EFFECTIVENESS OF PROGRESSIVE MUSCLE RELAXATION TECHNIQUE ON SLEEP QUALITY AND DAYTIME SLEEPINESS AMONG THE ELDERLY PEOPLE

BY

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A DISSERTATION SUBMITTED TO THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING

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Let them give thanks to the LORD for his unfailing love

and his wonderful deeds for mankind,

for he satisfies the thirsty

and fills the hungry with good things.

Psalms 107: 8-9

Thanks be to God Almighty who has been with me through out the happiness and hardships of my life and glory to his name as hea has lifted me up from dust, showed me light and enlightene`d me with his wisdom to do something good to my fellow-beings.

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ABSTRACT

The research project is "A quasi experimental study to evaluate the effectiveness of progressive muscle relaxation technique on sleep quality and daytime sleepiness among the elderly people residing in selected old age homes at Madurai". Pretest and post test non equivalent control group research design was adopted. Purposive sampling technique was used. The total sample size was 60. Out of which 30 samples were in the experimental group and 30 were in the control group. Modified insomnia screening tool was used to screen the samples. The modified epworth daytime sleepiness scale was used to assess the daytime sleepiness. The Pittsburgh sleep quality index scale was used to assess the sleep quality among the elderly people. The selected elderly people in the experimental group were given with progressive muscle relaxation technique for 30-45 minutes of duration per day for continuous 15 days. The posttest level of sleep quality and daytime sleepiness was assessed by using Pittsburgh sleep quality index and eppworth daytime sleepiness scale among both experimental and control groups. The study's conceptual framework was based on Wiedenbach's helping art of clinical nursing theory. According to the comparison of mean posttest scores of sleep quality and daytime sleepiness on 15th day is (2.6), (1.8) was significantly lesser than the mean pre test scores (13.57), (15.8). The obtained 't' values of sleep quality and daytime sleepiness on 15th day is (33.19) , (44.01), which was statistically significant. Effectiveness of progressive muscle relaxation technique over the time was calculated by One way ANOVA and Bonferroni. The obtained 'P' value of sleep quality and daytime sleepiness is $P<0.001^{***}$ was statistically significant and confirmed that the progressive muscle relaxation technique was significantly effective in improving sleep quality and reducing abnormal daytime sleepiness among the elderly people. As a conclusion the Progressive muscle relaxation technique is effective in improving sleep quality and reducing the daytime sleepiness among the elderly people.

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CHAPTER 1

INTRODUCTION

Gray hair is a crown of splendor;

it is attained in the way of righteousness.

Proverb16:31

BACKGROUND OF THE STUDY

In the holy bible, health and longevity are linked to living according to God's words and being obedient to his commands. The righteous shall flourish like palm tree, he shall grow like the palm tree, he shall grow like a cedar in lebonon. Old age is not a curse, but it is a blessing and gift of god. Ageing is a universal phenomenon, which is experienced by every human being. Ageing is a natural and inevitable process (psalm 92:12).

A silent revolution has occurred in the last 100 years unseen, unheard and yet so close. The biggest achievement of the century is longevity. All over the world, life expectancy has raised leading to a sharp rise in the number of older persons. Ageing is generally defined as a process of deterioration in the functional capacity of one individual that results from structural changes. India is growing older. The life expectancy has gone up from 20 years in the beginning of the 20^{th} century to 62 years today. A united nation report has predicted that India will have 198 million old people (> 60 years) is 2030 and 326 million in 2050 (http:/www_americangeriatrics.org).

According to Population Census 2011 there are nearly 104 million elderly persons (aged 60 years and above) in India; 53 million females and 51 million males and is expected to sharply increase to more than 315 million by 2050 ("Elderly in India Profile and Programmes," 2016).

Hypno-, a word of Greek origin means sleep. It is derived from the ancient Greek God of sleep "Hypnos". Somnus, the ancient Roman god of sleep from which a root word called somnia is derived. Sleep is necessary and vital biological function. It is essential to a person's physical and emotional well being. Without adequate rest, the brain's ability to function can quickly deteriorate. An average of 7 or 8 hours of sleep each night is necessary to feel fully alert during the day. This is usually also true for people age 65 or older (http://www.theoi.com).

Sleep is actually an active and organized process. Sleep is a state of unconsciousness in which the brain is relatively more responsive to internal than external stimuli. The predictable cycling of sleep and the reversal of relative external unresponsiveness are features that assist in distinguishing sleep from other states of unconsciousness. The brain gradually becomes less responsive to visual, auditory, and other environmental stimuli during the sleep. Sleep is a physical and mental resting state in which a person becomes relatively inactive and unaware of the environment. In essence, sleep is a partial detachment from the world, where most external stimuli are blocked from the senses. Sleep is governed by a number of factors. Some of the factors are under our control, such factors help us to check our sleep level, and there are some factors beyond our control. Chief among these is our internal biologic clock that regulates our biologic rhythm (also called a circadian rhythm) over a 24-hour period. Sleep also has an internal organization regulated by different areas of the brain (Stevenes, 2015).

Normal sleep physiology is divided into non–rapid eye movement (NREM) and rapid eye movement (REM) sleep. NREM sleep is further divided into progressively deeper stages of sleep: stage N1, stage N2, and stage N3 (deep or delta-wave sleep)[9]. As NREM stages progress, stronger stimuli are required to result in an awakening.

Stage R sleep (REM sleep) has tonic and phasic components. Most dreaming takes place during REM sleep.As stated earlier, circadian rhythms also known as the biological clock determines the sleep. A cycle that lasts 24 hours is called circadian. The body's internal clock (circadian rhythms) plays an important role in regulating sleep/wake cycles. Circadian rhythms change over the lifespan, and older adults often find their sleep affected by these changes (Suzanee, 2015).

Sleep patterns and sleep quality change throughout the lifespan. Normal sleep changes are expected and predictable as people enter later adulthood. The most notable change in older adults' sleep architecture is a decrease in the amount of deep sleep (stages 3). In addition, the percentage of REM sleep decreases slightly in older age. Older adults' sleep is typically more fragmented; that is, sleep is more often interrupted by wakefulness. In fact, the change in sleep need across adulthood is minimal; however, many factors impact the ability of older adults to obtain sufficient sleep at night. The common sleep problems of the old age are insomnia, day time sleepiness, poor quality of sleep, sleep deprivation, narcolepsy, hyper somnolence, restless leg syndrome, circadian rhythm sleep wake disorder (www.goodtherapy.org).

Symptoms of poor sleep:

- Difficulty falling asleep or staying asleep
- Falling asleep at inappropriate times
- Troubled sleep
- Physical illness or physical discomfort
- Depression, anxiety, or stress
- Counterproductive sleeping habits such as early bedtime, daytime napping, or excessive time spent awake in bed (Lubit, 2015).

By the time an adult is over 65 years old, his or her sleep-wake cycle may not seem to work as well as it did when he or she was younger. As age progresses, the body makes less of the chemicals and hormones that help us sleep well (growth hormone and melatonin).Older adults are more likely to report daytime sleepiness and to nap as compared to younger adults. Typically, the timing of sleep shifts to an earlier time (ie, advances) from adulthood to old age. For some individuals, this change in the timing of sleep is benign; however, for others this change is problematic. The common sleep problems of old age are insomnia, excessive day time sleepiness, poor quality of sleep, sleep apnea, restless leg syndrome, narcolepsy, sleep walking (Chris 2015).

If the sleep problems are not treated or if not taken any measures to alleviate, these problems may to lead consequences. The consequences of untreated sleep problems may include significant emotional, behavioral, and cognitive dysfunction. The magnitude of these sequelae is inversely proportional to overall ability to adapt and develop in spite of the sleep disturbance (Schriber, 2015).

There are many techniques to promote sleep in the elderly person such as pharmacological and non pharmacological techniques, Non pharmacological includes autogenic training, biofeedback training, hypnosis, imagery training, meditation and progressive muscle relaxation technique (Parul, 2009).

Evidence-based nursing interventions address insomnia and encompass educating elderly people, facilitating behavioral changes, altering the environment to make it more conducive to sleep, and planning care that both relaxes the elderly people and preserves normal circadian rhythms. Patient education is among the first-line interventions nurses can use in helping patients understand the nature of a sleep disturbance. These include teaching patients how to recognize age-related changes in

sleep and how to keep a sleep diary to provide additional information about factors affecting sleep and therapeutic response to treatment strategies. Treatment should target both the sleep problem and any co-morbitities thus optimizing the chance for improvement in quality of life and functioning of elderly people (Sandra, 2003).

NEED FOR THE STUDY

Magnitude of ever increasing geriatric population:

The world's older population continues to grow at an unprecedented rate. Today, 8.5 percent of people worldwide (617 million) are aged 65 and over. According to a new report, "An Aging World: 2015," this percentage is projected to jump to nearly 17 percent of the world's population by 2050 (1.6 billion) (Barbara ,2016).

India's older population will increase dramatically over the next four decades. According to the United Nations Population Division (UN 2011) the share of India's population aged 60 and older is projected to climb from 8 percent in 2010 to 19 percent in 2050. By mid-century, India's 60 and older population is expected to encompass 323 million people, a number greater than the total U.S. population in 2012. This profound shift in the share of older Indians taking place in the context of changing family relationships and severely limited old-age income support brings with it a variety of social, economic, and health care policy challenges (Paola, 2012).

Reasons of increasing old age homes:

There has been a significant increase in the numbers of old age homes all over the world. It has been noted that weakening relationships in families and lack of attachment between children and parents has been the reason for old people in families to move to old age homes. This can be attributed to the advent of technology and modernization. There has been weakening family bonds where senior citizens in

families have been feeling neglected and unworthy in their family environment. Old age demands affection and the new generation has been becoming materialistic and their attitude towards family has been changing over time (http:holdage.un.org/esa/population).

Hundreds of organizations are working to make life easy for destitute parents by developing old age homes in India. There are rare cases where parents themselves prefer the privacy of old age homes but in the majority of cases, it is the cold attitude of children that forces parents to move to these homes. Because of the following reasons, elderly people take the painful decision to move to the old age homes in India:

- Sometimes grown-ups fail to realize their duty and are so much engrossed in their personal lives that they feel it a burden to keep the parents with them. They feel it as an interference in their personal lives and eventually tell their parents that they can not keep them.
- The ego clash between mother-in-law and daughter-in-law causes too much stress in the house and the situation comes at such the worst that they cannot live together.
- New generation is becoming more materialistic and their attitude towards parents is changing. They seem to have lost their patience (Rajkaran, 2014).

Common geriatric problems:

The common geriatric problems quoted in the literature are dementia, delirium, depression, hearing impairment, immobility, **insomnia**, pressure ulcer, **poor sleep quality, sleep deprivation**, vision impairment (Mephee, 2012).

Importance of sleep:

Sleep plays a vital role in good health and well-being throughout the life. Getting enough quality sleep at night can help to protect mental health, physical health, quality of life, and safety. Sleep plays an important role in physical health such as healing and repairing of heart and blood vessels. Adequate sleep reduces the risk of obesity, diabetes, kidney disease, high blood pressure, heart disease, and stroke (stevenes, 2015).

Reasons for poor sleep and consequences of poor sleep in the elderly:

The National Sleep Foundation has reported that 24 percent of people aged 65-84 have been diagnosed with four or more medical conditions. In general, people with poor health or chronic medical conditions have more sleep problems. As people get older, changes occur in sleep architecture, sleep continuity, sleep quality, and circadian sleep-wake patterns. Polysomnographic findings suggest that older adults spend less time in deeper stages of sleep (slow wave sleep or SWS) compared with younger adults. With aging, sleep patterns tend to change. Most people find that aging causes them to have a harder time falling asleep. They awaken more often during the night and earlier in the morning. The transition between sleep and waking up is often abrupt, which makes older people feel like they are a lighter sleeper than when they were younger (http/sleepfoundation.org).

Older people wake up more often because they spend less time of deep sleep. Other causes include needing to get up and urinate, anxiety, and discomfort or pain from chronic illnesses. A good night's sleep is often more elusive as we age, because the prevalence of insomnia in older people is high. Insufficient sleep can have important effects on daytime function by increasing the need to nap, reducing cognitive ability including attention and memory, slowing response time, adversely affecting

relationships with friends and family, and contributing to a general sense of being unwell. However, rather than aging, circadian rhythm shifts, primary sleep disorders, co morbid medical/psychiatric illnesses, and medication use cause sleep difficulties in older people, which psychosocial factors may also affect (David, 2015).

Prevalence of sleep problems in the elderly:

The first ever pan-African and Asian analysis of sleep problems say nearly 5% Indians aged 50 years and above are suffering from sleep disorders. Researchers from the Warwick Medical School looked at the sleep quality of 24,434 women and 19,501 men aged 50 years and above in eight rural global locations like Ghana, Tanzania, South Africa, India, Bangladesh, Vietnam and Indonesia and Kenya. By 2030, the number of older adults in these settings is projected to rise to 1.578 million, corresponding to more than 260 million people possibly experiencing sleep problems. "Therefore, these estimates suggest that sleep disturbances may represent a significant and unrecognized problem among older people in low-income settings. These findings further emphasize the global dimension of sleep problems as an emerging public health issue," said the study (Kounteya, 2012).

Sarda (2000) conducted a cross-sectional cohort analysis of data pertaining to sleep disturbances and their potential correlates from 3,845 elderly Japanese American men residing in Hawaii. The prevalence of insomnia Difficulty Initiating and Maintaining Sleep (DIMS) was 32.6%, a rate similar to that reported in predominantly Caucasian populations. Depression, benzodiazepine use, and several chronic health problems were the most important factors associated with DIMS.

Jianfeng (2013) conducted a cross sectional research on prevalence of dementia and mild cognitive impairment among elderly residing in an urban community of Shanghai. The overall prevalence of poor sleep quality (defined as CPSQI >5) was

41.5% (95% CI=38.6–44.5%) which is comparable with that in western populations and Hongkong. Ageing, living alone, low education, anxiety and the number of chronic disease were found to be significantly associated with poor sleep quality.

Treatment modalities for sleep problems:

It is found that various non-pharmacological techniques like back massage, relaxation, imagery and music audiotape are effective in promoting sleep in elderly people. One can relax without sleeping, but sleep rarely occurs until one is relaxed. A commonly used relaxation technique is Progressive Muscle Relaxation Therapy, which teaches to rest effectively and to reduce tension in the body (Gregorey,2010).

