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Original Research Article

Effect of Baduanjin Exercises on Sleep, Anxiety and Quality of Life in 50-70 Years Old Population

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ABSTRACT

Background: Although Baduanjin exercise has been found effective in improving sleep in different population however its effects on sleep, anxiety and quality of life remain unclear in the elderly population. The purpose of the study is to compare the effect of Baduanjin exercise versus conventional exercise i.e. brisk walking on sleep, anxiety and quality of life in elderly population.
Method: 30 older adults (M age 63.2; SD= 4.84) with scores on Zung self rating anxiety scale-45-59 and Pittsburgh sleep quality index>5 were randomly assigned to either group A or group B. Zung self rating anxiety scale, Pittsburgh sleep quality index and Sf-36 questionnaire were the outcome measures used. The exercises for both the groups were given 5 days/ week for 3 weeks. Group A was given conventional treatment and group B was given Baduanjin exercises.
Results: Pre and post measures were noted. Paired t test was used to check the statistical significance with $p<0.05$ and unpaired t test was used for between group analysis where $p>0.05$.
Conclusion: Study concludes that Baduanjin exercise and conventional physiotherapy both were equally effective in improving sleep, anxiety issues and quality of life in 50-70 years old population.

Keywords: Baduanjin exercise, conventional physiotherapy, sleep, anxiety, quality of life.

INTRODUCTION

Modern life is characterized by reduced sleep times and worsened sleep quality due to changes in modern lifestyle. More than half of older adults suffer from insomnia and these subjects are often under treated. Sleep disturbances are common symptoms of older adults and are related to various factors including use of caffeine, tobacco, alcohol, co morbid diseases. [1] Subjects who present with sleep disturbances should be screened for sleep apnea syndrome, restless leg syndrome, psychiatric diseases like depression and anxiety compared with younger people, and elderly people show age related sleep changes including an advanced sleep phase which results in fragmented sleep and early awakening. (1)

Several physical and psychological changes are known to occur with aging. However adjustment to changes in sleep quality and quantity can be among the most difficult. [2] Although sleep disturbances is a a common complaint among patients of all ages, research suggest that older adults are particularly vulnerable. (2) Sleep consists of 2 main phases: Rapid eye movement (REM) sleep and Non rapid eye movement sleep. Studies comparing sleep in older adults to younger adults found that older adults spent less time in deeper stages of sleep. (2) A large study of over 9,000 adults age of more than 65 years found that 42% of participants reported difficulty in initiating and

maintaining sleep. Both subjective and objective measures of sleep quality provide support for age related sleep changes. Subjectively older adults report waking up at earlier times, increased sleep onset latency, time spent in bed, night time awakenings and decreased total sleep as compared to young adults. [(1)] The reason underlying sleep disturbances are complex which includes changes in sleep architecture, increased risk for sleep disorders, circadian rhythm shifts, medication use, medical or psychiatric illness. [(1)] Baduanjin exercise has documented health benefits including the prevention and treatment of all causes of mortality including coronary artery disease.

Although research has found that pharmacological treatment approach appears an effective treatment for sleep disorder, evidence of its sustained efficacy is lacking. [(3)] Previous reviews have reported that non pharmacological treatments are as effective as pharmacological treatments. The non pharmacological treatment have been studied including providing sleep hygiene advice and cognitive behavioural therapy, with advice to the patient to set a regular bed time schedule, limit alcohol and caffeine intake as increased daylight exposure and physical activity. Cognitive behaviour therapy comprises of behaviour therapies such as sleep hygiene education, stimulus control, sleep restriction, paradoxical intention and relaxation therapy. [(4)] Exercise programs are also recommended to help prevent and treat quality of sleep. [(3)] To improve cardio respiratory and muscular fitness, bone and functional health and depression, older adults should do at least 150 minutes of moderate intensity of aerobic activities throughout the week for 30 minutes per session for 5 days per week.(according to WHO) Several physical and psychological changes occur with normal aging, however adjustment to changes in sleep quantity and quality can be among the most difficult. Researchers say its normal for older adults to worry more about things like deteriorating health and financial concerns as they age, but elderly with CAD worry more about routine events and activities for 6 months or more. The distress experienced by such elderly can overwhelm already strained families, caregivers and community support systems so, providing appropriate and effective treatment are critical for QOL and health maintenance. [(5)]

Tai chi exercise may have beneficial effects by enhancing the sleep quality of healthy older adults. Tai chi qigong is an increasingly popular mind body form of exercise that incorporates physical, cognitive, social and meditative components. It is a whole body exercise that integrates breathing with harmonious movements of body training. It is designed to loosen the joints, promote deep relaxed breathing and cure many ailments. Baduanjin also known as “8 section of brocades” is characterized by simple, slow and relaxing movements. The exercise involves 8 simple movements according to traditional Chinese medicine theory, each of which can enhance the function of certain organs or parts of body. [(6)] The whole set of movements are fine and delicate with moderate intensity.

Purpose of study:

