



RESEARCH ARTICLE

A QUASI EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF SELECTED CALISTHENICS ON QUALITY OF SLEEP AMONG ELDERLY IN SELECTED OLD AGE HOMES, PUNJAB

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Abstract

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Introduction:-

Aging is the process of becoming older. Aging represents the accumulation of changes in a human being over time, encompassing physical, psychological, and social changes. Reaction time, for example, may slow with age, while knowledge of world events and wisdom may expand. Ageing is among the greatest known risk factors for most human diseases, roughly 150,000 people who die each day across the globe, about two thirds die from age-related causes.

Aging is the process of growing older at cellular, organ, or whole body level throughout the life span. Furthermore, the term —demographic transition refers to a shift in fertility and mortality rates leading to changes in population growth rates, and age distribution. Thus, as people globally live longer, increasing levels of chronic illness as well as diminished wellbeing are nominated to become major global health challenges. Subsequently, the global population of elderly is projected to further increase and reach 1.4 billion by 2030 and 2.1 billion by 2050. Moreover, ageing has important implications on social security, the economy, the organization and delivery of health care, caregiver availability and constraints, society, and policies. Thus, it is pertinent to establish comprehensive elderly-friendly health care with further focus on preventive action to maintain a healthy ageing process.

According to population census 2011 there are nearly 104 million elderly persons (aged 60 years or above) in India; 53 million females and 51 million males. A report released by the United Nations population Fund and Help Age India suggests that the number of elderly persons is expected to grow to 173 million by 2026.

As India moves closer to become the most populous country in the next 7 years, the country is facing another serious concern about ageing population. According to some studies, India is ageing much faster than previously thought and may have nearly 20 per cent population of 60 years and above by 2050. The numbers are even higher than projected by other international agencies like UN and Help Age. The agencies had projected the 60-plus population in India to rise to nearly 32 crore by 2050.

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Old age comprises "the later part of life; the period of life after youth and middle age , usually with reference to deterioration". At what age old age begins cannot be universally defined because it differs according to the context. The United Nations has agreed that 65+ years may be usually denoted as old age and this is the first attempt at an international definition of old age. However, for its study of old age in Africa, the World Health Organization (WHO) set 55 as the beginning of old age. At the same time, the WHO recognized that the developing world often defines old age, not by years, but by new roles, loss of previous roles, or inability to make active contribution to society. Most developed Western countries set the age of 60 to 65 for retirement. Being 60–65 years old is usually a requirement for becoming eligible for senior social program.

Sleep is an important vital function. Sleep promotes many functions such as restoration of body, repair of tissues, immune regulation, and consolidation of memory. Insomnia is one of the most common complaints in patients with mental health problems. The prevalence of insomnia is higher in elderly than in general population. The reasons could be due to physiological changes in sleep architecture with aging, high medical morbidity, multiple medication, loneliness, and environmental factors causing sleep disturbances. Although insomnia is a common troubling problem in the elderly, only minority seek professional help. Some elderly self-medicate with over-the-counter medications for their sleep problems. These practices lead to serious adverse effects over the long term. There are many myths related to insomnia in elderly. Thus, insomnia in elderly is often under-recognized and under-treated problem.

Sleep is a naturally recurring state of mind and body, characterized by altered consciousness, relatively inhibited sensory activity, reduced muscle activity and inhibition of nearly all voluntary muscles during rapid eye movement (REM) sleep, and reduced interactions with surroundings. It is distinguished from wakefulness by a decreased ability to react to stimuli, but more reactive than coma or disorders of consciousness, with sleep displaying very different and active brain patterns. Sleep occurs in repeating periods, in which the body alternates between two distinct modes: REM sleep and non-REM sleep. Although REM stands for "rapid eye movement", this mode of sleep has many other aspects, including virtual paralysis of the body. A well-known feature of sleep is the dream, an experience typically recounted in narrative form, which resembles waking life while in progress, but which usually can later be distinguished as fantasy.

Sleep needs change over a person's lifetime. Children and adolescents need more sleep than adults. Interestingly, older adults need about the same amount of sleep as younger adults - seven to nine hours of sleep per night. Unfortunately, many older adults often get less sleep than they need. One reason is that they often have more trouble falling asleep.