Progressive muscle relaxation is a relaxation technique that involves the sequential tensing and releasing of major skeletal muscle groups with the aim of inducing relaxation. Relaxation is more than a state of mind; it physically changes the way body functions. When body is relaxed breathing slows, blood pressure and oxygen consumption decrease, and some people report an increased sense of well-being. This is called the "relaxation response."Being able to produce the relaxation response using relaxation techniques may counteract the effects of long-term stress, which may contribute to or worsen a range of health problems including depression, digestive disorders, headaches, high blood pressure, and insomnia. (Payne, 2010)

A pre-experimental study was conducted to find the effectiveness of Progressive Muscle Relaxation Therapy upon the sleep pattern of 30 subjects suffering from sleep deprivation. Progressive Muscle Relaxation Therapy was administered to the subjects for three days and their sleep was assessed before and after PMRT. Majority of the subjects (73.3%) had moderately adequate sleep and 26.6% had inadequate sleep before progressive muscle relaxation therapy whereas after progressive muscle relaxation

therapy, most of them had adequate sleep (66.6%) and none had inadequate sleep (Nirmal, 2014). Similar positive results are noted in various other researcher.

PMRT is found to be effective in reducing anxiety (Berry, 2006), (Dehdari, 2009), depression (Teja, 2016), stress (Verma, 2009) and sleep (Swamy, 2003). But only meagre number of studies testing PMRT on sleep quality among geriatrics is reported.

It is seen that providing health services to the old people who live in the nursing home is very necessary and important. It is thought that evaluation of sleep and planning of interventions to promote sleep is essential. As a general rule non pharmacological treatment options should be available such as aerobic exercises, progressive muscle relaxation technique, music therapy, aromatherapy, sleep hygiene etc., Combinations of all these therapies is a nurse initiated intervention that has the advantage of being cost effective, therapeutic, social and recreational for the institutionalized older adult. The reason for choosing the current study can be summarised as below:

- The increase in the geriatric population world wide and India where research conducted on geriatric population is the need of the hours to make this study a significant one.
- Sleep problems are highly prevalent among the elderly people which affects all aspects of health, thus the problem area chosen is also significant.
- There are only dearth of studies evaluating the effectiveness of PMRT on sleep quality among the geriatric population.
- The interest of the researcher to work with the elderly people.

STATEMENT OF THE PROBLEM:

A study to assess the effectiveness of progressive muscle relaxation technique on sleep quality and day time sleepiness among the elderly people in selected old age home, Madurai .

OBJECTIVES:

1. To determine the sleep quality and the day time sleepiness among the elderly people before and after progressive muscle relaxation technique in the experimental and control group.
2. To evaluate the effectiveness of progressive muscle relaxation technique on sleep quality and the day time sleepiness among the elderly people.
3. To determine the relationship between the sleep quality and day time sleepiness among the elderly people.
4. To associate the sleep quality and the day time sleepiness among the elderly people with their selected demographic variables (Age, Sex, Educational status, Marital status, Economic status ,Number of children and Number of hours of day time sleep)

HYPOTHESIS:

Hypothesis will be tested at .05 level of significance.

H_{01} : The mean post test sleep quality score will be significantly lower than the mean pre-test score of the elderly people who had progressive muscle relaxation technique.

H_{02}: The mean post test daytime sleepiness score will be significantly lower than the mean pre test score of the elderly people who had progressive muscle relaxation technique.

H_{03}: The mean post test sleep quality score of the elderly in the experimental group will be lower than the mean post test sleep quality score of the elderly people in the control group.

H_{04}: The mean post test daytime sleepiness scores will be significantly lower in the experimental group than the mean post test daytime sleepiness in the control group.

H_{05}: There will be a significant positive relationship between the post test level of sleep quality and level of daytime sleepiness of the elderly people in the experimental group.

H_{06}: There will be a significant association between the pre test level of sleep quality score of elderly people in the experimental group and selected demographic variables (Age, Sex, Educational status, Marital status, Economic status ,Number of children and Number of hours of day time sleep).

H_{07}: There will be a significant association between the pre test level of daytime sleepiness of the elderly people in the experimental group and the selected demographic variables (Age, Sex, Educational status, Marital status, Economic status, Number of children and Number of hours of day time sleep).

OPERATIONAL DEFINITIONS:

Effectiveness:

In this study, effectiveness refers to the extent to which progressive muscle relaxation technique has achieved the desired effect on sleep quality and daytime sleepiness among elderly people and it will be measured by Pittsburgh sleep quality index and Epworth Day time sleepiness scale.

Progressive muscle relaxation technique:

In this study PMRT refers to a muscle relaxation technique used among elderly where the investigator helps the elderly people to relax the whole body slowly by making the person concentrate on each part of body from head to foot until a stage of complete relaxation through stretching and breathing and which will be done twice a day(morning and evening) each session provided 30 - 45 minutes for 15 days. Hence forth it will be termed as PMRT.

Sleep quality:

In this study it refers to the subjective measurement of the ability to initiate and maintain sleep such as latency, duration, efficiency, disturbances, use of medication, daytime dysfunction by the elderly as measured by Pittsburgh sleep quality index.

Day time sleepiness:

It refers to the subjective report of an increased desire to fall asleep and lack of energy during the day as measured by Epworth day time sleepiness scale.

Elderly people:

In this study, elderly refers to both male and female aged between 60-80 years residing in the selected old age home.

Selected old age home:

In this study it refers to an institution run by a private agency which gives care, shelter and food to the elderly on the basis of payment or free of cost.

ASSUMPTION:

- Nursing interventions based on the needs of the elderly people will enhance their interest to practice.
- Progressive muscle relaxation technique has no adverse effects on older adults.

- Older adults will not have difficulty in practicing Progressive muscle relaxation technique in their residence.
- Elderly would willingly participate in the study and respond honestly to the items.

PROJECTED OUTCOME:

The present study will reveal the effectiveness of progressive muscle relaxation technique in improving the sleep pattern among older adults.

DELIMITATIONS OF THE STUDY:

The study is delimited to:

- Elderly aged between 60-80 years.
- Residing in selected old age homes at Madurai.
- 60 elderly sample only.

CONCEPTUAL FRAME WORK

This study is based upon Widenbach's helping art of clinical nursing theory. Widenbach first published her ideas in 1964 in clinical nursing. The further refined her theory in nursing wisdom in nursing theory published in 1970.

Widenbach's views nursing as an art based as goal directed care. Factual and speculative knowledge judgement, and skills are necessary for effective nursing practice.

Widenbach's vision of nursing practice closely parallels assessment, implementation and evaluation steps of nursing process.

According to Widenbach, nursing practice consists of identifying a patient's need for help, ministering the needed help and validating that the need for help was met. The main concepts of this study are,

1. Identifying a need for help
2. Ministering needed help
3. Validating the need for help was met.

Identifying a need for Help:

Here the individual is considered as a unique person. Person's needs are determined and seen whether the person realizes the need and what prevents the person from meeting the need. In this study an individual refers to the elderly person residing in the old age home. Assessment of sleep problems is done among the elderly to identify the need for help..

Ministering the Needed help:

The second component is the ministration of the help needs. In ministering to the patient the nurse may give her advise or information, make a referral, apply a comfort measure, or carry out a therapeutic procedure. Should the patient become

uncomfortable, with what is being done, the nurse will need to identify the cause, and if necessary make an adjustment in the plan of action. In this study administration of PMRT by the investigator to the elderly people with sleep problem is carried out as a comfort measure and therapeutic procedure to promote sleep.

Validating the need:

The component is the validation. After help has been ministered, the nurse validates that the action were indeed helpful. Evidence must comes from the patient that the purpose of the nursing actions has been fulfilled (Wiedenbach 1964). In this study it refers to post assessment of sleep problems after progressive muscle relaxation technique. It is expected that there will be reduction in sleep problems among the elderly people.

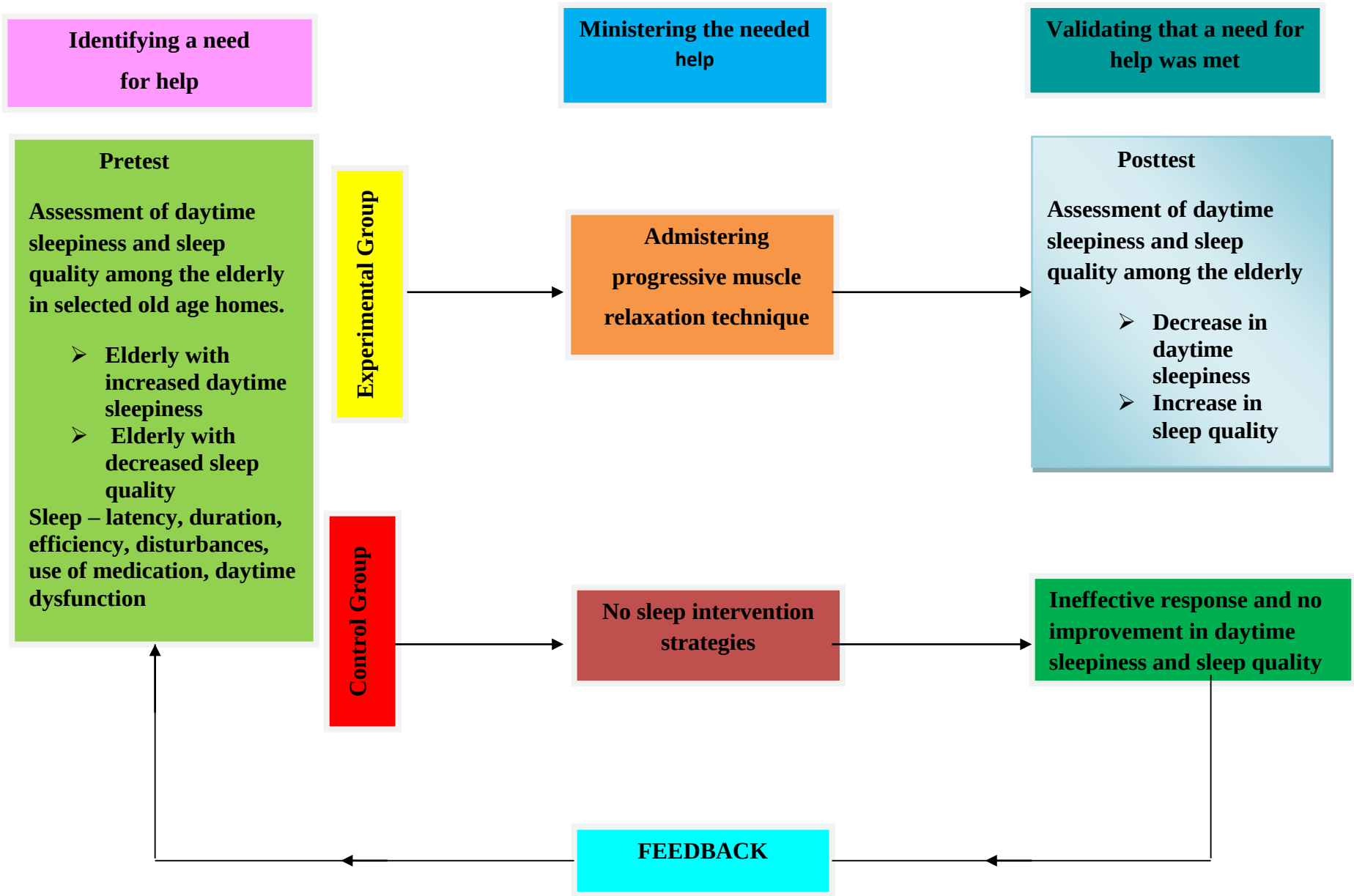

Fig:1 CONCEPTUAL FRAMEWORK FOR WIEDENBACH'S HELPING ART OF CLINICAL NURSING

CHAPTER-II

REVIEW OF LITERATURE

The term review literature refers to the activities involved in identifying and searching for information of the state of knowledge of the topic. This term is also used to designate a written summary of the state of the art on a research problem. The investigator carried out extensive review of literature on the research topic in order to gain deeper insight into the problem as well as to collect maximum relevant information for building up the study. This was accomplished by using Medline, internet and surveyed the latest journals and books presented under following headings:

1. **Review on magnitude of increasing elderly population**
2. **Review on sleep quality among elderly**
3. **Review on daytime sleepiness among elderly**
4. **Review on progressive muscle relaxation technique on sleep**

1. REVIEW ON MAGNITUDE OF INCREASING ELDERLY POPULATION:

The world population has been experiencing significant ageing, the process that results in rising proportions of older persons in the total population since the mid-twentieth century. Ageing has profound consequences on a broad range of economic, political and social processes. Population ageing is taking place in nearly all the countries of the world. Ageing results from decreasing mortality, and, most importantly, declining fertility. The global share of older people (aged 60 years or over) increased from 9.2 per cent in 1990 to 11.7 per cent in 2013 and will continue to grow as a proportion of the world population, reaching 21.1 per cent by 2050 (htttp://www.un.org).

Globally, the number of older persons (aged 60 years or over) is expected to more than double, from 841 million people in 2013 to more than 2 billion in 2050. The older population is itself ageing. Globally, the share of older persons aged 80 years or over (the "oldest old") within the older population was 14 per cent in 2013 and is projected to reach 19 per cent in 2050. If this projection is realized, there will be 392 million persons aged 80 years or over by 2050, more than three times the present (Mason, et al.,2011).

In 1950, there were 205 million persons aged 60 or over throughout the world. At that time, only 3 countries had more than 10 million people 60 or older: China (42 million), India (20 million), and the United States of America (20 million). Fifty years later, the number of persons aged 60 or over increased about three times to 606 million. In 2000, the number of countries with more than 10 million people aged 60 or over increased to 12, including 5 with more than 20 million older people: China (129 million), India (77 million), the United States of America (46 million), Japan (30 million) and the Russian Federation (27 million). Over the first half of the current century, the global population of 60 or over is projected to expand by more than three times to reach nearly 2 billion in 2050By then, 33 countries are expected to have more than 10 million people 60 or over, including 5 countries with more than 50 million older people: China (437 million), India (324 million), the United States of America (107 million), Indonesia (70 million) and Brazil (58 million) ("World Population Ageing," 2015)

People aged 60 or over currently constitute from one fifth to nearly one fourth of the population of Austria, Czech Republic, Greece, Italy, Japan, Slovenia and Spain. By 2050, more than two in every five persons are projected to be at least 60 years of age in those seven countries. Except for the Czech Republic, more than one in every

three people in these countries is projected to be aged 65 or older in 2050. In addition to these countries, persons over 60 will constitute more than one third of the population in another 30 countries, including 6 from the less developed regions, while individuals 65 or over will constitute between one fourth and one third of the population of 39 additional countries, including 10 from the less developed regions (htttp://www.un.org).