The ability to sleep decreases with age as a result of factors associated with aging. Studies comparing sleep in older adults to younger adults found that older adults spent less time in deeper stages of sleep. Sleep becomes more fragmented as aging occurs such that there are more frequent sleep stage shifts, arousals and awakenings. This results in decreased sleep efficiency. People with chronic sleeping difficulty show poorer attention, slower response times, problems with short term memory and decreased performance levels. Certain medications are known to affect sleep. These include bronchodilators, corticosteroids, decongestants, diuretics, stimulating antidepressants, psychiatric and gastrointestinal medications.[(1)] The

medications for sleep has number of side effects and other behavioural therapy are more effective than hypnotic however they are expensive to deliver. Several studies have shown a positive impact on self reported sleep among older normal sleepers following exercise training protocol including 30 minutes of walking daily. Walking is an appropriate exercise for elderly population as it does not require supervision and easy to perform as compared to other aerobic exercise such as jogging, swimming or running. Baduanjin exercise also called eight section brocade is a traditional Chinese mind body exercise routine, characterized by slow, co-coordinative sequential movements .Many historians believe that Baduanjin was initially created by the ancient Chinese national hero (Yeufei) in the song dynasty to help his soldiers recover from their bodily injuries and prepare for future battles. With the passage of time, movements in the Baduanjin form have been developed and reinforced to meet needs of individuals for both physical and psychological well being. When compared to complex movements in Tai chi, one of the most popular Chinese traditional qigong exercises, Baduanjin is easy to learn because it involves only eight separate movements. Each individual movement needs to be practised on both left and right sides of the body. [(3)] The evidence indicate that Baduanjin training could be an effective intervention program for physiological benefits (e.g.: Blood pressure, heart rate, cardiovascular endurance, attenuating BMD loss, slowing process of cognitive decline, strengthening physical function in aging population. [(5)]

Qigong exercise reduces fatigue and depression and also improves mental functioning; however the effects on sleep remain unclear. Studies have reported that aerobic exercise has positive effect on sleep quality in patients with chronic insomnia and obstructive sleep apnea and several studies have shown that qigong exercise improves sleep quality in patients with fibromyalgia, peri menopausal women and chronic fatigue syndrome. However few studies have shown the effectiveness of qigong exercise on sleep in elderly population. As Baduanjin exercise is very easy to learn and less physically or cognitively demanding it is popular in the Chinese population as a safe qigong exercise to promote health. [(7)]

Aim and objectives:

Aim: To find the effect of Baduanjin exercises on sleep, anxiety and quality of life in 50-70 years old population.

Objectives: 1.To find the effect of Baduanjin exercises on sleep quality in terms of Pittsburgh sleep quality index.

2. To find the effect of Baduanjin exercise on anxiety in terms of Zung self rating anxiety scale.

3. To find the effect of Baduanjin exercise on quality of life in terms of SF 36 questionnaire.

4. To find the effect of conventional exercise on quality of sleep ,anxiety and quality of life in terms of Pittsburgh sleep quality index, Zung self-rating anxiety scale and SF 36 questionnaire.

5. To compare the effect of Baduanjin exercise and conventional exercise in 50-70 years population.

MATERIALS AND METHODOLOGY

The study design was experimental and was carried out in a park. The sampling method was purposive and sample size was 30. The target population was 50-70 years old individuals. Individuals were randomly allocated in two groups using chit method.

INCLUSION CRITERIA: 1. Participants aged 50-70 years of age.

2. Males and females.

3. Participants whose score on self rating anxiety scale was 45-59 and global score on Pittsburgh sleep quality index being >5.

EXCLUSION CRITERIA: 1. Participants having addiction of smoking and alcohol.

2. Participants on medications for sleep.

3. Participants already on exercise program.

4. Participants who have undergone any recent surgery or trauma.

MATERIALS REQUIRED: 1.Yoga Mat
2. Pittsburgh sleep quality scale 3. Self rating anxiety scale 4. Pen
5. Consent form 6. SF 36 questionnaire

Procedure:

GROUP A [8,9]

Group A participants: Brisk walking.
Frequency: 5 days per week.
Intensity: 60% of HRmax.
Duration: 30 minutes/ session
Included 5 minutes of warm up and 5 minutes of cool down. (ACSM)
Warm up and cooldown: flexibility exercises of hip, knee and back. [8]

GROUP B

Baduanjin exercise is given to the group B for 4 weeks five days per week and for 30 minutes per session.
At the end of 4 weeks their sleep quality will be assessed using Pittsburgh sleep quality index. Baduanjin exercise consists of eight pieces which cultivate energy, flexibility, health and awareness.

The first piece: Lifting the Heavens

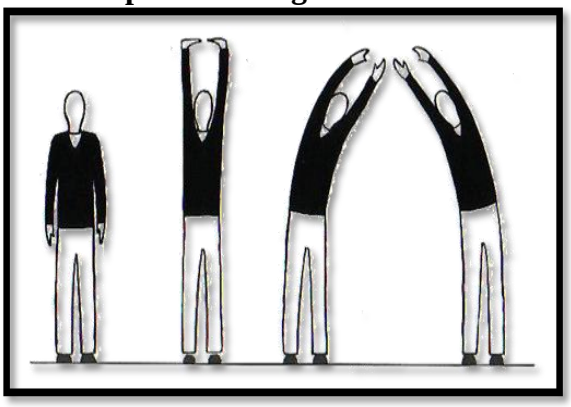


Figure 1: Lifting the heavens

Stand naturally with feet more or less parallel and shoulder width apart. Find a way to balance on the bubbling wells so you can release tension in your feet, ankles, knees, hips and back. Raise your arms above your head, turning the palms upward as if pushing the sky up and pushing down on the bubbling wells by moving forward. Lower your heels then let the upper body bend to the left and then to the right. Let the spine relax to the side vertebra by vertebra from the base up. Come back up the same way. Lower our hands down to your sides again.

The second piece: Shooting the arrow

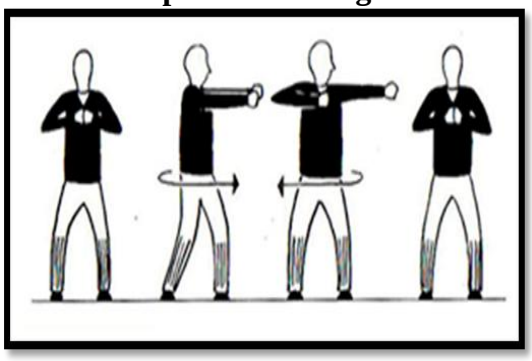


Figure 2: Shooting the arrow

Widen your stance so that your feet are about three feet apart and more or less parallel. This means you'll be squatting slightly; ease any tension in your back by tucking the tailbone forward slightly. Bring your hands up to the chest. Swivel your hips and extend your arms to the left and then turn back to centre as if you were drawing a bow. Return your hands to your chest. Then turn and shoot the bow to the right.

