs get toned, stomach and intestine are stretched. If these organs are ill, then Surya Namaskar re-tuned and revitalizes them too. In the movements of Surya Namaskar, the spinal column is bent and stretched in a specific manner, thus stimulating the blood circulation to whole spinal column and brain by these movements, the whole musculoskeletal system stretched and contracted in a systematic manner provides more strength and flexibility to them. Practice of Surya Namaskar improves blood circulation throughout the body, maintains health and makes the body disease-free. Regular practice of Surya Namaskar gives strength, flexibility and vitality to the body. [4]

Core muscles are known to consist of the muscles around the abdominal and lumbar regions, such as the rectus abdominis, erector spinae, quadratus lumborum, external oblique and gluteus medius. These muscles play a key role in providing individuals with stability during movement of the extremities. Many therapists have conducted strengthening exercises such as trunk stabilization exercise in order to improve the core stability. [5]

The use of Swiss balls in strength and conditioning programs has been growing massively. Swiss balls have been contributing consistently in strength training regimes and exercising on Swiss balls has been advocated on the belief that a labile surface will provide a greater challenge to the trunk musculature; increase the dynamic balance of the user. Exercising on an unstable surface, when compared a stable surface, arouses a greater influence on muscular activity and unstable surface. [6]

The Swiss ball exercise is one of the dynamic lumbar stabilization exercises, and

its main principle is to reduce low back pain by comprehensively improving muscle strength, endurance, balance, and flexibility of the trunk and the reflexes, cognitive sense, balance, and proprioceptive sense while the individual leans their body on the ball. Lumbar stabilization refers to internal stabilization achieved by isometric contraction of the abdominal and lumbar muscles to maintain stability. The effects of lumbar stabilization exercise on the alleviation of pain and improvement in function of patients with low back pain, special exercises concerning the stability of the trunk are more effective in alleviating pain and improving function of patients with chronic Spondylolisthesis, spondylolysis, and degenerative disc compared with conservative treatment. [7]

MATERIALS AND METHODOLOGY

INCLUSION CRITERIA:

- Peri menopausal females from age group 40-50
- Females having low back ache

EXCLUSION CRITERIA:

- Any recent fracture or surgery of the spine, hip, knee, ankle, shoulder, elbow
- Spondylolisthesis
- Uterine Fibroids, tumors etc
- Disc herniation
- Sacroiliac Joint Dysfunction
- Radiculopathy
- Females who have already attained menopause)
- Stroke
- Pregnancy
- Renal Pathology

OUTCOME MEASURES:

- Numerical Pain Rate Scale (NPRS)
- Menopause Specific Quality Of Life Questionnaire (MENQOL)
- Range Of Motion (ROM) Of Lumbar Spine

MATERIALS REQUIRED:

- Medicine ball 65cm
- Consent form
- Mat
- Measuring tape
- Goniometer

METHODOLOGY

A sample size consisting of 28 peri menopausal females with low back ache from age group 40-50 were screened as per the inclusion and exclusion criteria. Explaining the procedure and importance of the study, participants filled a consent form and pre ROM, NPRS and MENQOL was taken. Two groups with equal females were created. Group A, yoga therapy and Group B, Swiss ball activity consisting of 14 females each.

The participants in Group A, performed yoga beginning with the warm up session. That was of 5 minutes of pranayama, following Surya Namaskar. Along with Surya Namaskar they performed setu bandhasan and pavan muktasan, which are two yogasanas specifically for low back pain. The session was of 20 minutes, 4 times a week for 4 weeks' period. Initially, participants performed 5sets of Surya Namaskar in every session and 5 sets of both the asana. Later on, progression was done by increasing the number and repetition's i.e. by 5 sets of Surya Namaskar and 5 sets of both the asana at 2 weeks. Again NPRS, MENQOL and ROM were assessed at the end of second week. The session included mobility exercises of all joints as warm up for 5 minutes. The session was for 15-20 minutes. Subjects performed the above activities: The session was for 15-20 minutes. Subjects performed the above activities 4 times a week for 4 weeks.

1. Side twist
2. Side reach
3. Heel raises
4. Seated rolls

Post ROM, NPRS and MENQOL was taken and comparison of pre and post outcome measures was done. Effect of both the groups was compared.

STATISTICAL TESTS

Data was analyzed in WinPepi using paired t-test for intra group analysis and unpaired t-test for inter group analysis.