India's population of 1.31 billion, the second largest globally, comprises 17% of the world's total (United Nations 2015), and the United Nations Population Division estimates that India's population will in fact overtake China's by 2028. As India's population grows, its expanding share of older adults is particularly notable. Currently, the growth rate of the number of older individuals (age 60 and older) is three times higher than that of the population as a whole (Giridhar et al., 2014).

Three dominant demographic processes drive the growing share of older Indians: declining fertility rates due to improved access to contraceptives, increasing age at marriage, particularly among women, and declining infant mortality; increasing longevity because of advances in medicine, public health, nutrition, and sanitation; and large cohorts advancing to older ages (Bloom et al., 2014).

Tamil Nadu has the second highest percentage of senior citizens (above 60 years) in the country, only next to neighbouring Kerala. And the State is greying at a rate of 2.2 per cent, according to a study by United Nations Population Fund. The study "Caring for our elders: Early Responses India Ageing Report 2017", released on 20th june states that Tamil Nadu has 11.2 per cent of elderly population and is ranked behind Kerala, which has 12.3 per cent of greying population ("Greying Tamil Nadu has second highest senior citizen,"2017).

The study revealed that the southern states are greying faster along with Himachal Pradesh, Maharashtra, Odisha and Punjab when compared to Central and Northern States like Uttar Pradesh, Rajasthan, Madhya Pradesh, Bihar, Jharkhand, Chhatisgarh and Uttarakhand which have lower proportion of aged population. In the last decade (2001) the elderly population in Tamil Nadu was 9 per cent, while in 2011, it has increased to 11.2 per cent (2.2 percent growth). The growth across the nation as a whole was an increase from 6.9 per cent to 8.3 per cent (htttp://www.newsindianexpress.com).

Shivakumar (2017) stated, that "greying women in the state outlive men in the age group. As per statistics available, Tamil Nadu has 17 per cent of 60 plus male population while women in the age group is 19.4 per cent. Also, the sex ratio of elderly has increased from 938 women to 1,000 men in 1971 to 1,033 women in 2011 and is projected to increase to 1,060 women by 2026, says the report. Projections indicate that during 2000-2050, the overall population of India would grow by 56 per cent while that of 60 plus by 326 per cent. During the same period, the population of 80 plus would go up to 700 percent.

2. REVIEW ON SLEEP QUALITY AMONG ELDERLY:

Claudia and Maria (2010) "conducted a descriptive, cross-sectional study in São Paulo, Brazil, using a quantitative approach. This study was aimed at evaluating sleep quality and identifying sleep related problems among 38 elderly people living in long term care institutions. Data collection was performed by using Pittsburgh Sleep Quality Index (PSQI). Results showed that 81.6% of the studied elders reported their sleep quality was good. Nevertheless, there was an elevated frequency of sleep related problems such as: getting up to go to the bathroom (63.2%); getting up in the middle of the night or very early in the morning (50%); feeling too hot (23.7%); feeling pain

(21.1%). These findings show an evident contradiction between elders' perception of their sleep quality and the actual elevated number of identified sleep problems.

Chiya, Tung, Chin and Mei (2011) conducted a cross sectional survey to describe the sleep quality among community dwelling elderly people in Taiwan by door to door interviews. Sleep quality, physical activity and depression will be measured by the Pittsburgh Sleep Quality Index(PSQI) Physical Activity Scale for the Elderly (PASE) measured by Taiwanese Depression Questionaire (TDQ) respectively. The half of the elderly had short sleep onset(<15 minutes), but reported poor sleep quality (PSQI>5). Twenty two percent of community dwelling elders used psychoactive medication for sleep. The prevalence of depressive disorders (TDQ≥19) was 7%. Although both physical activity and depression was significantly associated with sleep quality in univariate analysis, only depression remained significant after adjusting for age, gender, education, marital status and chronic illness confounders in logistic regression (OR=1.31,95% confidence interval = 1.12- 1.52). The role of physical activity in late life potentially influence sleep quality but may have less significance compared with depression.

Jianfeng et al. (2013) conducted a cross sectional study in China among 1086 community residents aged 60 years and above to identify prevalence and risk factors of poor sleep quality by using Pittsburgh Sleep Quality Index (PSQI). Poor sleeper was defined by a PSQI global score of >5. Subjects also accepted the neurological and neuropsychological assessments, including the Mini-Mental State Examination, Center for Epidemiological Studies Depression Scale, and Zung Self-Rating Anxiety Scale (ZSAS). A history of chronic diseases was confirmed by the medical records of each participant. The prevalence of poor sleep quality in this population was 41.5% (95% confidence interval (CI) = 38.6–44.5%), with a higher rate observed in elderly females

(45.8% [95% CI = 41.9–49.7%]) than that in elderly males (35.8% [95% CI = 31.4–40.1%]). The prevalence rate increased with age, from 32.1% (95% CI = 27.8–36.4%) in those aged 60–69 years to 52.5% (95% CI = 45.9–59.1%) in those aged more than 80 years (p value for trend,0.001). Multivariate logistic regression analysis indicated that age (OR = 1.03[95% CI = 1.01–1.05], p,0.001), less education duration (OR = 1.04 [95% CI = 1.01–1.08, p = 0.014), living alone (OR = 1.62 [95% CI = 1.02–2.58], p = 0.04), anxiety (ZSAS score: OR = 1.09 [95% CI = 1.05–1.12], p,0.001), number of chronic disease (OR = 1.18 [95% CI = 1.07–1.30], p = 0.14) and arthritis (OR = 1.45[95% CI = 1.05–2.01], p = 0.025) were risk factors of poor sleep quality. Researchers conclude that poor sleep quality is highly prevalent among elderly Chinese residents in urban Shanghai. Growing attention and comprehensive countermeasures involving psycho-social and personal might alleviate the sleep problem in the elderly.

Adetola, Lawrence, Ogunbode et al.,(2014) conducted a cross-sectional study in Nigeria among 843 elderly patients aged of 60 years and above in old age home. The researchers assessed the following candidate variables which may be associated with insomnia such as socio demographic characteristics, morbidities, and lifestyle habits. Results showed that the point prevalence of insomnia was 27.5%. Insomnia was significantly associated with being female, not being currently married, having formal education, living below the poverty line, and not being physically active. Health complaints of abdominal pain, generalized body pain, and persistent headaches were significantly associated with insomnia. The study concluded that the high prevalence of insomnia among elderly patients calls for concerted effort by healthcare workers to educate the elderly on lifestyle factors.

Hassan, Mohammed and Jamal (2015) conducted a cross-sectional study on sleep quality among 126 older adults in Mehriz, Yazd Province, Iran. Cluster random sampling technique was used among 126 older adults. Sleep quality was assessed by Pittsburgh Sleep Quality Index. Data were analyzed. The most reported sleep quality related problems were pain (32.8%), waking up for toilet (28.6%) and nightmare (3.2%); waking up problem for driving was the least reported problem (0.8%). Sleep quality was worse among women than men ($p = 0.02$). There was a statistically significant relation between sleep quality score and disease like cardiovascular disease, diabetes, osteoporosis, breathing problems, visual and hearing problems, obesity and depression ($p < 0.05$).

Gülseren, Sukran and Selma (2015) conducted a descriptive and cross sectional study in Turkey to describe the sleep quality in the elderly among 112 subjects either living at home or in a nursing home. It was determined that 55.8% of the elderly living in the nursing home and 63.3% of those living in their own home had poor sleep quality. There was no statistically significant difference between general sleep score average and the sleep qualities of both groups ($p > 0.05$). Researcher concluded that the sleep qualities of the elderly either living at home or in a nursing home are at similar levels, and more than half of the individuals in both groups have poor sleep quality. In Turkey, the number of elderly individuals in the population is gradually increasing and, as a result, the problems of elderly people are growing.

Azwan, Dahlan, Ghazali and Anuar (2016) conducted a cross-sectional study among 331 elderly people in Malaysia by convenience sampling strategy from eight government-funded elderly institutions in Malaysia. The results indicated that the sleep quality among elderly in institutions is poor, and pain emerged as the main predictor of sleep quality for all groups (normal, mild cognitive impairment and dementia).

Dementia has two other main predictors which are role limitation due to emotional problems and emotional well-being.

3. REVIEW ON DAYTIME SLEEPINESS AMONG ELDERLY:

Hyukjoo et al. (2012) conducted a cross-sectional and community-based study among 333 people ≥ 60 years of age of older adults in Korea. This study aimed to estimate the prevalence and risk factors of Excessive Daytime Sleepiness (EDS), and investigated the relationship between EDS and cognitive impairment in an older Korean population. All participants underwent full-time nocturnal polysomnography and completed questionnaires assessing socio demographic factors. EDS was defined by Epworth Sleepiness Scale score > 10. Cognitive functions were estimated using the Korean version of the Consortium to Establish a Registry for Alzheimer's Disease neuropsychological assessment battery and subjective memory complaint questionnaire. The result showed that the overall prevalence of EDS was 18.9% with no significant difference between genders. In multivariate analysis using a multiple logistic regression model, obesity [odds ratio (OR) = 2.379, p = 0.022], educational attainment (OR = 0.929, p = 0.019) and total arousal (OR = 2.785, p = 0.008) were identified as the risk factors for EDS. Subjective memory impairment was related to EDS after controlling for confounding variables (p < 0.001). Researchers concluded that Korean elderly have a high prevalence and risk factors of EDS, which has modest effects on cognitive functioning.

Yaotung et al. (2013) conducted a cross-sectional study to investigate the relationship between social engagement and daytime sleepiness among aged residents of a veterans' housing facility in Taiwan among 597 elderly men. Each subject was assessed with the Resident Assessment Instrument Minimum Data Set, Geriatric Depression Scale, Pittsburgh Sleep Quality Index, and Mini-Mental State Examination.

Social engagement was measured with the Index of Social Engagement (ISE), and daytime sleepiness was defined according to the relevant Pittsburgh Sleep Quality Index subcomponent. Subjects were divided into two groups according to their ISE levels. A multivariate logistic regression model was used to examine the association between ISE and other variables. The results showed that the sample's mean age was 80.8 ± 5.0 years (range: 65–99 years). Mean ISE score was 1.5 ± 1.3 (range 0–5), with 52% of participants reporting poor social engagement (ISE = 0–1). Mean Pittsburgh Sleep Quality Index global score was 5.6 ± 3.6 (range: 0–18), and 31% of participants reported daytime sleepiness. The daytime sleepiness was found to be independently associated with subjects' level of social engagement (odds ratio: 2.5; 95% confidence interval: 1.7–3.8; P < 0.001). Researchers concluded that daytime sleepiness and poor social engagement are common among elderly residents.

Johnnatas, Fabio and Jovany (2013) conducted a cross-sectional population-based study carried out in the city of Campina Grande, Paraíba, among 168 elderly people to identify daytime sleepiness and the presence of cardiovascular risk, obesity and depression .Epworth Sleepiness Scale was used to diagnose excessive daytime sleepiness (> 10 points); waist circumference for the risk of cardiovascular dysfunction (> 94 or > 80 cm); Geriatric Depression Scale for depression (>10 points) and body mass index for obesity (> 25 kg/m$^{2)}$. Association analysis was performed by the chi-square test adjusted for sex and age group, adopting $\alpha < 0.05$. One hundred and sixty eight elderly individuals with mean age of 72.34 ± 7.8 years old participated in this study, being 122 (72.6%) women. EDS was identified in 53 (31.5%) of them; depression, in 72 (42.9%); overweight/obesity, in 95 (64.46%); and risk of cardiovascular dysfunction, in 129 (79.6%). Depressed men (78.6%, p = 0.0005) and risk of cardiovascular dysfunction (57.1%, p = 0.02) were more prone to EDS. In

women, only obesity was related to sleepiness (42.1%, p = 0.01). Only those aged between 70 - 79 years old showed association between sleepiness and obesity.

Coralyn et al. (2014) conducted a cross-sectional survey to correlates of Daytime Sleepiness among 4578 adults aged 65 and older, recruited from a random sample in United States. Daytime sleepiness measured by the Epworth Sleepiness Scale (ESS), Magnetic Resonance Imaging of the brain (MRI), cognitive function tests, and standardized questionnaires for cardiopulmonary symptoms and diseases, depressive symptoms, social support, activities of daily living, physical activity, and current medications. Results showed that approximately 20% of the participants reported that they were "usually sleepy in the daytime." Although elderly black men were less likely to report frequent awakenings than those in the other three race and gender groups, they had significantly higher mean ESS scores. The following were independently associated with higher ESS scores in gender-specific models: non-white race, depression, loud snoring, awakening with dyspnea or snorting, frequent nocturnal awakenings, medications used to treat congestive heart failure, non-use of sleeping pills, a sedentary lifestyle, and limitation of activities of daily living in both men and women; additional correlates included hip circumference and current smoking in men, and hayfever in women. The following were not independently associated with ESS in the models: age, education, use of wine or beer to aid sleep, use of tricyclic antidepressants, long- or short-acting benzodiazepines, asthma, angina, myocardial infarction, congestive heart failure itself, forced vital capacity, social support, cognitive function, or MRI evidence of global brain atrophy or white matter abnormality.

Angeliki et al. (2015) conducted a longitudinal study in U.S.A among 1041 elderly people to identify daytime sleepiness and sleep inadequacy as risk factors for dementia. Sleep problems were estimated using the RAND Medical Outcomes Study

Sleep. Increased risk of incident dementia was still associated with sleep inadequacy (HR = 1.20; 95% CI 1.01–1.42; p = 0.040), as well as with increased daytime sleepiness ('Have trouble staying awake during the day') (HR = 1.24; 95% CI 1.00–1.54; p = 0.047). The study concluded that increased daytime sleepiness are risk factors for dementia in older adults, independent of demographic and clinical factors.

Amie et al. (2015) conducted a cross-sectional study in Australia to identify Excessive Daytime Sleepiness and falls among older men and women among 367 samples of a population-based sample, Sleepiness was assessed using the Epworth Sleepiness Scale (ESS), and scores of ≥ 10 indicated EDS. Falls risk score was obtained using an Elderly Fall Screening Test (EFST). Among women, 50 (13.6 %) individuals reported EDS. Women with EDS were more likely to report a fall, and were more likely to report the fall occurring outside. Among men, 72 (16.0 %) individuals reported EDS. No differences were detected for men with and without EDS in regard to reported falls, and a trend towards significance was noted between EDS and a high falls risk as assessed by the EFST (p = 0.06), however, age explained this relationship (age adjusted OR = 2.20, 95 % CI 1.03-1.10).