Third piece: Separating heaven and earth

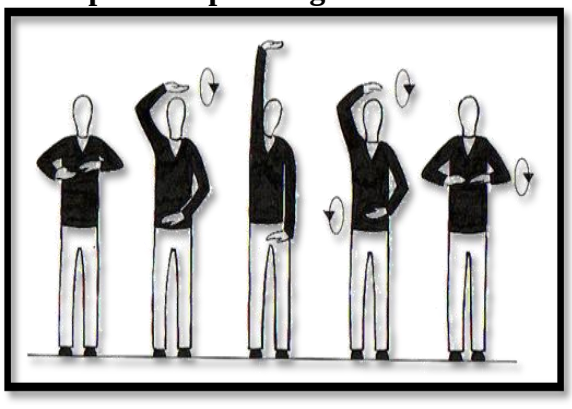


Figure 3: Separating heaven and earth

Stand naturally with feet about shoulder width apart. Raise your hands, palms up, to the level of the solar plexus. Raise your left arm, palm up pushing above your head and at the same time press down with your right

arm, palm down. The hands should move up and down the centre of body. Then change hands so the right hand pushes up while the left hand presses down.

Fourth piece: Looking behind

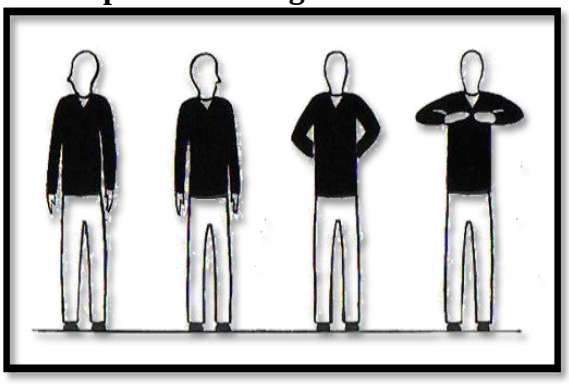


Figure 4: Looking behind

Stand naturally with feet parallel and shoulder width. As you exhale, turn your head to the left and look backward. As you inhale turn your head back to centre, and as you exhale again continue on the right and look backward. Do this three (six, nine, twelve) times. Then place your palms on the kidneys and do another set looking left and then right three (six, nine, twelve) times. Then raise the hand to chest level, with palms up, forming a horizontal circle in front of you and do a third set.

Fifth piece: Sway the head and swing the tail

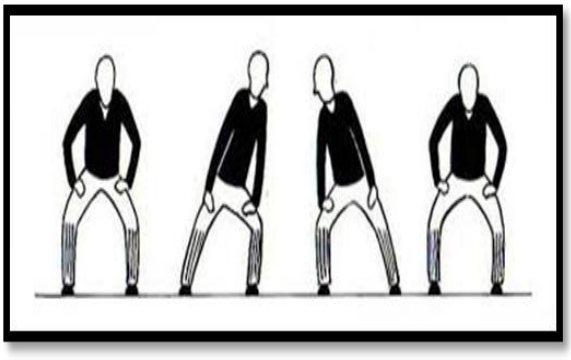


Figure 5: Sway the head and swing the tail

Step your right leg to the right to widen your stance to three or four feet. Squat down with tailbone tucked forward slightly so there is no strain in back. Place your hands on your knee with thumb pointing outwards and the fingers on the inside of the thigh just above the knee. Sway your head and swing your tail by driving your weight with the left leg as you turn the hip to the left.

Sixth piece: Hands holding feet

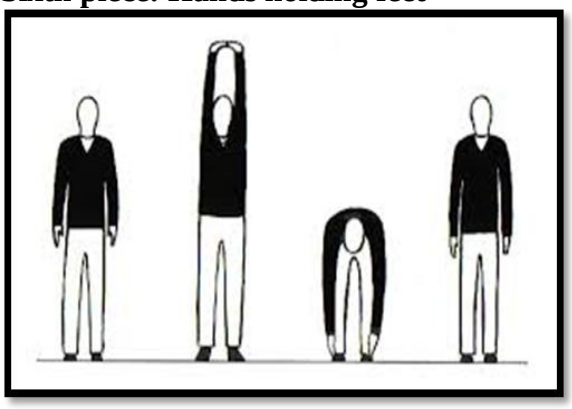


Figure 6: Hands holding feet

Stand naturally with feet parallel and shoulder width. Push your arms above your head with palms facing up, as if you were lifting something. Lower chin to chest and slowly bend forward with a flexible back, vertebra by vertebra like a blade of grass. Grasp your feet (all your ankle, calves and knees) and pull them very gently so that you are pushing up into your kidneys for a couple of seconds. Do not strain. Slowly stand upright again, keeping the spine flexible, keeping your chin to your chest until you are upright with hands above your head. Bring hands down in front again.

Seventh piece: Screwing the fist with fiery eyes

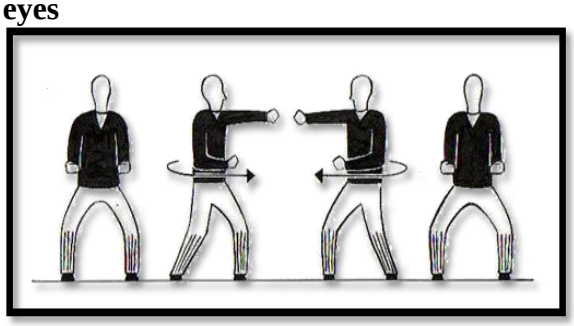


Figure 7: Screwing the fist with fiery eyes

Step your right leg to the right to widen your stance. Squat down with tailbone tucked forward slightly so that your back is not strained. Your feet are about three feet apart and more or less parallel. Raise your fists to your sides. Turn from the hips to the

left and extend your left arm as if punching, rotating the fist 180 degree clockwise. Your right fist remains at your hip. Return to centre and then continue to the right, extending your right arm, rotating 180 degree counter clockwise. Your left fist remains at your hip.