The NPRS mean difference between both groups were, Group A 1.5 and Group B 0.57, standard deviation of Group A 1.160 was and Group B 0.75 respectively, with p value 0.0093 which is extremely significant.

There was a marked difference in the mean values of physical symptoms OF MENQOL i.e. Group A 19.42 and Group B 9.14, standard deviation of Group A was 4.55 and Group B 2.5 respectively, with p value <0.0001 which is extremely significant.

The mean values of right lumbar rotation were 28.14 and 26.5standard deviation 2.81 and 0.770 of Group A and B respectively, with p value of <0.0001 considered significant, Left lumbar rotation mean values were 28.14and 26.5 of group A and B, with standard deviation of 2.53 and 0.64 respectively, with p value <0.0001 considered to be significant.

RESULTS

Significant improvement in pain relief and physical component of MENQl scale was seen in the Swiss ball activity group compared with the group who underwent yoga training. Whereas, increase of lumbar ranges of motion was seen in yoga group.

TABLE NO 1: - NPRS values of group A and group B

	GROUP A	GROUP B	p-value
PRE	7.28	7.35	0.8458
2 WEEKS	3.35	3.57	0.5432
POST	1.5	0.57	0.0093

Interpretation: Table 1 shows the comparison of NPRS values of group A and group B, i.e. the pre session, at 2 weeks and post sessions. Both the data were compared.

TABLE NO 2:-MENQOL values of Group A and Group B

	VASOMOTOR			PSYCHOSO-CIAL			PHYSICAL			SEXUAL		
GROUP	A	B	P value	A	B	P value	A	B	P value	A	B	P value
PRE	0.933	0.866	0.960	3.133	2.2	0.492	46.57	47.35	0.5653	0.466	0.66	0.886
2 WEEKS	0.928	0.733	0.885	2.33	1.66	0.621	28.92	23.35	0.0003	0.466	0.66	0.886
POST	0.933	0.733	0.882	1.93	1.26	0.621	19.42	9.14	0.0001	0.466	0.66	0.886

TABLE 3: LUMBAR RANGE OF MOTION OF GROUP A AND GROUP B (In Degrees)

	FLEXION		EXTENSION		RT.LAT.FLEXION		LT.LAT.FLEXION		RT.ROTATION		LT.ROTATION	
GROUP	A	B	A	B	A	B	A	B	A	B	A	B
PRE	5.266	51.93	21.64	19.57	38.42	39.07	38.28	38.92	23.78	24.57	23.85	24.5
p-value	o.ooo1		0.0008		0.3949		0.3974		0.3026		0.3430	
2 WEEKS	53.46	53.06	22.5	20.78	40	40.28	39.92	41.78	25.28	25.64	25.57	25.5
p-value	0.4710		0.0039		0.7125		0.0186		0.6360		0.9180	
POST	56.06	54.6	22.92	22.14	41.35	41.92	41.35	41.64	27.64	26.85	28.14	26.5
p-value	0.0126		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	

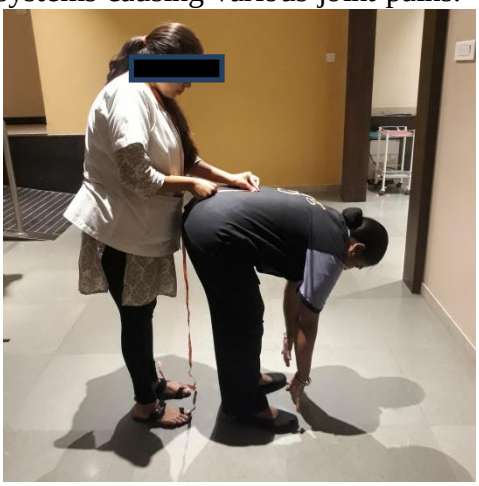
Interpretation: Table 2 shows the difference between pre, at 2 weeks and post values of the 4 domains of the MENQOL scale. There was no significant difference seen in the vasomotor, psychosocial and sexual symptoms. A significant difference of the pre and post values was seen only in the physical symptoms within the group A.

Interpretation: Table 3 shows the lumbar ranges of motion in both the groups. A difference is seen in the lumbar range of motion in all ranges except for flexion. Group A shows a significant difference in the range of motion than group B.