Melendez, Jimenez and Gallegoz (2016) conducted a retrospective analysis study in Mexico among 191 records and 148 polysomnographic records from adults over 65 years. Results showed that 82.2 % of patients were diagnosed with Obstructive Sleep Apnoea Syndrome (OSAS). The associated factors found were night time awakening (89%), medical comorbities (84.5%), difficulty walking (70.7%), being overweight or obese (69.1%), among others. Of the total sleep time, they spent 14.2% in N1, 53.8% in N2, 16.1% in N3 and 15.4% in Rapid Eye Movements (REM). Moreover, a REM sleep latency of 160 min was found.

Diego et al. (2017) conducted a longitudinal study to test the hypothesis that baseline Excessive Daytime Sleepiness (EDS) predicts subsequent longitudinal pattern of β-amyloid accumulation in non-demented community dwelling elderly. From the population-based sample of Mayo Clinic Study of Aging, researchers identified 283 non-demented individuals aged 70 and older who had at least two serial PiB-PET scans and completed sleep questionnaires. EDS was defined as Epworth Sleepiness Scale score ≥10. Multiple linear regression models were fit in six AD-related regions (orbitofrontal, prefrontal, anterior cingulate, cingulate-precuneus, temporal, and parietal) to explore whether EDS at baseline predicted variability in amyloid accumulation between two serial scans, while controlling for baseline age, sex, Apolipoprotein E4(APOE4), education, regional PiB positivity (SUVR ≥ 1.4), physical activity, cardiovascular comorbidities (obesity, hypertension, hyperlipidemia, diabetes), reduced sleep duration, respiratory symptoms during sleep (snoring and/or witnessed apneas), depression and interval between scans. Baseline EDS was significantly associated with increased β-amyloid accumulation in the orbitofrontal, anterior cingulate and cingulate/precuneus regions when the models included all subjects. However, the strength of the associations was stronger in PiB-positive areas. EDS predicted further increased β-amyloid accumulation in the anterior cingulate (0.06, 95%CI: 0.02–0.1, p=0.007), cingulate/precuneus (0.076; 95%CI: 0.03–0.12, p=0.002), and parietal cortex (0.058, 95%CI: 0.01–0.11, p=0.03) in the subset of subjects who were amyloid positive at baseline in these regions. Researchers concluded that EDS in non-demented elderly was associated with an increased rate of β-amyloid accumulation particularly in areas associated with the Default Mode Network (DMN). DMN regions are vulnerable to increased amyloid accumulation, suggesting that treating sleep

disorders underlying EDS may be a targetable pathway towards prevention of β-amyloid accumulation in these areas.

4. REVIEW ON PROGRESSIVE MUSCLE RELAXATION TECHNIQUE ON SLEEP:

Maryam Tahereh and Amir (2012) conducted a quasi-experimental study to evaluate the effect of progressive muscle relaxation on sleep quality of patients undergoing hemodialysis, 42 patients were selected using purposive sampling technique. Sleep quality of samples was assessed by Pittsburgh Sleep Quality Index (PSQI). Progressive muscle relaxation was trained to patients in three sessions. They were also asked to do relaxation practice for a month, twice a day (once during the day and once before going to bed at night), and fill in the relaxation form after each practice. Afterwards, sleep quality of patients before and after relaxation were compared. Seven samples were excluded during the study and finally the data gained from 35 samples were analyzed. The study concluded that the mean of samples' sleep quality total score after relaxation was significantly lower than before relaxation ($P<0.001$). The score of each sleep quality dimension (except for use of sleep medications) were significantly lower than before relaxation.

Nuray and Mehtap˘ (2014) conducted a cross-sectional study in Turkey among 32 participant to evaluate the effect of progressive relaxation exercises on fatigue and sleep quality in patients with Multiple Sclerosis. This study was designed as a single-group pretest/posttest pretrial model. Fatigue Severity Scale was used for measuring fatigue, and the Pittsburgh Sleep Quality Index was used to evaluate the sleep quality. PMRT was applied to the sample group once a day for 6 weeks. A statistically significant difference was found between the pretest and post test global sleep quality ($p<0.001$) score averages and the score averages the patients obtained from subjective

sleep quality ($p<0.001$), sleep latency ($p<0.001$), sleep duration ($p<0.05$), sleep efficiency ($p<0.05$), sleep disorder ($p<0.001$), and daytime dysfunction ($p<0.001$) as of sleep quality scale after PMRT. Since none of the patients used sleeping pills, they were scored as ‘‘0’’ in the area of ‘‘use of sleep medication’’ and no statistical operation was performed. This finding demonstrates that PMRT applied in patients with MS is effective in improving patients’ sleep quality.

Nahid et al. (2014) conducted a three-group clinical trial on 100 primigravida women, refered to Mashhad health care centers in 2014. All women who met the inclusion criteria, were randomly assigned to three groups: progressive muscle relaxation, guided imagery, and control group. The intervention groups performed the exercises twice a day for a period of four weeks at home after two sessions of relaxation training (held during two weeks). Then, the quality of sleep was measured using Pittsburgh Sleep Quality Index. For data analysis, ANOVA, Kruskal-Wallis, paired t-test, and posthoc test were performed. The total score of sleep quality and its components (except use of sleep medication) was significantly lower after the intervention, compared to the preintervention period in progressive muscle relaxation and guided imagery groups ($P<0.001$). Both relaxation techniques were effective in improving sleep quality and its components ($P<0.001$). However, the effect of guided imagery was more significant than progressive muscle relaxation ($P=0.015$).

Jayestri (2015) conducted Quasi-experimental study, to assess the effectiveness of two treatment (i.e) nursing interventions and progressive muscle relaxation techniques on sleep among the senior citizens residing in old age homes in puducherry. The target population consist of senior citizens residing in old age homes at puducherry. Samples were the senior citizens with sleep disturbance. Convenient sampling technique was used to select 150 subjects. The tool used for the study Consisted sleep

pattern assessment questionnaire, Visual analog Scale to assess the subjects perceived level of sleep. Experimental group I received nursing intervention, Experimental group II received progressive muscle relaxation and control group received routine. The mean post-test sleep pattern score of the subjects in experimental group II was (12.04) which was higher then the mean pre-test score (10.44) after giving 3 months of intervention. Paired 't' test results showed significant difference between the two mean scores which was statistically significant at $P < 0.01$ level. Hence it is concluded that progressive muscle relaxation with deep breathing exercises was effective in promoting sleep among the subjects residing in old age homes. While comparing the control group with the experimental group I, it was proved that the nursing interventions was effective in promoting sleep among elderly which was found significant at $p<0.05$ level. While comparing the control group III with experimental group II, it was found that progressive muscle relaxation with deep-breathing exercise was effective in promoting sleep which was significant at $P < 0.001$ level.

CHAPTER – III

RESEARCH METHODOLOGY

The methodology of research indicates the general pattern of organizing the procedure for gathering valid and reliable data for investigation. This chapter provides a brief description of the tool, pilot study, data collection procedure research approach, research design, settings, sample size, sampling technique, description of the toll, pilot study, data collection procedure and plan for data analysis.

Research Approach:

A quantitative approach was adopted for this study. Quantitative approach is a scientific investigation in which observations are made and data are collected according to a set of well defined criteria. (Suresh, K. Sharma., 2014)

Research Design:

Quasi experimental non equivalent pre test post test control group design was adopted for this study.

Group	**Pre Test 1st day**	**Intervention**	**Post Test 8th day**	**Post Test 15th day**
Experimental Group	O_1 D_1	X	O_2 D_2	O_3D_3
Control Group	O_1 D_1	-	O_2 D_2	O_3D_3

O_1 - Pretest level of sleep quality

D_1 - Pretest level of daytime sleepiness

O_2 - Post test$_1$ level of sleep quality

D_2 - Post test$_1$ level of daytime sleepiness

O_3 - Post test$_2$ level of sleep quality and day time sleepiness

D_3 - Post test$_2$ level of day time sleepiness

X - Progressive muscle relaxation technique

Variables:

Dependent variable - Sleep quality and day time sleepiness

Independent variable - Progressive muscle relaxation technique

Settings of the Study:

The study was conducted in two old age homes in and around Madurai. The two Old age homes are namely Inba Illam at Pasumalai and Christian Seva Sangh Old age home at Alagapa nagar. They are located at a distance of 15-18 km respectively from Sacred Heart Nursing College.

Description:

1. Inba Illam old age home, Pasumalai.

The home has a total of 50 elderly, 30 females and 20 males. The home has shared accommodation for the inmates. It provides medical and accommodation facilities and recreation facilities (TV) at free of cost. Common dormitry is provided to male and female subjects separately.

2. Christian Seva Sangh old age home, Alagapa nagar.

The home has a total of 55 Inmates, 40 females and 15 males. The home has single rooms for each inmates. It provides medical, accommodation facilities and recreation facilities. Common dormitry is provided to male and female subjects separately.

Study Population:

The target population of the study were the elderly residing in selected old age homes at Madurai.

Sample:

Elderly people who fulfilled the inclusion criteria.

Sample Size:

The total sample size were 60 elderly people with sleep problem. In that 30 elderly people with sleep problems were assigned to the experimental group and 30 elderly with sleep problems were assigned to the control group.

Sampling Technique:

Purposive sampling technique was used for this study. Purposive sampling is more commonly known as ‘judgemental’ or ‘authoritative sampling’. In this type of sampling, subjects are chosen to be part of the sample with a specific purpose in mind. In purposive sampling, the researcher believes that some subjects are fit for research compared to other individuals. This is the reason why they are purposively chosen as subjects (Suresh K Sharma 2014)

Inclusion criteria:

Elderly people those who were:

- Aged between 60-80 years.
- Elderly people of both genders.
- Willing to participate
- Understand English /Tamil.

Exclusion criteria:

Elderly people those who were:

- Not willing to participate.
- On sedatives.
- With psychiatric illness.
- With hearing impairment
- Bed ridden.

Criteria for Sample Selection:

The samples were selected using Modified Insomnia Screening questionnaire. This has 6 items with 5 options. A person who answers 3,4 or 5 on 2 or more items are likely to suffer from insomnia and were considered to be included as a sample in the study. Initially samples were screened for eligibility using the inclusion and exclusion criteria. In Inba illam old age of a total of 68 were found to have sleep problem and were include as samples. In Christian Seva Sangh, 72 were screened and 48 were selected .Finally a total of 35 samples in Inba illam and 38 samples in Christian Seva Sangh.

Research Tool and Technique:

The tool used for data collection had 3 sections.

Part I: Demographic variable:

The demographic characteristics of the study were age, sex, educational status, marital status, economic status, number of children and number of hours of day time sleep.

Part II: Modified Insomnia screening tool

The Modified Insomnia Screening Tool is a screening tool used to guide the researcher in the clinical evaluation of insomnia. This tool was used to select the samples. It has 1 to 6 questions for insomnia. Each question has 5 options like never, rarely, occasionly, mostly and always.

The scoring procedure is as below:

Never	:	1
Rarely	:	2
Occasionly	:	3
Mostly	:	4
always	:	5

Interpretation of the Score:

Diagnostic Domain: Insomnia: **Q1-6** Samples who answer **3, 4 or 5** on 2 or more question is likely to suffer from **insomnia**.

Section B: Pittsburgh Sleep Quality Index

Pittsburgh Sleep Quality Index is a self report instrument that measures subjective sleep quality (Buvsso, 1989). The Pittsburgh Sleep Quality Index scale has been reported to be useful in the screen of the total sleep quality of elderly population. This instrument contains 9 self-report items and seven component scores, each scored from 0 (no difficulty) to 3 (severe difficulty). The component scores are summed to produce a global score range of 0 to 21. Higher scores indicate poor sleep quality.

Interpretation of the Score:

Component	Question	Measurement
Subjective sleep quality	Q 9	Q 9
Sleep latency	Q2 and 5a	Q2+ Q5a
Sleep duration	Q4	Q4
Sleep efficiency	Q 1,3,4	Q4/Q1+Q5X100
Sleep disturbance	Q5b – 5i	Sum of Q5b-5i
Use of sleep medication	Q6	Q6
Day time dysfunctions	Q7	Q7 +Q8

Scoring the PSQI

The order of the PSQI items has been modified from the original order in order to fit the first 9 items (which are the only items that contribute to the total score) on a single page. Item 10, which is the second page of the scale, does not contribute to the PSQI score.

In scoring the PSQI, seven component scores are derived, each scored 0 (no difficulty) to 3 (severe difficulty). The component scores are summed to produce a global score (range 0 to 21). Higher scores indicate worse sleep quality.

Component 1: Subjective sleep quality – question 9

Response to Q9	**Component 1 score**
Very good	0
Fairly good	1
Fairly bad	2
Very bad	3

Component 1 score: _____

Component 2: Sleep latency – questions 2 and 5a

Response to Q2	**Component 2/Q2 sub score**
≤ 15 minutes	0
16-30 minutes	1
31-60 minutes	2
> 60 minutes	3

Response to Q5a	**Component 2/Q5a sub score**
Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Sum of Q2 and Q5a sub scores	**Component 2 score**
0	0
1-2	1
3-4	2
5-6	3

Component 2 score: _____

Component 3: Sleep duration – Question 4

Response to Q4	**Component 3 score**
> 7 hours	0
6-7 hours	1
5-6 hours	2
< 5 hours	3

Component 3 score: _____

Component 4: Sleep efficiency – Questions 1, 3, and 4

Sleep efficiency – (# hours slept / # hours in bed) X 100%

hours slept – question 4

hours in bed – calculated from responses to questions 1 and 3

Sleep efficiency	**Component 4 score**
> 85%	0
75-84%	1
65-74%	2
<65%	3

Component 4 score: _____

Component 5: sleep disturbance – questions 5b-5j

Questions 5b to 5j should be scored as follows:

Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Sum of 5b to 5j scores	Component 5 score
0	0
1-9	1
10-18	2
19-27	3

Component 5 score: _____

Component 6: Use of sleep medication – question 6

Response to Q6	Component 6 score
Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Component 6 score: _____

Component 7: Daytime dysfunction – questions 7 and 8

Response to Q7	Component 7/Q7 sub score
Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Response to Q8	Component 7/Q8 sub score
No problem at all	0
Only a very slight problem	1
Somewhat of a problem	2
A very big problem	3

Sum of Q7 and Q8 sub scores	Component 7 score
0	0
1-2	1
3-4	2
5-6	3

Component 7 score: _____

Global PSQI Score: Sum of seven component scores: _____

Interpretation of the Score:

- A total score of >5 indicates poor sleeper
- A total score of <5 indicates good sleeper

Section C: Epworth Daytime Sleepiness Scale

The Epworth Daytime Sleepiness scale was developed by (Murre and Johns in the year 1990). The original Epworth Day time Sleepiness was modified after pilot study.