Eight piece: Rocking the bubbling wells

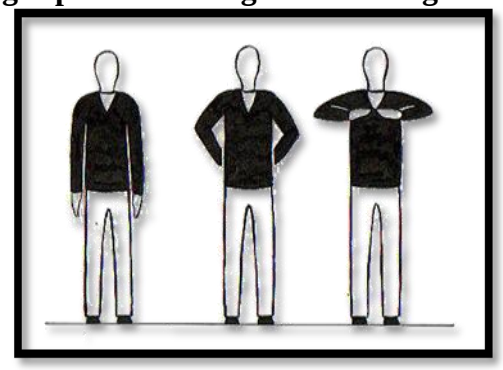


Figure 8: Rocking the bubbling wells

Stand naturally with feet parallel and shoulder width. Press down on the bubbling wells by rocking forward an inch or two from the dantien below your navel. Then return do these three (six, nine, twelve) times. Then place your palms above the kidneys and do a second set of repetitions. Then raise your hands, palms up, into horizontal circle at chest level, and do a third set of repetition.

RESULTS

The data was analyzed using "Primer" statistical package software.

30 participants with score of >5 on Pittsburgh sleep quality index and 45-59 on Zung self rating anxiety scale were included in the study. The data was entered into excel spreadsheet, tabulated and subjected to statistical analysis.

Statistical measures such as Mean, Standard deviation (SD), Test of significance such as Paired t- test were used to analyze the data.

Results were concluded to be statistically significant with $p<0.05$ in group A and Group B after pre and post intervention. However results of the comparison between group A and group B were concluded to be statistically non significant with $p>0.05$.This concluded that both the interventions given in group A and group B were proven to be equally effective.

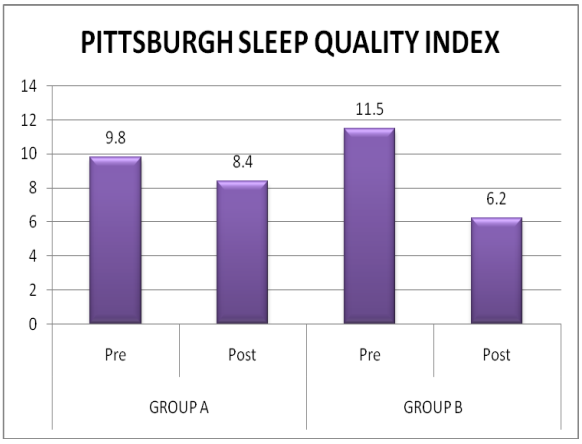
As the data was parametric, Paired t-test was used for within group analysis and unpaired t test was used for between group analysis.

Table-1 Gender distribution

Gender	Distribution
Male	17
Female	13

Table 2.1 Pittsburgh sleep quality index in Group A and Group B.

Groups	Group A-PSQI		Group B-PSQI	
	Pre	Post	Pre	Post
Mean	9.8±3.4	8.4±3.3	11.5±3.1	6.2±3.4
P value for within group	0.001		0.001	
P value for between group	0.10			
T value for within group	6.332		15.8	
T value for between group	1.68			