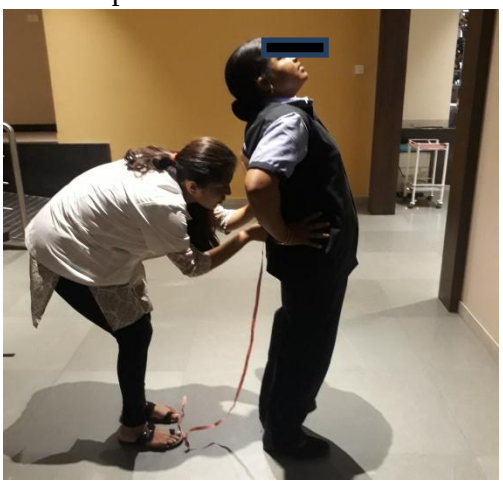
DISCUSSION

Menopause is the permanent cessation of menses. This occurs due to the declining levels in the estrogen hormone. Decreased estrogen level leads to various systemic diseases. Thus it is necessary to review a woman's lifestyle choices by recommendation, that will help maintain and improve her quality of life. CVD, diabetes and breast cancer are commonly occurring diseases in menopausal females. Regular physical exercise can reduce level of stress and menopausal symptoms, which will help preventing bone loss and improve balance and strength. [8] Decreased estrogen

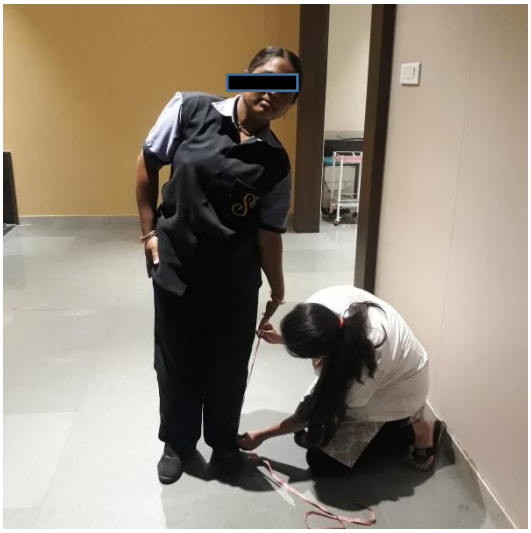
levels leads to osteoporosis in the musculo-skeletal systems causing various joint pains. Low back is highly susceptible in menopausal females. [9]



LUMBAR FLEXION



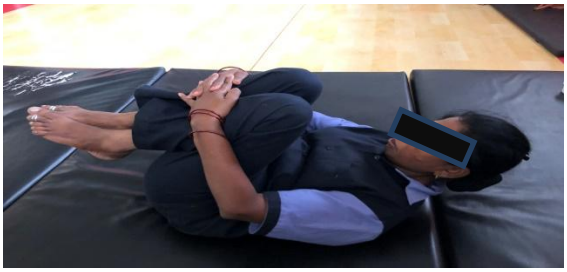
LUMBAR EXTENSION



LATERAL FLEXION

LUMBAR ROTATION

SURYA NAMASKAR

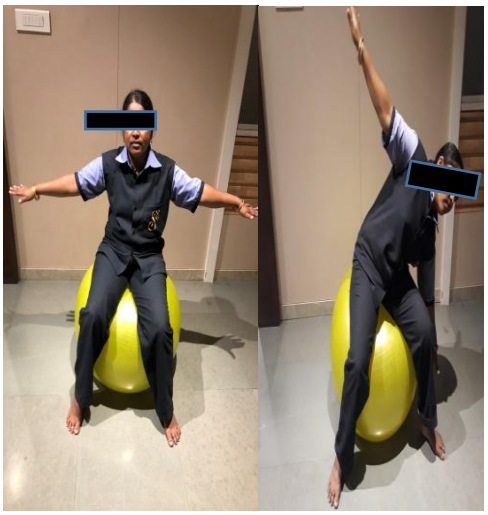


PAVANMUKTASAN

SETHUBANDHASAN

Whereas group B performed Swiss ball exercises

STARTING POSITION ENDING POSITION
SIDE TWIST



STARTING POSITION ENDING POSITION
SIDE REACH

STARTING POSITION ENDING POSITION
HEEL RAISES

STARTING POSITION ENDING POSITION
SEATED ROLLS

The aim of this study was to find the effect of yoga therapy versus Swiss ball activity training in females having low back pain.