Poor sleep quality is associated with adverse effects on health outcomes. The 2003 National Sleep Foundation survey showed that one third of adults aged 64 years and older have at least one sleep-related complaint such as difficulty falling asleep, being awake a lot during the night and waking up too early. Exercise is often considered a non-pharmacological approach that could have beneficial effects on sleep. This is supported by epidemiologic studies showing an association between self-reported exercise and better sleep. Additionally, some evidence indicates that aerobically fit individuals have shorter sleep-onset latencies, less wake time after sleep onset, and higher sleep efficiency than their sedentary peers, and increased fitness has been associated with improvements in subjectively-assessed sleep. However, results from experimental exercise studies have been mixed. Several studies have shown a positive impact on self-reported sleep among older normal sleepers following exercise training protocols, including 30-min 67%–70% or 30%–40% heart rate reserve of cycling for 3 times/week, daily 30-min walking, calisthenics, or dancing, and 60-min Tai Chi practice twice a week. Positive effects of exercise on sleep have also been found in studies of seniors who had mild to moderate sleep problems.

Poor sleep quality is a common problem in the general population, often due to work-related demands and lifestyle changes. Poor sleep quality is associated with serious negative consequences on physical, mental, and social aspects of well-being. Poor sleep quality can have profound physical effects on the elderly, including fatigability and an increased risk of falls. Poor sleep quality and sleep deprivation are also associated with effects on activities of daily living and cognitive impairment in the elderly. Moreover, both are significantly related with psychological problems, mood changes, and depression. Previous studies have indicated that supportive ties and close relationships among family members are positively related to good sleep quality, while aversive ties predict poor sleep quality.

Several generalizations can be made regarding aging and sleep characteristics. Compared with younger persons, elderly persons tend to achieve less total nighttime sleep. However, it cannot be assumed that elderly persons require less sleep. Elderly persons have more nighttime arousals and awakenings. Increased daytime sleepiness may be the effect of such a pattern. Overall, the sleep-wake cycle in the elderly may be fragmented, with interrupted nighttime sleep and daytime wakefulness interrupted by naps. The deepest stages of non-REM sleep are frequently reduced or nonexistent in elderly persons; however, REM sleep tends to be preserved. Although a mild deterioration in sleep quality may be normal in the aging process, an elderly patient's complaint of significantly disrupted nighttime sleep or impaired daytime functioning.

Sleep quality refers to how well you sleep. For adults, good quality sleep means that you typically fall asleep in 30 minutes or less, sleep soundly through the night with no more than one awakening, and drift back to sleep within 20 minutes if you do wake up. On the flip side, bad sleep quality is the kind that leaves you staring at the ceiling or counting sheep. It may be characterized by trouble falling asleep and staying asleep, restlessness, and early awakenings.

Quality sleep is as important as quantity for rejuvenating the body. While drifting off, our body enters into NREM (non-rapid-eye-movement) sleep and goes through four stages, beginning with light sleep, progressing to deeper sleep. During the fifth stage, known as REM (rapid eye movement) sleep, breathing becomes irregular and shallow, our eyes move rapidly, limb muscles become immobile, and dreaming may occur. The entire NREM-REM cycle lasts about 90-110 minutes, and usually takes place 4-5 times during normal sleep.

Calisthenics is a form of exercise consisting of a variety of movements which exercise large muscle groups, such as running, standing, grasping, pushing, etc. These exercises are often performed rhythmically and with minimal equipment, as bodyweight exercises. They are intended to increase strength, fitness and flexibility, through movements such as pulling, pushing, bending, jumping, or swinging, using one's bodyweight for resistance. Calisthenics can provide the benefits of muscular and aerobic conditioning, in addition to improving psychomotor skills such as balance, agility and coordination.

Calisthenics the name of the discipline is Greek in origin; a combination of the words 'kalos' meaning 'beauty' and 'sthenos' meaning 'strength'. It is a form of dynamic exercises consisting of simple, often rhythmical, movements; generally using minimal equipment. It is like physical exercises that, though not a part of gymnastics, are closely related to it, mainly with the purpose of increasing strength, endurance and psychomotor skills such as balance, agility and coordination. There are basically two types of calisthenics exercises - aerobic exercises and anaerobic exercises. These exercises are to build up not only the physical strength of the trainee but also their cardiovascular, mental and overall well-being.