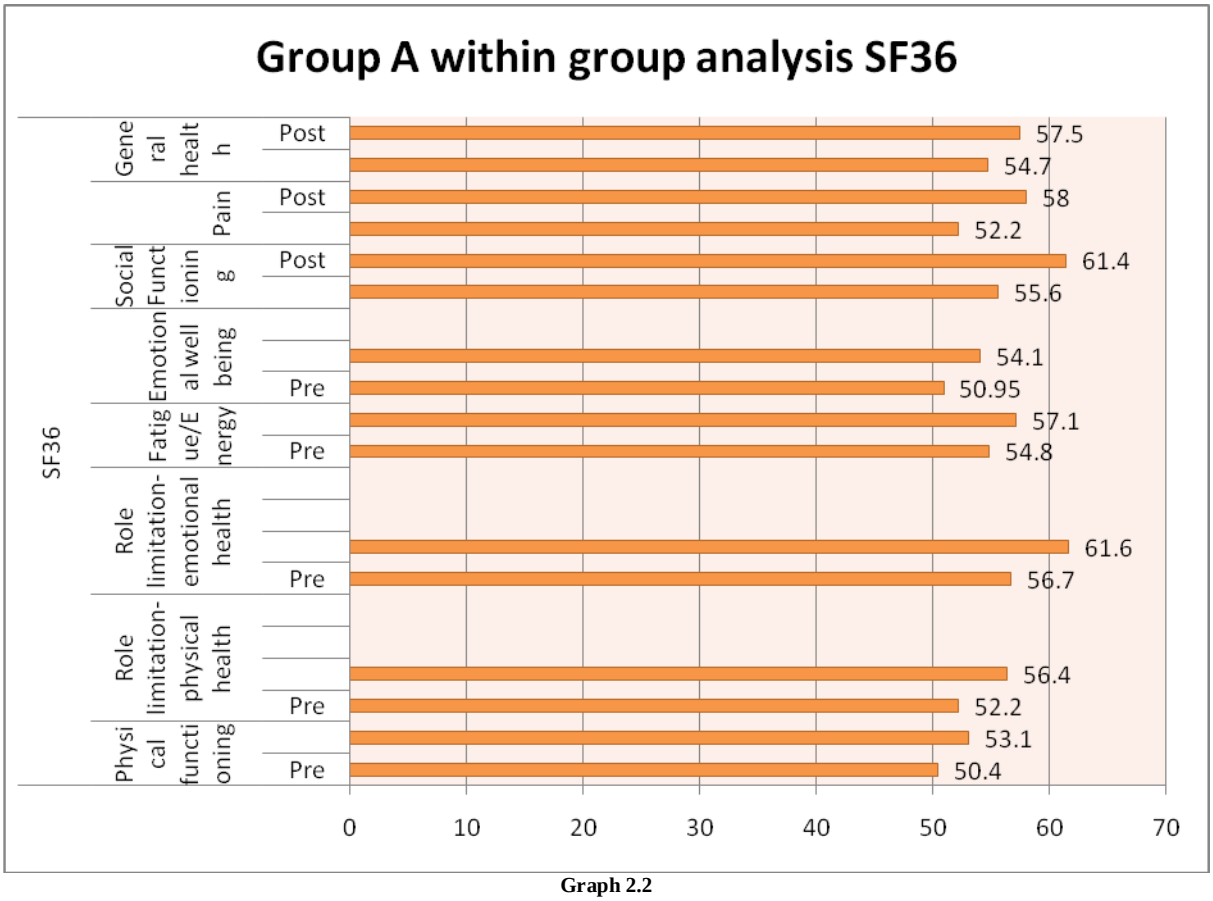
Graph 2.1

Interpretation:

Table 2.1 and Graph 2.1 shows the pre and post values on Pittsburgh sleep quality index of the study population in Group A and Group B. The data was statistically analyzed using the paired t test which gave p value-0.001 for Group A and 0.001 for Group B which is <0.05. Thus, the result is statistically significant whereas between group analysis shows the result was not significant as $p>0.05$. Unpaired t test was used for between group analysis.

Table 2.2 Group A : SF-36

Physical functioning		Role limitation-physical health		Role limitation-emotional health		Fatigue/ Energy		Emotional well being		Social Functioning		Pain		General health	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
50.4± 7.2	53.1± 8.9	52.2 ±8.9	56.4 ±10.1	56.7 ±6.4	61.6 ±6.3	54.8 ±6	57.1 ±4.9	50.9 ±4.6	54.1± 3.7	55.6± 4.7	61.4± 3.8	52.2± 4.2	57.9± 4.9	54.7± 3.8	57.5± 3.4
0.001		0.11		0.004		0.003		0.004		0.002		0.002		0.004	
2.8		1.72		2.3		3.53		3.73		3.442		2.67		3.2	



Graph 2.2

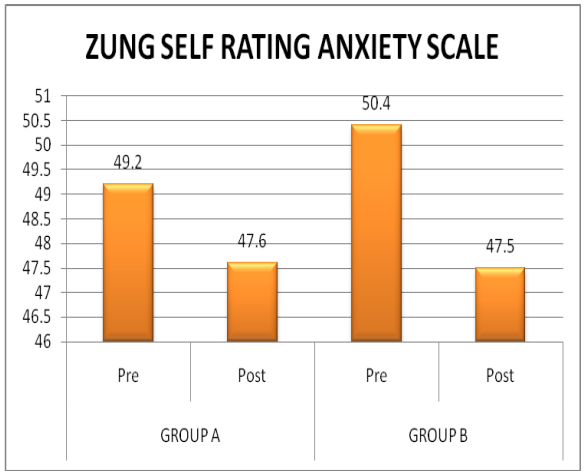
Interpretation:

Table 2.2 and Graph 2.2 shows the pre and post values on SF-36 questionnaire of the study population in group A. The data was statistically analyzed using the paired t test which gave t value for physical functioning-2.8 p value-0.001,role limitation-emotional health-2.3 p value-0.004, emotional well being-3.73, p-value-0.004, pain-2.67 p-value-0.002, fatigue/energy-3.53 value-0.003, social functioning-3.442 p value-0.002 and general health-3.2 p value-0.004 which is <0.005.Thus, the result for these components were statistically significant.

T value for role limitation-physical health-1.72 p value-0.11 which is>0.005. Thus the result for this component were statistically insignificant.

Table 3.1 Zung self rating anxiety scale in Group A and Group B.

Group B	ZSAS		ZSAS	
	Pre	Post	Pre	Post
Mean	49.2±3.8	47.6±4	50.4±3.9	47.5±3.6
P value for within group	0.001		0.001	
P value for between group	0.95			
T value for within group	9.7		12.42	
T value for between group	0.058			