The study was conducted on 28 subjects having low back pain from the age group 40-50 for time duration of 4 days for 4 weeks. Participants were distributed in two groups viz. Group A i.e. yoga therapy and Group B i.e. Swiss ball activity training. Group A performed Surya Namaskar and two yogasanas pavan muktasan and sethu bandhasan. Whereas Group B performed exercises on the Swiss ball. Both the groups were given similar time duration of 20

minutes, including warm up and stretching session. Assessment was taken at three times i.e. before the treatment, after 2 weeks and post i.e. at the end of 4th week.

NPRS Scale was taken as an outcome measure to assess the intensity of pain. The mean difference between both groups were, Group A 1.5 and Group B 0.57, standard deviation of Group A 1.160 was and Group B 0.75 respectively, with p value 0.0093 which is extremely significant. The reason for decrease in the pain intensity may be due to performing activity on an unstable surface that leads to stressing of the musculature and activates the proprioception to gain stability. [9] Behm G et also found the same result in his study which showed decrease in level of pain due to muscle strengthening on the exercise ball.

MENQOL Scale was taken as an outcome measure to assess the variations in quality of life. MENQOL Scale was divided into 4 domains i.e. vasomotor, psychosocial, physical and sexual. The mean difference between vasomotor, psychosocial and sexual did not show much significance. There was a marked difference in the mean values of physical symptoms i.e. Group A 19.42 and Group B 9.14, standard deviation of Group A was 4.55 and Group B 2.5 respectively, with p value <0.0001 which is extremely significant. The physical domain in the MENQOL scale showed a positive result. The cause for this might be due to the decreasing level of pain. Regular exercising helps to maintain and increase muscle strength and flexibility. Thus, there was only physical domain which showed a significant difference.

Lumbar range of motion was taken to assess the improvement in the lumbar spine flexibility. There was no significant difference in the flexion ranges of both the groups. The extension ranges mean values of Group A was22.92 and Group B 22.14,with standard deviation of Group A being 1.77 and Group B 1.167, (p value<0.0001) considered significant. Right lateral flexion mean values were, Group A was 41.35 and Group B was 41.92,with standard deviation of 0Group A 2.134 and Group B 1.94, with p value <0.0001 considered extremely significant. The values of left lateral flexion were not considered to be significant. The mean values of right lumbar rotation were 28.14 and 26.5standard deviation 2.81 and 0.770 of Group A and B respectively, with p value of <0.0001 considered significant, Left lumbar rotation mean values were 28.14and 26.5 of group A and B, with standard deviation of 2.53 and 0.64 respectively, with p value <0.0001 considered to be significant. In this study increased range of motion were seen in group A consisting yoga therapy. There was no marked increase in the lumbar ranges for group B. Stretching is an important component in yoga. Most of the poses performed in yoga are based on stretching and hyper extending. Stretching helps in improving the range of motion. Thus group A showed significant improvement in the ranges of motion.

In this study, the participants performing Swiss ball activity experienced effective reduction in pain, improved physical symptoms of daily life than the participants performing yoga. Swiss ball activity enhances the balance and co-ordination of core muscle groups used to stabilize the spine and adapts an upright posture which in turn reduces stress on the lower back. Whereas the participants performing yoga showed improvement in lumbar ranges of motion. Yoga helps in achieving flexibility to faster. [10]

Both, the treatment was effective, although group B showed a better result in NPRS, MENQOL than group A. Where the lumbar ranges of motion were increased in group A. The p value of both the groups for NPRS was< 0.0001 that of MENQOL physical domain was <0. 0001. The p value for lumbar range of motion in between both groups did not show considerable significance.

Clinical Implications

Since, Swiss ball training and yoga both found to be effective in the treatment of low

back pain in peri-menopausal female. But Swiss training showed more effect on decreasing pain as compared to yoga. Due to which a significant difference was seen in the physical domain of the MENQOL scale. Improvement of ADLs was seen in physical domain.

But the group undergoing yoga showed a slight increase in the lumbar range of motion.

Further studies can be done with a large sample size, long term effects can be assessed.

Other outcome measures like flexibility test, core muscle strength with dynamometer can be assessed.

CONCLUSION

The result of this study showed that Swiss ball training holds the advantage of reducing pain in peri menopausal women with improvement in the physical component of MENQOL scale as well. Whereas, when it comes to improving lumbar range of motion, yoga outperformed owing to its own nature of performance.

Conflict of interest: There is no conflict of interest.

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Ethical clearance- Dr D. Y. Patil Ethics Committee

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