Need Of The Study

As person aged, they will experience bodily changes that affect how we sleep. These changes often become more pronounced later in life, and the effects may be influenced by chronic illness or the side effects of prescription medication. As a result, sleep problems and disorders are relatively common among seniors. Epidemiological self-report studies suggest that many older adults sleep seven hours or less, which might be health-compromising to some degree. A survey of adults over the age of 65 by the National Institutes of Health also found that 13% of men and 28% of women require more than 30 minutes to-fall asleep.

Approximately 50% of older adults complain of difficulty sleeping. Poor sleep results in increased risk of significant morbidity and mortality. The decrements seen in the sleep of the older adult are often due to a decrease in the ability to get needed sleep. However, the decreased ability is less a function of age and more a function of other factors that accompany aging, such as medical and psychiatric illness, increased medication use, advances in the endogenous circadian clock and a higher prevalence of specific sleep disorders. Given the large number of older adults with sleep complaints and sleep disorders, there is a need for health care professionals to have an increased awareness of these sleep disturbances to better enable them to assess and treat these patients. A thorough sleep history (preferably in the presence of their bed partner) is required for a proper diagnosis, and when appropriate, an overnight sleep recording should be done. Treatment of primary sleep problems can improve the quality of life and daytime functioning of older adults.

Sleep problems are not an inherent part of the aging process. Many older adults have good sleep quality until the end of their lives. It is critical that sleep problems are not mistaken for physiologic changes in sleep-awake patterns and sleep architecture that occur throughout the lifespan. Older adults often display an advanced circadian tendency, having an earlier bedtime and an earlier wake-up time. Sleep architecture changes include spending an increased proportion of time in stages N1 and N2 sleep (i.e, the lighter stages of sleep), a decreased proportion of time in stage N3 sleep (i.e, a deeper stage of sleep) and in rapid eye movement (REM) sleep. These architecture changes reflect a decrease in deep, restorative sleep and an increase in light, transitory sleep. In addition, older adults tend to spend slightly less time asleep than their younger counterparts. Although some older adults complain of poor night-time sleep or subsequent impairments in daytime functioning, others assume that their difficulties are part of the normal aging process. Therefore, a focused evaluation of sleep, specifically sleep apnea and insomnia, and related daytime functioning should be performed in every older adult in whom sleep disturbances are suspected.

Complaints of sleep difficulty are common among the elderly. In a National Institute on Aging study of over 9,000 persons aged 65 years and older, over one half of the men and women reported at least one chronic sleep complaint. Typical symptoms of sleep problems in the elderly include difficulty falling asleep and maintaining sleep, early-morning awakening and excessive daytime sleepiness.

Among numerous covariates, sleep quality can also influence physical activity. Sleep quality is defined as 'one's perception that they fall asleep easily, get sufficient duration so as to wake up feeling rested, and can make it through their day without experiencing excessive daytime sleepiness.' Although numerous studies have shown the associations between physical activity and sleep quality, little is known about the reverse association, that is, sleep quality is associated with physical activity. Specifically, Lentino et al showed that in a sample of 14 148 (83.4% men) National Military Guard members, 'poor' sleepers were significantly less likely than 'good' sleepers to meet aerobic exercise and resistance training recommendations and pass their army physical fitness test. In one longitudinal study, authors showed that better initial sleep quality predicted higher levels of later physical activity beyond the effects of prior physical activity, while initial physical activity did not predict later sleep quality after adjusting for prior sleep quality in a sample of older adults. In general, a recent systematic review has shown that both sleep and physical activity influence each other through physiological and psychological mechanisms and that the association is bidirectional.

One-third of the older adult population has extreme sleep duration (≤ 5 or ≥ 10 h), and almost a half presents difficulties on sleep onset and maintenance or have daytime sleepiness. Both extreme duration and poor quality of sleep are associated with important health outcomes, such as worse health-related quality-of-life and higher general mortality. However, these associations may not be due to each of these two sleep characteristics separately, but rather to a harmful pattern of sleep with concurrent alterations in duration and quality. Thus, a better knowledge of this sleep pattern would be helpful to understand the relations between duration and quality-of-sleep and worse health outcomes in older adults.