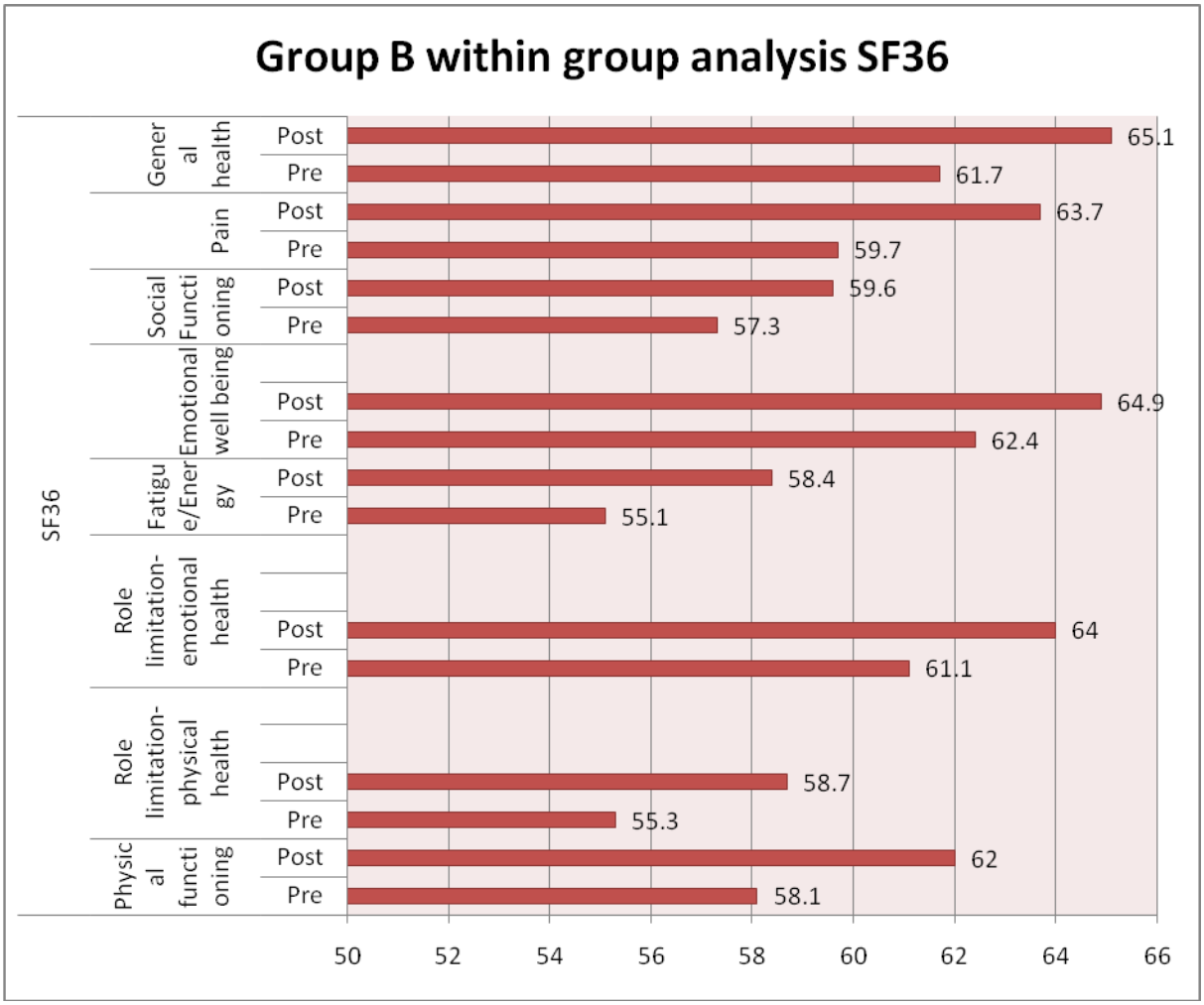
Graph 3.1

Interpretation:

Table 3.1 and Graph 3.1 shows the pre and post values on Zung self rating anxiety scale of the study population in group A and group B. The data was statistically analyzed using the paired t test which gave p value-0.001 for group A and 0.001 for group B which is <0.05.Thus, the result is statistically significant whereas between group analysis shows the result was not significant as p>0.05. Unpaired t test was used for between group analysis.

Table 3.2 Group B : SF-36

Physical functioning		Role limitation-physical health		Role limitation-emotional health		Fatigue/ Energy		Emotional well being		Social Functioning		Pain		General health	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
58.1± 4.4	62± 3.5	55.3 ±4.3	58.7 ±3.6	61.1 ±4.8	64 ±3.2	55.1 ±4.9	58.4 ±4.7	62.4 ±3.1	64.9± 2.6	57.3± 3.8	59.6± 2.7	59.7± 5.6	63.7 ± 4.5	61. 7± 3.8	65.1 ±4
0.0013		0.001		0.003		0.001		0.004		0.002		0.001		0.001	
4.49		7.96		3.93		7.80		5		4.2		8		11.2	