2 questions were found irrelevant for the group and were deleted after pilot study. Modified Epworth Day time Sleepiness scale consisted of 6 questions where the score ranged from 0 to 3 and it measures the elderly's chance to doze in 6 specific situation. Each question was scored as bellows:

0	Would never doze
1	Slight chance of dozing
2	Moderate chance of dozing
3	High chance of dozing

Scoring interpretation:

This score ranges from 0-18. A higher score indicates greater day time sleepiness and it is interpreted as

0-4 - Normal range

5-10 - Borderline daytime sleepiness

11-18 - Abnormal daytime sleepiness

Testing of the Tool:

Validity:

Validity refers to the degree with which an instrument measures what it is supposed to be measuring (Polit and Hungler 2001) The tool was translated into Tamil and retranslated into English by language experts. The tool and content of the intervention was validated by five experts, two from the field of Medical Surgical Nursing, one expert specialized in Geriatrics and one from the medical field and one of the expert in physiotherapy. Based on their suggestions the tool was modified.

Reliability:

Reliability of Insomnia screening tool, Pittsburgh Sleep Quality scale and Epworth Daytime Sleepiness scale was obtained by test re test method with a reliability score of 0.95, 0.91, and 0.97 respectively.

Development of the intervention

The intervention of the study is progressive muscle relaxation therapy . the intervention was prepared on the basis of literature review on PMRT and after consultation with experts.

Definition

In this study it refers to a muscle relaxation technique used among elderly where the investigator helps the elderly people to relax the whole body slowly by making the person concentrate on each part of body from head to foot until a stage of complete relaxation through stretching and breathing and which will be done twice a day(morning and evening) each session ..... 30 - 45 minutes for 15 days. (Nugent 2013)

Total no of session/day	:	Two session (morning/evening)
Time for each session	:	30-45 minutes
Total duration	:	15 days
Mode	:	individual session

Goal:

To enhance relaxation of all muscle groups through PMRT thereby promoting sleep quality among the elderly people residing in old age home.

Pre intervention

Start the procedure by greeting the elderly people. Researcher develops and maintains a good rapport with the elderly people. The investigator provides adequate explanation regarding PMRT.

Steps in procedure

The elderly people will be encouraged to do PMRT in the following sequence and the instruction is given by the investigator:

- Begin by finding a comfortable position i.e., sitting position in a location where there will be no interruption. Close the eyes and allow the attention to focus only on body. When the mind wanders, bring the concentration back to the muscle which is being worked on.
- Take a deep breath through the abdomen, hold for a few second, and exhale slowly. Again, when a breath is taken notice the stomach rising and the lungs filling with air.
- When a breath is let out, imagine the tension in the body being released and flowing out of the body. And again inhale…..and exhale. Feel the body already relaxing.
- Go through each step and remember to keep breathing.

- Now let's begin. Tighten the muscles in the forehead by raising the eyebrows as high as possible. Hold for about five seconds, and abruptly release feeling the tension fall away.
- Pause for about 10 seconds.
- Now smile widely, feeling your mouth and cheeks tense. Hold for about 5 seconds, and release, appreciating the softness in your face.
- Pause for about 10 seconds.
- Next, tighten the eye muscles by squinting the eyelids tightly shut. Hold for about 5 seconds, and release.
- Pause for about 10 seconds.
- Gently pull the head back as if to look at the ceiling. Hold for about 5 seconds, and release, feeling the tension melting away.
- Pause for about 10 seconds.
- Now feel the weight of the relaxed head and neck sink.
- Breath in…and out.
- In…and out.
- Let go of all the stress
- In…and out. Now, tightly, but without straining, clench the fists and hold this position until I say stop. Hold for about 5 seconds, and release.
- Pause for about 10 seconds.
- Now, flex the biceps. Feel that buildup of tension. Now visualize that muscle tightening. Hold for about 5 seconds, and release, enjoying that feeling of limpness.
- Breath in...and out.

- Now tighten the triceps by extending the arms out and locking your elbows. Hold for about 5 seconds, and release.
- Pause for about 10 seconds.
- Now lift the shoulders up as if they could touch the ears. Hold for about 5 seconds, and quickly release, feeling their heaviness.
- Pause for about 10 seconds.
- Tense the upper back by pulling the shoulders back trying to make the shoulder blades touch. Hold for about 5 seconds, and release. Pause for about 10 seconds. Tighten the chest by taking a deep breath in, hold for about 5 seconds, and exhale, blowing out all the tension.
- Now tighten the muscles in the stomach by sucking in. Hold for about 5 seconds, and release. Pause for about 10 seconds.
- Gently arch the lower back. Hold for about 5 seconds, relax. Pause for about 10 seconds.
- Feel the limpness in the upper body letting go of the tension and stress, hold for about 5 seconds, and relax.
- Tighten the buttocks. Hold for about 5 seconds…, release, imagine the hips falling loose.
- Pause for about 10 seconds. Tighten the thighs by pressing the knees together, and hold a penny between them. Hold for about 5 seconds…and release.
- Pause for about 10 seconds.
- Now flex the feet, pulling the toes towards you and feeling the tension in the calves. Hold for about 5 seconds, and relax, feel the weight of both legs sinking down.

- Pause for about 10 seconds.
- Curl the toes under tensing the feet. Hold for about 5 seconds, release. Pause for about 10 seconds. Now imagine a wave of relaxation slowly spreading through the body beginning at the head and going all the way down to the feet.
- Feel the weight of the relaxed body.
- Breathe in…and out…in…out….in…out. (Edmund 2017).

Post intervention

Help the elderly to assume any position they are comfortable and thank them for their support and co-operation.

Pilot Study

In order to test the feasibility, relevance and practicability of the study, pilot study was conducted among 6 elderly person in a old age home in a manner in which the final study would be done. The pilot study findings revealed that two questions in the Epworth day time sleepiness scale was not relevant for the group and they were deleted after expert's opinion.The deleted questions are sitting inactive in a public place and in a car, while stopped for a few minutes in traffic. It revealed that the study was feasible. Data were analyzed to find out the suitability of statistical method.

Data Collection Procedure:

The pilot study and the main study were conducted after the removal of the ethical committee of the Sacred Heart Nursing College. Before starting the study, the researcher obtained formal permission from Inbha illam and Christian seva sangh old age homes, Madurai.

The data collection was done for 6 weeks in the selected old age homes. Quasi experimental design with non equivalent pretest and post test control group design was

adopted for this study. Two old age homes were selected, Inba Illam for experimental group and Christian Seva Sangh old age home for control group. The elderly people were selected on the basis of inclusion criteria. Informed consent was obtained from the elderly people prior to the data collection procedure after explaining the nature and purpose of the study. Purposive sampling was used for this study. A total of 60 samples, 30 in the experimental group and 30 in the control group were selected. Insomnia screening tool used to screen sleep problems among the elderly. Pittsburgh Sleep Quality Index scale was used to measure the subjective sleep quality and Epworth Daytime Sleepiness Scale was used to measure daytime sleepiness of elderly. Approximately 20 minutes was taken to do the complete assessment of each individual. In the 1st week of data collection, pretest was done for the first two days. The elderly with sleep problems were selected for the intervention. After pretest assessment progressive muscle relaxation technique was demonstrated through video presentation for the male elderly person and female elderly person separately. Followed by this the procedure was demonstrated to each individual separately. The researcher developed a good rapport with the elderly people. The elderly in the experimental were instructed and motivated to do PMRT twice a day, once in the morning and evening for 15 days. It took an average of 30 to 45 minutes for each session.

The control group received routine care with no PMRT. The post test was done on 8th and 15th days of data collection period.

At the end of the data collection the researcher thanked each participant and did not experience any problem during data collection process.

Data Analysis:

Data analysis was done according to the objectives of the study. Both descriptive and inferential statistics were used.

Descriptive Statistics:

Frequency, percentage, mean and standard deviation were used to describe the data.

Inferential Statistics:

1. Paired‘t’ test was used to determine the difference between pretest and posttest score in the experimental group.
2. Independent ‘t’ test was used to determine the post test score difference between the experimental group and the control group.
3. Chi-square was used to determine the association between selected demographic variables and pre test scores of the both experimental and control group.

Protection of Human Rights:

The proposed study was conducted after the approval of dissertation committee of the college of nursing. Permission was obtained from the correspondent and the principal of the Sacred Heart Nursing College. Permission was obtained from the old age homes before the data collection. Written informed consent of each subject was obtained before starting the data collection and assurance was given to them that the anonymity of each individual would be maintained.

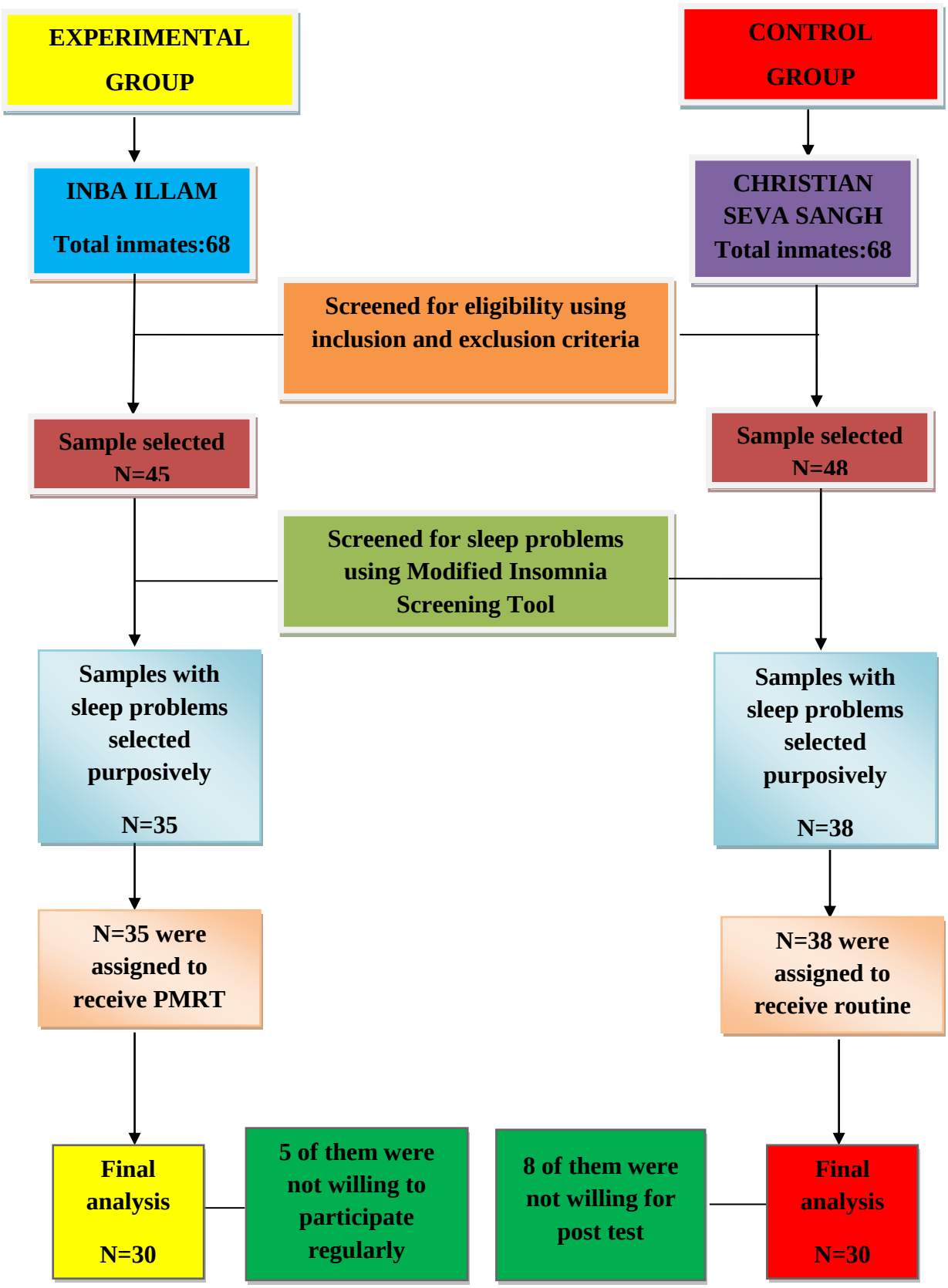

Fig: 2 Schematic representation of sample selection

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

Analysis is a process of organizing and synthesizing data in such a way that research questions can be answered and hypotheses tested (Polit Beck 2013).

This chapter deals with the analysis and interpretation of the data collected from selected group of sample to evaluate the achievement of the objectives of the study. The data collected were tabulated analysed and presented as follows:

Section I:

- It deals with demographic profile of the samples.

Section II:

- Frequency and percentage distribution of the elderly in the experimental group according to their level of sleep quality in the pre test and post test.
- Frequency and percentage distribution of the elderly in the control group according to their level of sleep quality in the pre test and post test.
- Frequency and percentage distribution of the elderly in the experimental group according to their level of day time sleepiness in the pre test and post test.
- Frequency and percentage distribution of the elderly in the control group according to their level of day time sleepiness in the pre test and post test.

Section III:

- Comparison of pre test Vs post test level of sleep quality of the elderly in the experimental group.
- Comparison of pre test Vs post test level of sleep quality of the elderly in the control group.

- Comparison of post test$_1$ and post test$_2$ mean quality sleep scores between the control group and the experimental group. .
- Comparison of pre test Vs post test level of day time sleepiness of the elderly in the experimental group.
- Comparison of pre test Vs post test level of day time sleepiness of the elderly in the control group.
- Comparison of post test$_1$ and post test$_2$ mean daytime sleepiness scores between the control group and the experimental group.
- One way ANOVA and Bonferroni estimates for repeated measures of sleep quality in the control and group experimental.
- One way ANOVA and Bonferroni estimates for repeated measures of daytime sleepiness in the control and group experimental.
- Relationship between the level of sleep quality and level of daytime sleepiness in the pretest experimental group and control group.