Previous studies have verified the effect of exercise on the quality of sleep in the elderly: these effects varied according to the intensity and duration of the workout accordingly, in Santos et al a moderate exercise done by 22 old males for 24 weeks improved some sleep parameters, such as rapid eye movement latency and time awake and these results were attributed to the anti-inflammatory effect of moderate training. In another study conducted by Durcan et al, the exercise reduced the rate of fatigue, pain, and sleep disorder in patients. Yang et al in a review study indicated that exercise can even rectify the sleep latency, but no change was observed for other sleep indices, such as sleep duration, sleep efficiency, sleep disturbance, and daytime functioning. Another meta-analysis performed by Kredlow et al on the effect of exercise on sleep quality, including 66 current studies, showed there are many different beneficial effects of the physical exercise programs in terms of intensity, duration, exercise type, sex, and age that had demanded other studies in this field.

Due to the lack of a good and satisfying sleep in elderly people, which causes chronic tiredness and frustration; they contribute these sleep disorders to the high age, as a result, do not seek the required treatments. Thus, detecting the factors that influence the quality of sleep in the elderly is of prominent importance. Although the exercise program has been recommended to reduce the sleep disturbance in the elderly, considering the few and controversial studies in the field and knowing that sleep is a vital need for the human body, the present study is aimed to examine the effect of an exercise program on the quality of sleep of the elderly people.

Researcher personally observed that most of elderly people suffer from sleeplessness. Researcher reviewed various research studies related to the quality of sleep among elderly. Most of studies show that sleeplessness is a common health problem in elderly. So the researcher wanted to do something for the benefit of elderly. Hence the researcher felt a need to assess the effect of selected calisthenics on improving quality of sleep in elderly people staying in old age homes.

Aim Of Study

The aim of the present study is to assess the effectiveness of selected calisthenics on quality of sleep among elderly in selected old age homes, Punjab.

Objectives:-

1. To assess the pre-interventional quality of sleep among the elderly in experimental and control group.
2. To assess the post-interventional quality of sleep among the elderly in experimental and control group.
3. To compare the pre-interventional and post-interventional quality of sleep among the elderly in experimental and control group.
4. To determine the relationship of quality of sleep among the elderly with selected demographic variables.

Conceptual Frame Work:

Modified Roy Adaptation nursing theory is used in present study.

Research Methodology:-

Research Approach

A quantitative research approach was used to assess the effectiveness of selected calisthenics on quality of sleep among elderly in selected old age homes, Punjab.

Research Design

A quasi experimental research with non-randomized control group design is adopted for conducting the study.

Study subject	Pretest	Intervention	Post-test
Experimental group	O ₁	X	O ₂
Control group	O ₂		O ₂

E – Experimental group

C – Control group

O1 - Pre-test.

X- Intervention (Application of Calisthenics)

O2 - Post-test.

Research Variables

- a) Independent variables –The independent variable of the study is calisthenics.
- b) Dependent variables – The dependent variable of the study is Quality of Sleep.
- c) Extraneous variables- The extraneous variables of study is age, gender, marital status, education status, source of financial support, history of any disease, duration of staying in old age home, relative visit in old age home,

Research Setting

Study was conducted in selected old age homes, Punjab. PinglaGharJalandher and Old age home Hoshiarpur were taken for study. Experimental group selected from old age home Hoshiarpur and control group selected from PinglaGharJalandher. The primary reason for selecting these elderly home were researcher convenience, familiarity and expected co-operation from sample, getting permission from these home to conduct the study, local language, geographical proximity and eco-nomical considerations.

Target Population

Elderly (≥ 60 years of age) who had a poor sleep quality in selected old age homes, Punjab.

Sample And Sampling Technique

Elderly client with age 60 and above was selected through purposive sampling technique from selected old age homes for study (25samples in control group and 25 in experimental group).

Criteria For Sample Selection

The sample was selected based on the following inclusion and exclusion criteria.

Inclusion criteria:

only those elderly will be included who

- a) Were willing to participate.
- b) Were physically and mentally stable.

Exclusion criteria

- a) Those who were unable to do exercises.
- b) Those who were mentally incompetent to follow the commands.