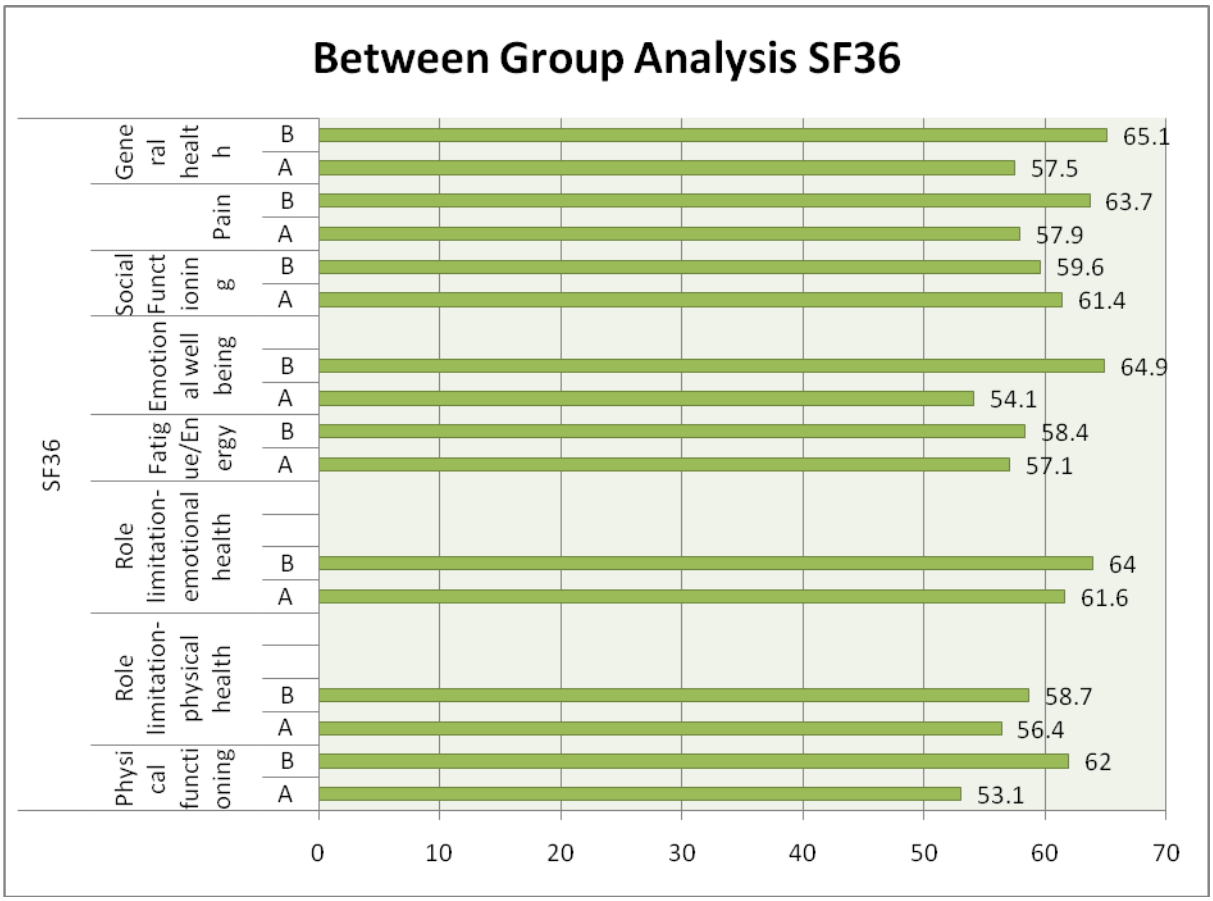
Graph 3.2

Interpretation:

Table 3.2 and Graph 3.2 shows the pre and post values on SF-36 questionnaire of the study population in group A. The data was statistically analyzed using the paired t test which gave t value for physical functioning-4.59 p value-0.0013,role limitation-physical health-7.96 p value-0.001,rolelimitation-emotionalhealth-3.93p-value-0.003,fatigue/energy-7.80,p-value-0.001,emotionalwellbeing-5 p value-0.004,social functioning-4.27 p value-0.002,pain-8 p value-0.001,general health-11.12 p value-0.001 which is <0.005. Thus, the results for these components were statistically significant.

Table 4.1 Between Group A and Group B : SF-36

Physical functioning		Role limitation-physical health		Role limitation-emotional health		Fatigue/ Energy		Emotional well being		Social Functioning		Pain		General health	
A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
53.1± 8.9	62± 3.5	56.4 ±10.1	58.7 ±3.6	61.6 ±6.3	64 ±3.2	57.1 ±4.9	58.4 ±4.7	54.1 ±3.7	64.9± 2.6	61.4 ± 3.8	59.6 ± 2.7	57.9 ± 4.9	63.7 ± 4.5	57.5 ± 3.4	65.1 ±4
0.8		0.5		0.3		0.5		0.001		0.2		0.001		0.003	
2.93		0.67		1.06		0.59		7.3		1.2		2.7		4.4	



Graph 4.1

Interpretation:

Table 4.1 and Graph 4.1 shows the values on SF-36 questionnaire of the study population in group A and group B. The data was statistically analyzed using the unpaired t test where p value-0.8, role limitation-physical health-0.67 p value-0.5, role limitation-emotional health-1.06 p value-0.3, fatigue/energy-0.59 p value-0.5, social functioning-1.2 p value-0.2 which is >0.005. Thus, the results for these components were statistically not significant.

The t value of emotional well being-7.3 p value-0.001, pain-2.7 p value-0.001, general health-4.4 p value-0.003 which is <0.005.

Thus the result for these components were statistically significant

DISCUSSION

The study compared the effect of aerobic exercise and Baduanjin exercise on sleep, anxiety and quality of life using the Pittsburgh sleep quality index, Zung self rating anxiety scale and SF-36 questionnaire in elderly population. There was significant improvement with respect to reduction in insomnia, anxiety and quality of life in group A participants as well as group B participants as in qigong with the addition of gentle movements and stretching extra oxygen is demanded from the blood which helps to reduce the presence of hydrogen ions and helps to produce a less acid environment with increase in energy production. [(10)]

Pittsburgh Sleep quality index: The result of the study showed significant improvement in sleep after 3 weeks in Group A participants and group B participants. From table 3.1, the improvement in mean values in Group B was 11.5±3.100 to 6.2±2.485 ($p < 0.05$) which is statistically significant. Over the three weeks period participants were asked to perform the Baduanjin exercises for 30 minutes with each set of movements performed three times which was gradually progressed to six times and nine times in the later weeks. Study supporting the result was conducted by Jessie S.M Chan et al (2014) stated that qigong exercises were an efficacious and acceptable treatment for sleep disturbances, fatigue, anxiety and depressive symptoms in people with CFS like illness. The longer the duration of intervention accounted for the effectiveness of qigong for sleep improvement in this study. There were only 16 sessions in 9 weeks in the previous studies while participants performed qigong for 6 days per week for 3 weeks in this study. Another possible reason was that in this study as it consisted of elderly population they were more enthusiastic to learn something new. Qigong involves posture, movements, breathing techniques and mental focus which is practised to integrate and cleanse the body, mind and spirit. Through the use of specific postures, proper breathing qi (vital energy) can flow freely throughout the entire body. This reinforces the sleep-wake cycle and encourages a natural sleep. In the concept of Chinese medicine, insomnia can be caused by blocked meridians (the pathway through which the qi flows). Qigong can help remove the blockages so that qi and blood can flow to the internal organs. [(11)] Baduanjin exercise involves reverse abdominal breathing which stimulates the vagus nerve which activates the parasympathetic nervous system which releases acetylcholine which turns down the fires of inflammation which is related to the negative effects of stress. [(12, 13)]