Section III:

- Association between level of sleep quality of experimental group and control group with selected demographic variables (Age, Sex, Educational status, Marital status, Economic status ,Number of children and Number of hours of day time sleep).
- Association between level of daytime sleepiness of experimental group and control group with selected demographic variables (Age, Sex, Educational status, Marital status, Economic status ,Number of children and Number of hours of day time sleep).

SECTION- I

Table 1: Distribution of the sample according to demographic profile.

N=60

Demographic Data	Experimental group (n=30)		Control Group (n=30)		Total N=60	
	F	%	F	%	F	%
1.Age of Elderly :						
61-70	20	66.7	16	53.3	36	60
71-80	10	33.3	14	46.7	24	40
2.Gender:						
Male	13	43.3	5	16.7	18	30
Female	17	56.7	25	83.3	42	70
3.Marital status:						
Married	24	80	23	76.7	47	78
Single	6	20	7	23.3	13	22
4.Religion:						
Hindu	17	56.7	19	63.3	36	60
Christian	13	43.3	11	36.7	24	40
5.Education :						
Literate	9	30	8	26.7	17	28
Illiterate	21	70	22	73.3	43	72
6.Leisure time activity :						
Reading/Watching TV	30	100	30	100	60	100
Gardening	0	0	0	0	0	0

Table 1 depicts that little over half in the experimental group (53.3%) and two thirds in the control group (66.7%) belonged to the age group of 60-70years. Majority (83.3%) in the control group were females where as in the experimental group a little over half (56.7%) were females. Majority in both the groups were married (76.7% and

80% in the control group in experimental group respectively). Nearly two thirds (60%) were Hindu by religion. Majority (i.e) 73.3% and 70% in the control and experimental group) were literates. In the experimental group and control group all the samples spend their leisure time by watching TV.

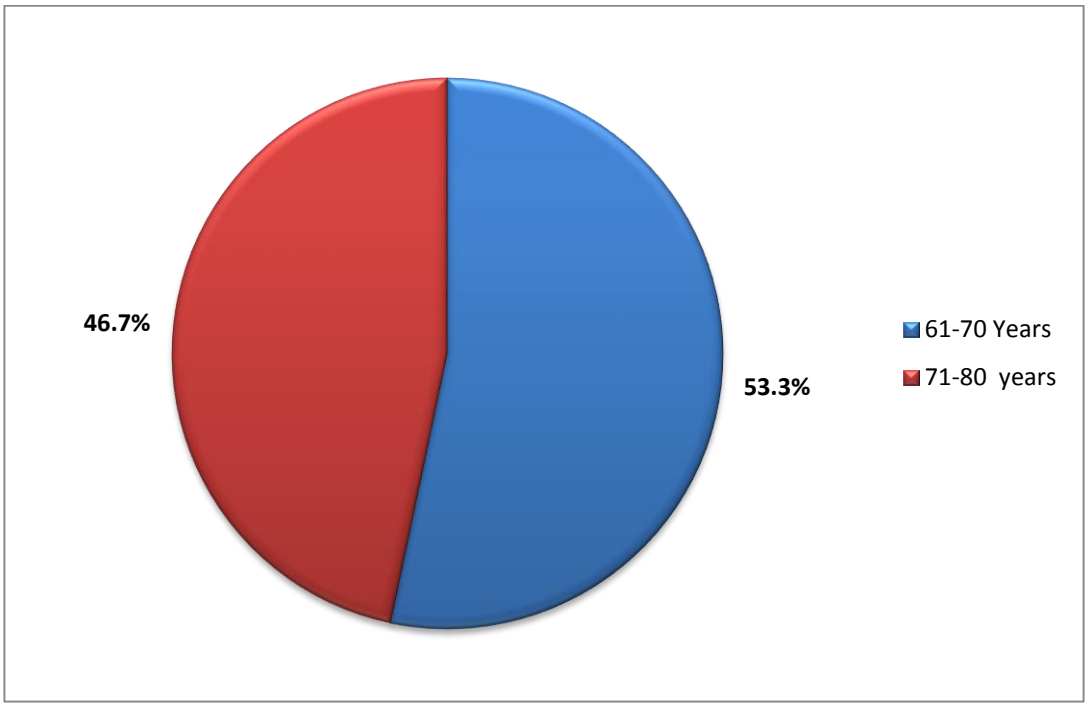

Fig 3: Percentage distribution of the elderly people according to their age

SECTION- II

Table 2: Frequency and percentage distribution of the elderly in the experimental group according to their level of sleep quality in the pre test and post test

N=30

Level of Sleep Quality	Experimental Group					
	Pre test		8th Day		15th Day	
	f	%	f	%	F	%
Good sleeper (<5)	-	-	9	30	27	90
Poor sleeper(>5)	30	100	21	70	3	10
Total	30	100	30	100	30	100

Table 2 predicts that all the samples in the experimental group were poor sleepers before the intervention where as by 8th day of the intervention 30% were good sleeper. On the 15th day of the intervention majority (90%) of them were good sleepers and only 10% of them were poor sleepers.

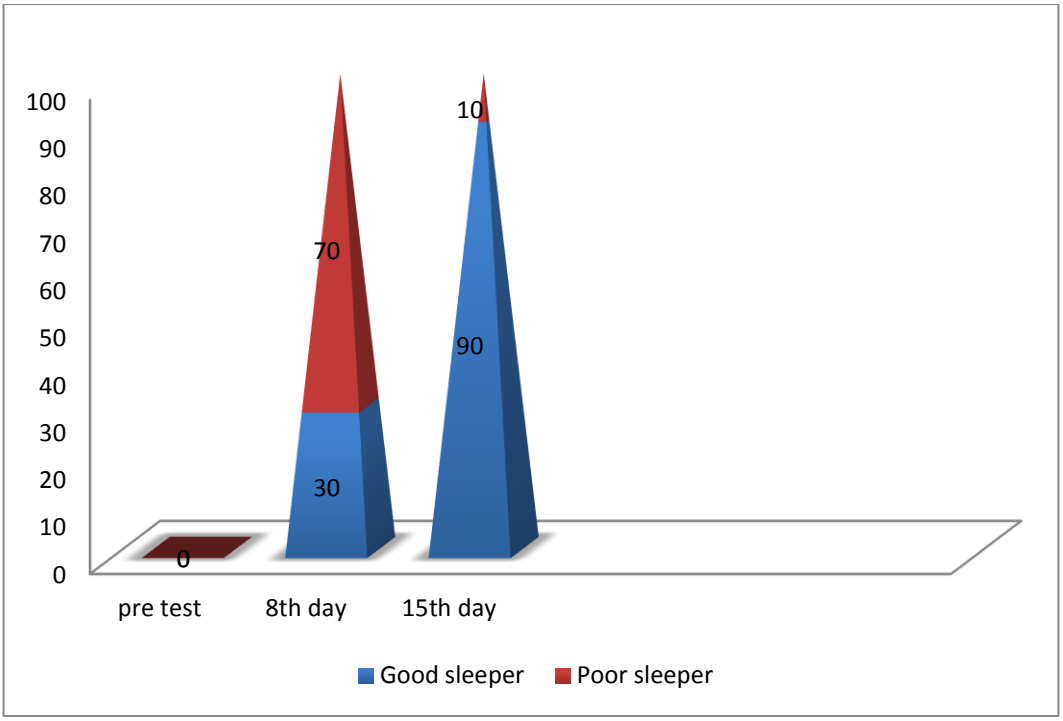

Fig 4: Level of sleep quality in the experimental group

Table 3: Frequency and percentage distribution of the elderly in the control group according to their level of sleep quality in the pre test and post test

N=30

Level of Sleep Quality	Control Group					
	Pre test		8th Day		15th Day	
	F	%	F	%	f	%
Good sleeper(<5)	-	-	-	-	-	-
Poor sleeper(>5)	30	100	30	100	30	100
Total	30	100	30	100	30	100

Table 3 predicts that all the samples in the control group were poor sleepers in the pre test and this remained the same on 8th and 15th day of post test also.

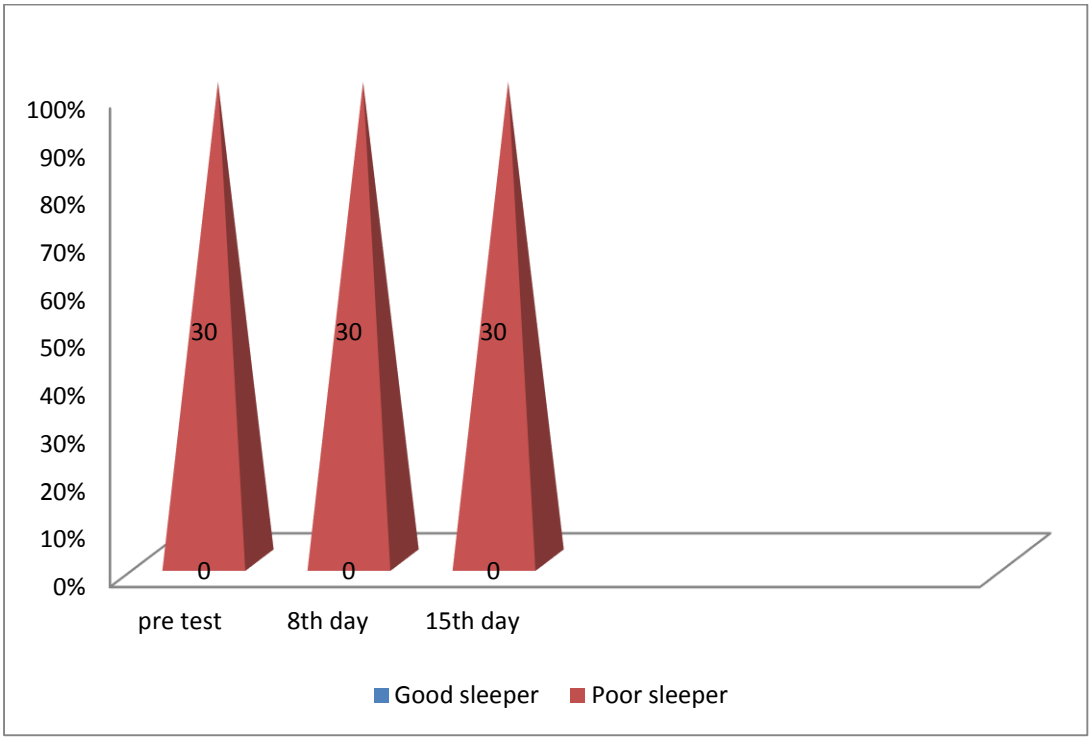

Fig 5: Level of sleep quality in the control group

Table: 4 Frequency and percentage distribution of the elderly in the experimental group according to their level of day time sleepiness in the pre test and post test

N=30

Level of Daytime Sleepiness	Experimental Group					
	Pre test		8th Day		15th Day	
	f	%	f	%	f	%
Normal	-	-	1	3.33	26	86.7
Borderline	-	-	27	90	4	13.3
Abnormal	30	100	2	6.67	0	0
Total	30	100	30	100	30	100

Table 4 predicts that in the experimental group all the samples had abnormal level of daytime sleepiness but by 8th day of the intervention only 6.67% experienced abnormal level of daytime sleepiness. By 15th day none experienced abnormal level of daytime sleepiness and 86.7% returned to normal level.

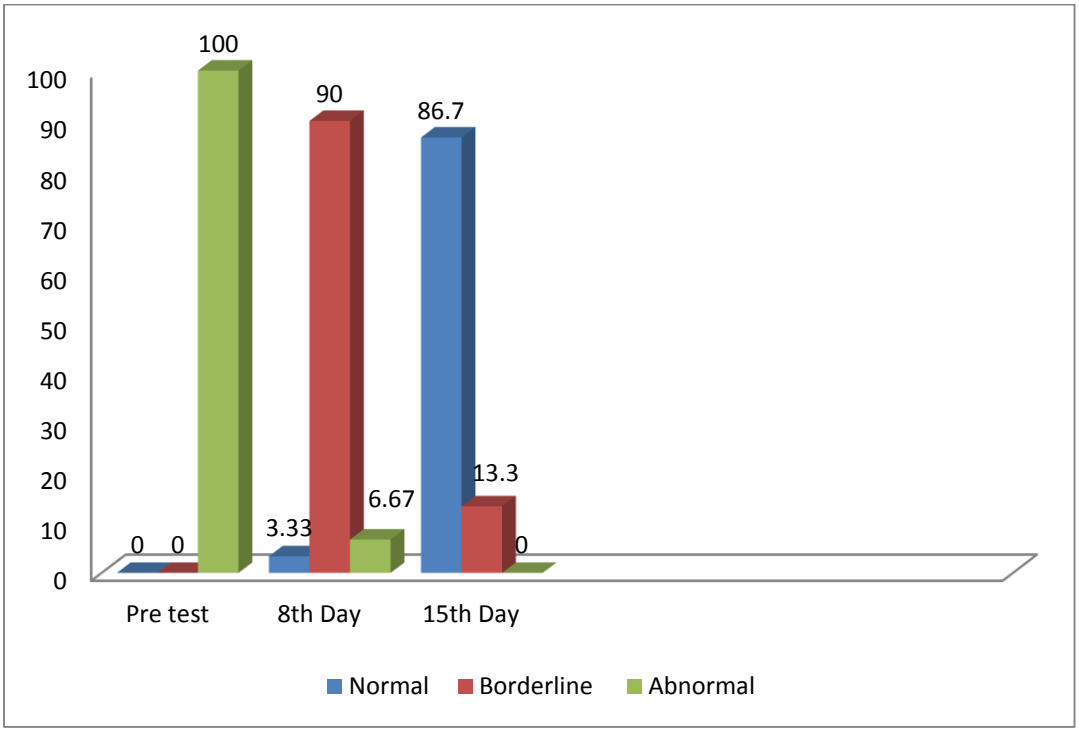

Fig 6: Level of daytime sleepiness in the experimental group

Table: 5 Frequency and percentage distribution of the elderly in the control group according to their level of day time sleepiness in the pre test and post test.

N=30

Level of Daytime Sleepiness	Control Group					
	Pre test		8th Day		15th Day	
	f	%	f	%	F	%
Normal	-	-	-	-	-	-
Borderline	-	-	-	-	-	-
Abnormal	30	100	30	100	30	100
Total	30	100	30	100	30	100

Table 5 predicts that all the samples experienced abnormal day time sleepiness in the pretest and remained the same on 8^{th} , 15^{th} day of the post test also.