Development And Description Of Tool

The study aimed was to assess the effectiveness of selected calisthenics on quality of sleep among the elderly clients. The data collection instruments were developed through an extensive review of literature and consultation with experts. The instruments used in this study were consisted of different sections:

Section A : Demographic data:

It consisted of personal information like age, gender, marital status, education status, source of financial support, history of any disease, duration of staying in old age home, relative visit in old age home, habit of smoking/ alcoholism.

Section B:Pittsburg sleep quality index scale:

It is a standardized tool to assess the quality of sleep. It consists of 19 individual items creating 7 components (subjective sleep quality, sleep duration, sleep latency, sleep efficiency, sleep disturbance, use of sleep medications and day time dysfunctions) which subjectively describe the person's sleep quality for a month. The seven component scores are derived, each scored '0' (no difficulty) to 3 (severe difficulty). The component scores are summed to produce overall score (range 0 to 21). Higher scores indicate worse sleep quality.

Criteria Measure

Sleep Quality	Score
Poor sleep quality	>5
Good sleep quality	<5

Maximum Score – 21

Minimum Score - 0

Description Of Intervention

Calisthenics

Calisthenics are a form of dynamic exercise consisting of a variety of simple, often rhythmical, movements, generally using minimal equipment or apparatus. The weight of the own body is used as resistance to build body strength and suppleness. It leads to an improvement in overall strength and energy which in turn promotes overall good health. The best low intensity calisthenics exercises for old age and the steps to perform the exercises are as follows:

Step 1: Warming up – the first step before starting exercise is to warm up the body so the old age person is asked to walk slowly for 5 minutes.

Step 2: Arm rotation – in this exercise the old age person is instructed to stretch the arms horizontally and flex the elbows so that the fingers rest on the shoulders and do the rotation both clockwise and anti- clockwise direction for 5 times in each side.

Step 3: Hip rotation – in hip rotation the old age person has to stand straight and place the hand on the hip. Then slowly move hip in clockwise and anti- clockwise direction for 5 times in each side.

Step 4: Ankle rotation - this exercise has to be done in sitting position. Initially the old age person has to sit in the chair and raise one leg and then rotate the ankle both in clockwise and anti- clockwise direction for 5 times in each side.

Step 5: Side bends – in side bends initially the old age person has to stand straight and bend in sideways in c shaped arc position for 5 times in each side.

Step 6: Forward bends – the old age person has to stand straight and then bend forward without bending the knees and do the forward bend for 5 times.

Step 7: Cooling down – final step is to cool down the body so that the old age person has to walk slowly for 5 minutes and gradually cool down the body.

Content Validity Of Tool

The content validity of the tool was determined by the expert's opinion. The tool for the content validity was circulated among the expert's in the field of nursing. After their valuable suggestions amendments was made. The tool was validated by English and Punjabi language expert in their respective language.

Pilot Study

The pilot study was conducted in January, 2020 to ensure the reliability of tool and feasibility of study. The permission was taken from concerned authorities for the conduction of pilot study. Purposive sampling technique was used to select 5 clients from selected old age home. The tool was given to the clients after giving necessary instructions. Calisthenics were performed one time per day with duration of 30 minutes for 7 days. Calisthenics were performed by experimental group and quality of sleep was assessed in both experimental and control group after the completion of 7 days. Study was found to be feasible.

Reliability Of Tool

The Reliability of PSQI is 0.70 as measured by using Cronbach's alpha.

Data Collection Procedure

The procedure of data collection was carried out in a selected time period. Elderly were screened for the quality of sleep with the help of pittsburg sleep quality scale index scale. Then the 50 elderly with poor sleep quality were selected by purposive sampling technique. Firstly the pre-test was conducted on both group experimental and control group and then intervention was given to the experimental group(calisthenics) and after that post-test was conducted on both group (experiment and control group) to assess the effectiveness of calisthenics.

Ethical Considerations

Written permission was obtained from the authorities of old age homes for study conduction. The written consent was taken from the study subjects. The subjects were explained about the purpose of the study and confidentiality was assured to them. The subjects had full autonomy to participate in the research and withdrawal from the research at any time. Anonymity and confidentiality was maintained.

Plan For Data Analysis

Analysis and interpretation of data was done in accordance with the objectives of the study using descriptive and inferential statistics. Descriptive statistics like Frequency distribution Percentage, Mean, Standard deviation and Inferential statistics like Chi-square test, 't' test and 'F' test Value was used to analyze the data.