Improvement in Group A was 9.8±3.425 to 8.4±3.306 ($p<0.001$) from table 2.1 which is statistically significant. Study supporting the result was conducted by Passos Gs et al (2011) stated that a bout of moderate intensity aerobic exercise example walking reduced the time it took to fall asleep and increased the length of sleep of people with chronic insomnia compared to a night in which they did not exercise. However in the same study vigorous aerobic exercise example running or lifting heavy weights did not improve sleep. The possible mechanism may be exercise triggers an increase in body temperature and post exercise drop in temperature promotes falling asleep. Exercise also reduces insomnia by decreasing arousal, anxiety and depressive symptoms by its effects on circadian rhythms. [(14)]

Table 4.1 and graph 4.1 shows the values on Pittsburgh sleep quality index and Zung self rating anxiety scale of the study population in group A and group B post intervention. The t value for PSQI was 1.6 p value>0.05 and t value for ZSAS was 0.05 p value>0.05. This implies that the study for these components-sleep and anxiety is not significant which shows both the treatments were equally effective for improving sleep and anxiety.

Zung self rating anxiety scale:

The result of the study showed significant reduction in anxiety levels after 3 weeks in group B participants and group A participants. From the table 3.1, the improvement in the mean values in group B was 50.4±3.949 to 47.5±3.628 ($p<0.05$) which is statistically significant. Study supporting the result was conducted by Andrew MH Su et al (2011) stated that qigong requires the person to clear wandering thoughts and focus on here and now visual imagery and distract the subjects from daily stress and worries. According to a study conducted by Jones Lee et al(2004) short term practice of qigong enhances the parasympathetic tone and reducing the sympathetic activity thereby reducing the blood pressure, levels of stress hormones example noradrenalin thereby reducing the anxiety levels. In this study qigong exercise was given for 8 weeks once every week under the supervision of the instructor then they were asked to continue this for 4 weeks at home which was the limitation of this study. Another limitation was the placebo effect i.e. positive expectations of the subjects towards the intervention which was noted in this study. [(12)]

Improvement in group A was 49.2±3.881 to 47.6±4.060($p <0.005$) from table 2.1 which is statistically significant. Study supporting this result was conducted by Geetha Shivakumar et al (2013) stated that aerobic exercise is effective in reducing anxiety and depression. Dysregulation in hypothalamic pituitary adrenal axis have been implicated in the manifestation of depressive and anxiety symptoms. Regular exercise increases the seratonergic and noradrenergic levels in the brain similar to the effects of anti depressants. Exposing someone with high anxiety sensitivity to the physiological symptoms they fear such as rapid heartbeat in the context of physical exercise increases their tolerance for such symptoms. [(15)]

SF-36 Quality of life questionnaire:

The result of the study showed significant improvement in the quality of life after 3 weeks in group B participants and group A participants .SF-36 consists of eight components-physical functioning, role limitation-physical health, role limitation-emotional health, fatigue/energy, emotional well being, social functioning, pain and general health. In group B participants physical functioning, role limitation-physical health, role limitation-emotional health, fatigue, emotional well being, social functioning, pain and general health improved with a difference of 3.2±2.20,3.4±1.34,2.9±2.330,2.5±1.581,2.3 ±1.702,4±1.563, 3.4±0.966 respectively after 3 weeks intervention. Study supporting this result was conducted by Ran Li et al stated that while practicing Baduanjin exercise, the body maintains a steady gravity centre. With the lumbar spine as the axis, the movement of the four limbs is driven. In practicing the mind, body and breath are required to be smooth and unstrained. [(16)] Baduanjin exercise improves physical flexibility by promoting the motion of shoulder and sacroiliac joint. Baduanjin has a positive effect on lowering the blood pressure, blood lipid and helps the body to dredge the meridians and collaterals, facilitate blood circulation, relax the mind, balance emotion and regulate the internal organs to enhance one's physical health and quality of life and psychological state. [(16)]

In group A participants physical functioning, role limitation-emotional health, fatigue/energy, emotional well being, social functioning, pain and general health improved with a difference of 2.7±1.90, 4.9±3.46, 2.3±2.330, 2.5±1.62, 3.2±2.26, 5.8±4.101, 5.4±4.030, 2.8±1.97 respectively after 3 weeks intervention. Study supporting this result was conducted by Andrea P Rossi et al stated that moderate degree of aerobic exercise program based on supervised walking has beneficial effects on body composition, muscle function and physical performance. Walking has positive effects on skeletal muscle function, prevents sarcopenia and prevents the decrease of muscle strength associated with aging. [(17)] However in this study the p value of role

limitation-physical health >0.005 (t value=1.72) which states that study for this component was not significant. This may be due the reason that the study was conducted for a short period of time i.e. 3 weeks so the physical function could not be attained to the maximum level so that it doesn't restrict the participants in vigorous physical activities.

From the table 4.2 and graph 4.2 which showed the mean values on SF-36 questionnaire in both group A and group B post intervention stated that the t value of emotional well being-7.3 p value<0.05, pain-2.7 p value<0.05,general health-4.4 p value<0.05. The results for only these components were statistically significant in both groups. Walking reduces the pain for people with arthritis by between a quarter and a third, has low to moderate effect on the treatment of lower back pain and reduces the physical symptoms of anxiety associated with minor stress. [(18)] The study for other components-physical functioning, role limitation-physical health, role limitation-emotional health, fatigue/energy, social functioning p value>0.05 was statistically not significant in both the groups. This implies both the intervention were equally effective in improving the quality of life

CONCLUSION

The study concluded that Baduanjin exercise and conventional physiotherapy both were equally effective in improving sleep, anxiety issues and quality of life in 50-70 years population.

Limitations

1. The study was carried out in a short period of time.
2. The study consisted of small sample size

Future scope of study

1. Long term follow up can be carried out in future studies.
2. The study can be carried out in other population.
3. Chair aerobics can be added to the aerobic exercise group for this population in future studies.

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