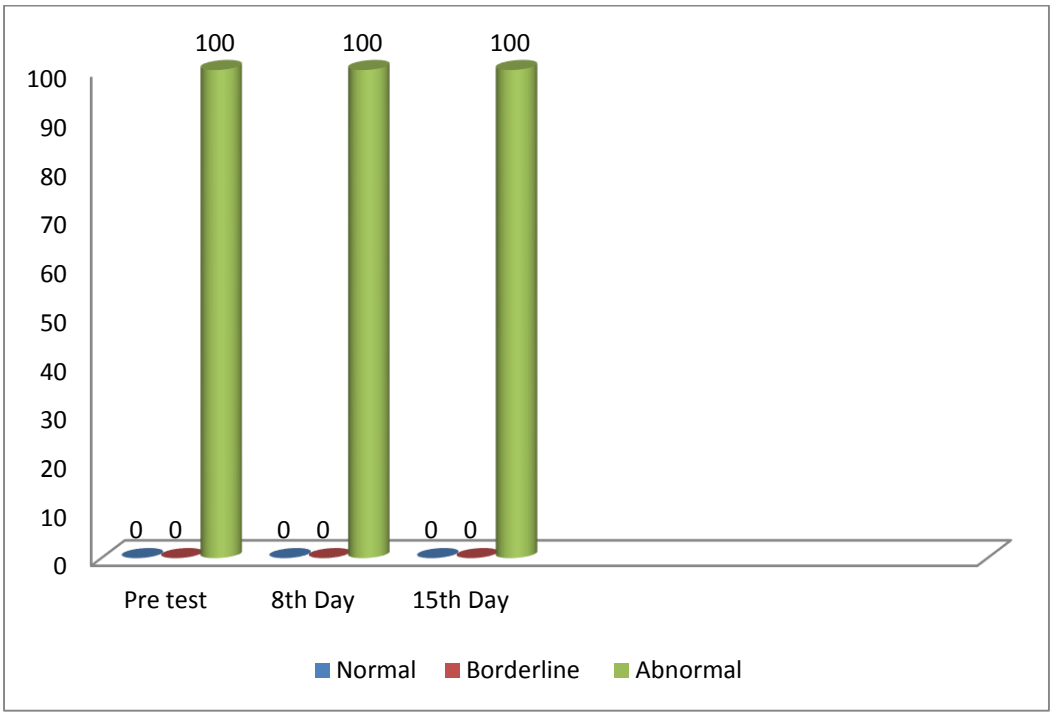

Fig7: Level of daytime sleepiness in the control group

Table:6 Comparison of mean pre test Vs post test level of sleep quality of the elderly people in the experimental group.

N=30

Experimental Group Pre Test		Post Test (Days)	Experimental Group Post test		Mean Difference	"t" value	"P" Value
Mean	**SD**		**mean**	**SD**			
13.57	1.48	8th day post test	6.4	1.71	7.16	21.56	P<0.001***
		15th day post test	2.6	1.49	10.97	33.19	P<0.001***

(*-P<0.05, Significant,P<0.01 Highly Significant,***P<0.001Very Highly Significant)**

Sleep quality among the elderly was measured using modified Pittsburg Sleep Quality Index. As per the scale score the higher scores indicate worse sleep quality.

To compare the mean pre test and post test level of sleep quality score of the experimental group the null hypothesis was stated as follow:

H_{01}: There will be no significant difference between the mean pre test sleep quality score and mean post test sleep quality score of the elderly in the experimental group.

Table 6 portrays that the mean pretest sleep quality score 13.57 improved to 6.4 and 2.6 on the 8th and 15th day of the intervention. The comparison of the mean sleep quality scores between the pretest and post $test_1$ ('t'=21.56) and between the pretest and post $test_2$ ('t'=33.19) were statistically very highly significant at <0.001.

This illustrates that the difference obtained was true and has not occurred by chance. So the researcher rejected the null hypothesis and accepts the research hypothesis.

Table:7 Comparison of mean pre test Vs post test level of sleep quality of the elderly people in the control group.

N=30

Control group Pre test		Post Test (Days)	Control Group Post test		Mean Difference	"t" Value	"P" Value
Mean	**SD**		**Mean**	**SD**			
13.93	2.13	8th day post test	14.2	1.5	0.3	1.68	0.102
		15th day post test	14.3	1.6	0.37	1.689	0.102

(*-P<0.05, Significant,P<0.01 Highly Significant, *** P<0.001 Very Highly Significant)**

Data in table 7 shows that the mean post test sleep quality score on 8th, 15th days were 14.2 and 14.3 respectively were significantly poorer than the pre test score of 13.93.

The obtained 't' value between the pretest and post test, comparison (t=1.68) and between the pretest and post test comparison (t=1.68) were not statistically significant (p>0.05)

Table:8 Comparison of post test$_1$ and post test$_2$ mean sleep quality scores between the control group and the experimental group.

N=60

Post Test (Days)	Control Group		Experimental Group		Mean difference	't' Value	P Value
	Mean	SD	Mean	SD			
8th day post test	14.2	1.5	6.4	1.71	7.83	18.82	P<0.001***
15th day post test	14.3	1.6	2.6	1.49	11.7	29.12	P<0.001***

(*-P<0.05, Significant,P<0.01 Highly Significant,***P<0.001Very Highly Significant)**

Sleep quality among the elderly was measured using modified Pittsburg Sleep Quality Index. As per the scale score the higher scores indicate worse sleep quality. To compare the post test mean sleep quality scores between the control and the experimental group the null hypotheses is stated as below:

H_{03}: The mean post test sleep quality score of the elderly in the experimental group will be lower than the mean post test sleep quality score of the elderly people in the control group.

Table 8 shows that the mean of sleep quality score in the experimental group both on 8th day (6.4) and 15th day (2.6) after the use of PMRT is lower than the mean level of sleep quality of the control group 8th day (14.2) and 15th day (14.3) respectively. The difference in the mean sleep quality score between the experimental group and control group was statistically significant on 8th day (t=18.82, P= <0.001***) and 15th day(t=29.12,P=<0.001***)..This illustrates that the difference obtained was true and has not occurred by chance. Researcher rejects the null hypotheses and accepts research hypotheses.

Table:9 Comparison of mean pre test Vs post test level of daytime sleepiness of the elderly people in the experimental group.

N=30

Experimental Group Pre Test		Post Test (Days)	Experimental Group Post test		Mean Difference	"t" Value	"P" Value
Mean	**SD**		**Mean**	**SD**			
15.8	1,37	8th day post test	7.83	1.82	7.97	35.84	P<0.001***
		15th day post test	1.8	1.42	14	44.01	P<0.001***

(*-P<0.05,Significant,P<0.01 Highly Significant,***P<0.001Very Highly Significant)**

Daytime sleepiness among the elderly people was measured using Epworth Daytime Sleepiness Scale . As per the scale score the higher scores indicate worse daytime sleepiness.

To compare the mean pre test and post test level of daytime sleepiness score of the experimental group the null hypothesis was stated as follow:

H_{01}:There will be no significant difference between the mean pre test daytime sleepiness score and mean post test daytime sleepiness score of the elderly people in the experimental group.

Table 9 portrays that the mean pretest daytime sleepiness score 15.8 improved to 17.83 and 1.8 on the 8th and 15th day of the intervention. The comparison of the mean daytime sleepiness scores between the pretest and post test ('t'=35.84) and between the pretest and post test ('t'=44.01) were statistically very highly significant at <0.001.This illustrates that the difference obtained was true and has not occurred by chance. So the researcher rejected the null hypothesis and accepts the research hypothesis.

Table:10 Comparison of mean pre test Vs post test level of daytime sleepiness of the elderly people in the control group.

N=30

Control Group Pre Test		Post Test (Days)	Control Group Post test		Mean Difference	"t" Value	"P" Value
Mean	**SD**		**Mean**	**SD**			
15.63	1.45	8th day post test	15.8	1.37	0.13	1.72	0.255
		15th day post test	15.8	1.37	0.13	1.72	0.255

(*-P<0.05, Significant,P<0.01 Highly Significant,***P<0.001Very Highly Significant)**

Data in table 10 shows that the mean post test daytime sleepiness score on 8th and 15th day were 15.8and 15.8 respectively which were significantly poorer than the pre test score of 15.63.

The obtained 't' value between the pretest and post test, comparison (t=1.72) and between the pretest and post test comparison (t=1.72) were not statistically significant (p>0.05)

Table: 11 Comparison of post test$_1$ and post test$_2$ mean daytime sleepiness scores between the control group and the experimental group.

N=60

Post Test (Days)	Control Group		Experimental Group		Mean difference	't' Value	P Value
	Mean	SD	Mean	SD			
8th day post test	15.8	1.3	7.83	1.82	7.93	18.07	P<0.001***
15th day post test	15.8	1.47	1.8	1.42	14	37.44	P<0.001***

(*-P<0.05, Significant,P<0.01 Highly Significant,***P<0.001Very Highly Significant)**

Daytime sleepiness among the elderly people was measured using Epworth Daytime Sleepiness Scale . As per the scale score the higher scores indicate worse daytime sleepiness.

To compare the post test mean daytime sleepiness scores between the control and the experimental group the null hypotheses is stated as below:

H_{04}: The mean post test daytime sleepiness scores will be significantly lower in the experimental group than the mean post test daytime sleepiness in the control group.

Table 11 shows that the mean of daytime sleepiness score in the experimental group both on 8th day (7.83) and 15th day (1.8) after the use of PMRT is lower than the mean daytime sleepiness score of the control group on 8th day (15.8) and 15th day (15.8) respectively. The difference in the mean sleep quality score between the experimental group and control group was statistically significant on 8th day (t=, P= <0.001***) and 15th day(t=,P=<0.001***)..

This illustrates that the difference obtained was true and has not occurred by chance.

Table 12 : One way ANOVA and Bonferroni estimates for repeated measures of sleep quality in the control and group experimental.

N=60

Group		Mean	SD	N	F-ratio	p-value	Bonferroni Estimates
Control Group	Pre test	13.93	2.132	30	2.093	0.137	Pre Vs Post $test_1$(P=0.32$^{\#}$)
	1st Post test	14.23	1.501	30			Pre Vs Post $test_2$=(P=0.30$^{\#}$)
	2nd Post test	14.30	1.601	30			Post1 Vs Post $test_2$=(P=0.32$^{\#}$)
Experimental Group	Pre test	13.57	1.478	30	578.2	P<0.001***	Pre Vs Post $test_1$(P=0.001***)
	1st Post test	6.40	1.714	30			Pre Vs Post $test_2$ (P=0.001***)
	2nd Post test	2.60	1.499	30			Post1 Vs Post $test_2$(P=0.001***)

(*-P<0.05, Significant,P<0.01 Highly Significant,***P<0.001Very Highly Significant,#-P>0.05 Not Significant)**

Table 12 depicits there was no statistically significant difference notes when the pretest post $test_1$ and post $test_2$ sleep quality scores of the control group were compared (F=2.093, P=0.137). Hence the post hoc Bonferroni estimates were also not significant.

A statistically significant difference was noted. Post hoc Bonferroni estimates reveal that there was a statistically significant difference the sleep quality scores of pretest and post $test_1$, (p=0.001***), pretest and post $test_2$(p=0.001***), post $test_1$ and post $test_2$ (p=0.001***).

Table 13: One way ANOVA and Bonferroni estimates for repeated measures of daytime sleepiness in the control and group experimental.

N=60

Group		Mean	SD	N	F-ratio	p-value	Bonferroni Estimates
Control Group	Pre test	15.63	1.450	30	1.796	0.186	Pre Vs Post $test_1$(P=0.76$^{\#}$) Pre Vs Post $test_2$=(P=0.28$^{\#}$) Post1 Vs Post $test_2$=(P=0.76$^{\#}$)
	1st Post test	15.77	1.569	30			
	2nd Post test	15.80	1.472	30			
Experimental Group	Pre test	15.80	1.375	30	1159.8	P<0.001***	Pre Vs Post $test_1$=(P=0.001***) Pre Vs Post $test_2$=(P=0.001***) Post1 Vs Post $test_2$=(P=0.001***)
	1st Post test	7.83	1.821	30			
	2nd Post test	1.80	1.424	30			

(*-P<0.05, Significant,P<0.01 Highly Significant,***P<0.001Very Highly Significant,#-P>0.05 Not Significant)**

Table 13 depicits there was no statistically significant difference notes when the pretest post $test_1$ and post $test_2$ daytime sleepiness scores of the control group were compared (F=1.796, P=0.186). Hence the post hoc Bonferroni estimates were also not significant.

A statistically significant difference was noted. Post hoc Bonferroni estimates reveal that there was a statistically significant difference the scores of daytime sleepiness pretest and post $test_1$, (P=0.001***), pretest and post $test_2$(P=0.001***), post $test_1$ and post $test_2$(P=0.001***).

Table: 14 Relationship between level of sleep quality and level of datime sleepiness in the pretest experimental and control group.

Correlation co-efficient between level of sleep quality and level of datime sleepiness

N=60

Variables	Mean	SD	'r'-value
Sleep quality	15.2333	.96316	$0.1^{\#}$
Daytime sleepiness	15.5500	1.46629	

(*- P<0.05, Significant,P<0.01 Highly Significant,***P<0.001Very Highly Significant, # - Not significant)**

To find out the relationship between level of sleep quality and level of daytime sleepiness in the experimental and control group null hypothesis was stated as follow:

H_{05}: There will be a significant positive relationship between the post test level of sleep quality and level of daytime sleepiness.

Table 14 shows that there is a weak positive relationship between level of sleep quality and level of daytime sleepiness (r = 0.1) which is not statistically significant at p = 0.44.

SECTION- III

Table 15: Association between the post test sleep quality score of the elderly people in experimental group with their selected demographic variables.

N=30

Demographic variables	Above mean		Below mean		χ^2 Value	P Value
	F	%	F	%		
1.Age of Elderly :						
61-70	7	23.3	13	43.3	0.07	0.784
71-80	3	10	7	23.3	(df=1)	NS
2.Gender:						
Male	5	16.7	12	40	0.27	0.602
Female	5	16.7	8	26.7	(df=1)	NS
3.Marital status:						
Married	9	30	15	50	0.94	0.333
Single	1	3.3	5	16.7	(df=1)	NS
4.Religion:						
Hindu	7	23.3	10	33.3	1.09	0.297
Christian	3	10	10	33.3	(df=1)	NS
5.Education :						
Literate	3	10	6	20	0	1
Illiterate	7	23.3	14	46.7	(df=1)	NS
6.Leisure time activity :						
Reading/Watching TV	10	33.3	20	66.7	0	1
Gardening	0	0	0	0		NS

(*-P<0.05, Significant,P<0.01 Highly Significant,***P<0.001Very Highly Significant)**

To find out the association between the post test sleep quality and demographic variables of the elderly, the null hypothesis was stated as follows:

H_{06}: There will be no significant association between the post test level sleep quality score of the elderly people in the experimental group and selected demographic

variables like Age, Sex, Educational status, Marital status, Economic status ,Number of children and Number of hours of day time sleep).