Results:-

The study result revealed that, In experimental group, during pretest, 100% were having a poor sleep quality. During post-test 76% having poor sleep quality whereas 24% were having good sleep quality. While in control group, in the pre-test, 100% were having poor sleep quality whereas during post-test 100% were having poor sleep quality.

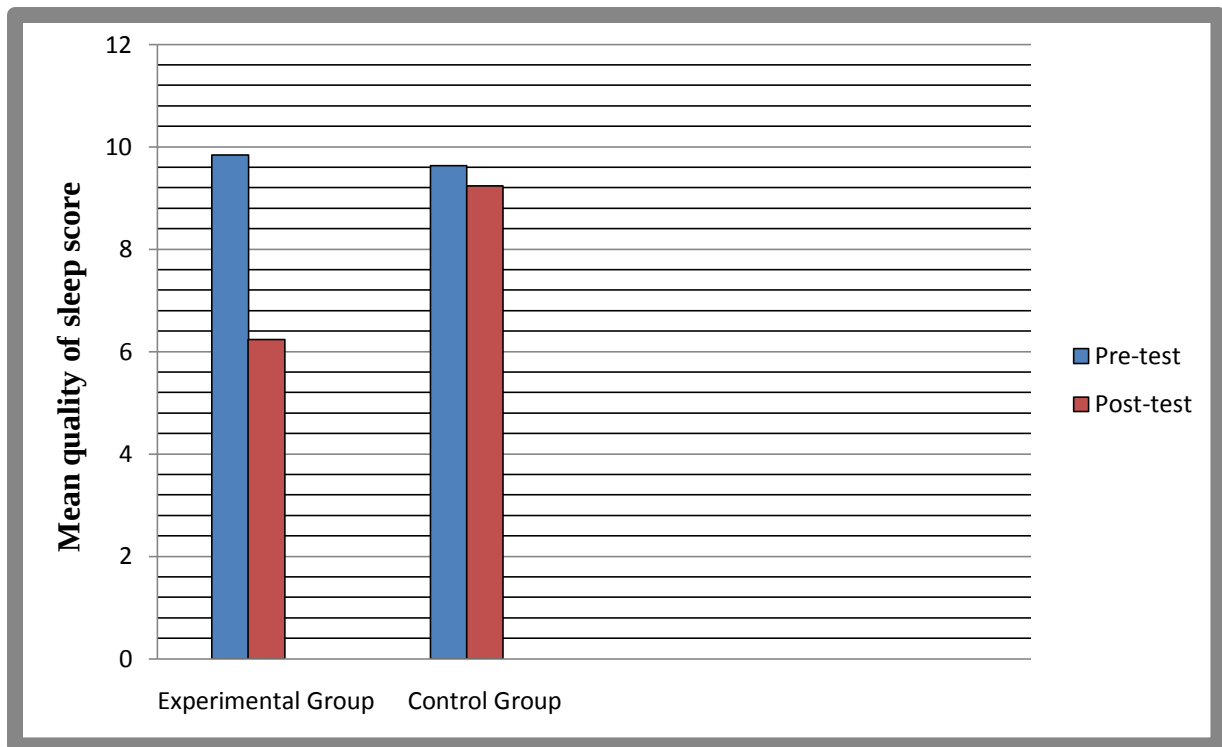


Figure:- comparison of pre-interventional and post-interventional mean quality of sleep among elderly in experimental and control group.

Findings revealed that the mean quality sleep score was lower after calisthenics intervention in experimental group and it was statistically significant at $p < 0.05$ level. So, calisthenics exercise on quality of sleep was found to be effective. Hence H_0 was rejected and H_1 was accepted.

The result also shows that the age, gender, educational status, does any relative visit in old age home, source of financial support, suffering from any health problem, habit like smoking, alcoholic had no impact on quality of sleep among elderly in experimental and control group. Marital status, how long staying in old age home had statistically significant impact on quality of sleep in experimental and control group.

Conclusion:-

The main focus of study was to assess the effectiveness of selected calisthenics on quality of sleep among elderly in selected old age homes. The study finding concluded that there was significant association between quality of sleep and few selected demographic variables. Hence, the study finding concluded that the selected calisthenics have impact on quality of sleep among elderly.