Table15 shows that there is no statistically significant association between the post test level of sleep quality and demographic variables like age($\chi 2$=0.07;P=0.784), sex($\chi 2$=0.27, P=0.602),education ($\chi 2$=0;P=1), religion($\chi 2$=1.09,P=0.027), marital status($\chi 2$=0.94,P=0.33) leisure time activity($\chi 2$=0;P=1). So the researcher accepts the null hypothesis and rejects the research hypothesis.

Table 16. Association between post test level of daytime sleepiness score of the elderly in the experimental group with their selected demographic variables.

N=30

Demographic variables	Above mean		Below mean		$\chi 2$ Value	P Value
	F	%	F	%		
1.Age of Elderly :						
61-70	2	6.7	18	60	0.57	0.448
71-80	2	6.7	8	26.7	(df=1)	NS
2.Gender:						
Male	3	10	10	33.3	1.88	0.170
Female	1	3.3	16	53.3	(df=1)	NS
3.Marital status:						
Married	3	10	21	70	0.07	0.788
Single	1	3.3	5	16.7	(df=1)	NS
4.Religion:						
Hindu	1	3.3	16	53.3	1.88	0.170
Christian	3	10	10	33.3	(df=1)	NS
5.Education :						
Literate	1	3.3	8	26.7	0.05	0.815
Illiterate	3	10	18	60	(df=1)	NS
6.Leisure time activity :						
Reading/Watching TV	4	13.3	26	86.7	0	1
Gardening	0	0	0	0		NS

(*-P<0.05, Significant,P<0.01 Highly Significant,***P<0.001Very Highly Significant)**

To find the association between the day time sleepiness and demographic variables of the elderly, the null hypothesis was stated as follows:

H_{07}: There will be no significant association between the post test level daytime sleepiness of the elderly people in the experimental group and the selected

demographic variables like age, sex, educational status, marital status, economic status ,number of children and number of hours of day time sleep).

Table16 shows that there was no statistically significant association between the post test level of daytime sleepiness and demographic variables age ($\chi 2=0.57;P=0.448$), sex ($\chi 2=1.88,P=0.170$), education ($\chi 2=0.05;P=0.815$), religion ($\chi 2=1.88,P=0.170$), marital status ($\chi 2=0.07,P=0.788$) leisure time activity ($\chi 2=0;P=1$). So the researcher accepts the null hypothesis and rejects the research hypothesis.

Table 17: Distribution of samples in experimental group on the basis of their feedback for Progressive Muscle Relaxation Technique.

N=30

Questions	Experimental Group	
	F	**%**
Progressive Muscle Relaxation Technique promotes good sleep		
a. Yes	30	100
b. No	0	0
Do you recommend Progressive Muscle Relaxation Technique to others		
a. Yes	30	100
b. No	0	0

Table 17 shows the feed back of Progressive Muscle Relaxation Technique in experimental group.

All the subjects 30 (100%) in the experimental group reported that the Progressive Muscle Relaxation Technique promoted good sleep and all of them were willing to recommend Progressive muscle relaxation technique to others about its benefit.

CHAPTER-V

DISCUSSION

The present study was conducted to evaluate the effectiveness of progressive muscle relaxation technique on sleep quality and daytime sleepiness among the elderly people residing in old age home at Madurai. Quasi experimental non equivalent pre test post test control group design was adopted for this study. The data were collected from Inba Illam and Christian Seva Sangh old age home at Madurai. A total of 60 samples were selected purposively, 30 in the experimental group and 30 in the control group. The tools used in the study are insomnia screening tool, Pittsburg Sleep Quality Index and Epworth Day Time Sleepiness Scale The study findings are discussed in this chapter with reference to objectives and hypotheses stated in chapter-1.

Distribution of sample with regard to demographic variables:

Little over half in the experimental group (53.3%) and two thirds in the control group (66.7%) belonged to the age group of 60-70years. Majority (83.3%) in the control group were females where as in the experimental group a little over half (56.7%) were females. Majority in both the groups were married (76.7% and 80% in the control group in experimental group respectively). Nearly two thirds (60%) were Hindu by religion. Majority (i.e) 73.3% and 70% in the control and experimental group) were literates. In the experimental group and control group all the samples spend their leisure time by watching TV.

For the discussion to be more perceptible the first and second objectives are discussed together.

1. **To determine the sleep quality and the day time sleepiness in the elderly people before and after progressive muscle relaxation technique in the experimental and control group.**

2. **To evaluate the effectiveness of progressive muscle relaxation technique on sleep quality and the day time sleepiness among elderly people.**

Sleep quality:

The study findings revealed that all the elderly people both in the experimental and control group had been experiencing poor sleep. (control group sleep quality mean : 13.93; experimental group sleep quality mean 13.57). As evident in the current study, the prevalence of sleep disorders tend to increase with age. The current study findings are supported by the following studies where Chiya, Tung, Chin and Mei (2011) in their study reported that half of the elderly 50 reported poor sleep quality; Jianfeng et al. (2013) reported the prevalence of poor sleep quality to be 41.5% (95% confidence interval (CI) = 38.6- 44.5%) in their study among Chinese elderly.

Sleep disorders are of significant source of concern especially in the geriatric population. changes in sleep pattern are part of the normal ageing process, but sleep disorders are of significant source of concern especially in the geriatric population. Changes in the sleep patterns are part of the normal ageing process, but sleep disorders have been implicated with increased mortality and side effects such as dementia, cognitive impairment and falls. (Theresa, 2007). Hence it of utmost importance that the elderly are helped to have a relaxed sleep and nurses do play a very important role in enhancing the sleep quality of the elderly people.

In the current study, the elderly people in the experimental group were given PMRT for 15 days where as those in the control group received the routine care. Sleep pattern of the elderly in the experimental group gradually improved which was evident in the sleep quality mean improving from13.5 in the pretest to 6.40 on the 8^{th} day and 2.60 on the 15^{th} day. While none were good sleepers in the pretest,30% reported to have

good sleep on day 8 of PMRT and this further improved to 90% on day 15th . The poor sleep scenario remained the same among the elderly in the control group with the sleep quality mean worsening from 13.93 in the pretest to 14.2 and 14.3 on the 8th and 15th day respectively.

The elderly people in the experimental group who underwent PMRT had good sleep than those in the control group [8th day post test comparison ($t=18.82; P<0.001$), 15th day post test comparison ($t=29.12; P<0.001$)].

Day time sleepiness

Sleep disturbance are frequent in the general population, increase with age, and have a deleterious impact on health. In the current study all the elderly people in both the control and experimental group experienced abnormal daytime sleepiness.

Excessive daytime sleepiness is one of the most frequent sleep complaints in the population and effects 10-30% of older adults aged 65 years and above (Nalaka, 2013). EDS has been consistently associated with an adverse risk profile and hence may be associated with an increase risk of mortality (Johnnatas, 2013). Empans et al. (2009) in their study reported that excessive daytime sleepiness was associated with a significant 33% increased risk of mortality (95% CI:1.13 to 1.61) after adjustment for other factors. EDS is also associated with increased fall in the elderly (Amie, 2015), cognitive impairment (Maurice, 2002), obesity and depression (Mikael, 2013).

In the current study, the daytime sleepiness of the elderly in the experimental group who underwent PMRT improved from 15.8 in the pretest to 7.83 on the 8th day and 1.8 on the 15th day. While all the samples (100%) experienced abnormal daytime sleepiness, 3.33% returned to normal level by 8th day and this rose to 86.7%by the 15th day of the intervention. Mean while in the control group all the 30 samples continued routine care and experienced abnormal daytime sleepiness.

PMRT had helped the elderly people in the experimental group to experience normal level in terms of daytime sleepiness then those in the control group (t=1.72, P=0.255). The immediate effects after each session of PMRT are decrease in heart rate, BP and rate of breathing, better oxygen levels in the blood stream, the brain wave activity shifts from beta waves to an increase in alpha waves which results in a more relaxed mental state and less muscle tension throughout the body. All these immediate effects lead to long term benefits like decrease in general anxiety, stress, an improved ability to sleep, better immune system, increase in energy level, and general wellbeing improved self esteem and a positive mood.

The above said benefits of PMRT could have mediated a good sleep quality in the night among the elderly in the experimental group, there by decreasing daytime sleepiness.

The current study findings that PMRT improves sleep quality and decreases daytime sleepiness among the elderly is well documented by other researchers who evaluate the effectiveness of PMRT on the elderly people (Jayestri, 2015), Ozlem et al. (2014). (Jayestri, 2015) through her study concluded that all the senior citizens residing in old age homes experienced sleep disturbances. Nursing interventions and progressive muscle relaxation techniques are alternative measures to improve sleep among the elderly.

There are only handful of studies that had earlier determined the effectiveness of PMRT on sleep quality among the elderly. So the current study findings are very significant in the area of sleep research among geriatric population.

Relationship:

3. **To determine the relationship between the sleep quality and day time sleepiness of the elderly people.**

In the current study, relationship between level of sleep quality and level of daytime sleepiness shows that there is a weak positive relationship between level of sleep quality and level of daytime sleepiness (r = 0.1) which is not statistically significant at p = 0.44.

A similar study done by Goldman, Hall and Newman (2008) in their study among 235 elderly reported that more sleep fragmentation in the night was associated with higher odds of napping although not with napping duration and this supports the current study findings.

Association:

4. **To associate the sleep quality and the day time sleepiness of elderly people with their selected demographic variables (Age, Sex, Educational status, Marital status, Economic status, Number of children and Number of hours of day time sleep)**

The current study shows that there is no statistically significant association between the post test level of sleep quality and demographic variables like age ($\chi 2$=0.07;P=0.784), sex ($\chi 2$=0.27,P=0.602). education($\chi 2$=0;P=1), religion ($\chi 2$=1.09,P=0.027), marital status ($\chi 2$=0.94,P=0.33) , leisure time activity($\chi 2$=0;P=1). Similarly no statistically significant association was found between the post test level of daytime and demographic variables age ($\chi 2$=0.57;P=0.448), sex ($\chi 2$=1.88,P=0.170), education ($\chi 2$=0.05;P=0.815), religion ($\chi 2$=1.88,P=0.170), marital status($\chi 2$=0.07, P=0.788) leisure time activity ($\chi 2$=0;P=1).

In contrary to the current study findings, (Ogunbode, 2014) in their study among 843 elderly patients aged 60 years and above reported that insomnia was significantly associated with being female, not being currently married, having formal education, living below the poverty line, and not being physically active.

Yet another study by Jianfeng et al. (2013) contradicted the current study findings. The study was conducted among 1083 elderly people. The prevalence of poor sleep quality in this population was 41.5% (95% confidence interval (CI)=38.6–44.5%), with a higher rate observed in elderly females (45.8% [95% CI=41.9–49.7%]) than that in elderly males (35.8% [95% CI=31.4–40.1%]). The prevalence rate increased with age, from 32.1% (95% CI=27.8–36.4%) in those aged 60–69 years to 52.5% (95% CI=45.9–59.1%) in those aged ≥80 years (p value for trend<0.001). Multivariate logistic regression analysis indicated that age (OR=1.03[95% CI=1.01–1.05], p<0.001), less education duration (OR=1.04 [95% CI=1.01–1.08, p=0.014), living alone (OR=1.62 [95% CI=1.02–2.58], p=0.04), anxiety (ZSAS score: OR=1.09 [95% CI=1.05–1.12], p<0.001), number of chronic disease (OR=1.18 [95% CI=1.07–1.30], p=0.14) and arthritis (OR=1.45[95% CI=1.05–2.01], p=0.025) were risk factors of poor sleep quality.

Conclusion:

From this study that the progressive muscle relaxation techniques is a alternative measures to improve sleep and reduce the abnormal daytime sleepiness among the elderly people. Nurses play a vital role in educating the progressive muscle relaxation techniques among the elderly people residing in a old age homes.

CHAPTER-VI

SUMMARY, CONCLUSION, IMPLICATION AND RECOMMENDATIONS

This chapter deals with the summary of the study and conclusion drawn. It clarifies the limitations of the study and the implications. The recommendations are given for different areas like implication for nursing profession, limitations, conclusion and recommendations.

Summary of the study:

The study was undertaken to determine the effectiveness of progressive muscle relaxation technique on sleep quality and daytime sleepiness among the elderly people residing in selected old age homes at Madurai. Quasi experimental non equivalent pre test post test control group design was adopted for this study. The study was conducted at Inba illam and Christian Seva Sangh old age homes of Madurai district. The population of the study was elderly people who were residing in old age home. A total of 60 samples selected by purposive sampling technique. Data collection tools consisted of modified Pittsburgh Sleep Quality Index to assess the sleep quality and Epworth Daytime Sleepiness Scale to assess the daytime Sleepiness. Data were collected over a period of 6 weeks. Data were analysed using descriptive and inferential statistics.

The objectives of the study:

- To determine the sleep quality and the day time sleepiness among the elderly people before and after progressive muscle relaxation technique in the experimental and control group.
- To evaluate the effectiveness of progressive muscle relaxation technique on sleep quality and the day time sleepiness among the elderly people.

- ❖ To determine the relationship between the sleep quality and day time sleepiness among the elderly people.
- ❖ To associate the sleep quality and the day time sleepiness among the elderly people with their selected demographic variables (Age, Sex, Educational status, Marital status, Economic status ,Number of children and Number of hours of day time sleep)

The following hypotheses were set for the study, and all hypothese were tested at 0.05 level of significance.

H_{01} : The mean post test sleep quality score will be significantly lower than the mean pre-test score of the elderly people who had progressive muscle relaxation technique.

H_{02}: The mean post test daytime sleepiness score will be significantly lower than the mean pre test score of the elderly people who had progressive muscle relaxation technique.

H_3: The mean post test sleep quality score of the elderly in the experimental group will be lower than the mean post test sleep quality score of the elderly people in the control group.

H_{04}: The mean post test daytime sleepiness scores will be significantly lower in the experimental group than the mean post test daytime sleepiness in the control group.

H_{05}: There will be a significant positive relationship between the post test level of sleep quality and level of daytime sleepiness of the elderly people in the experimental group.

H_{06}: There will be a significant association between the pre test level of sleep quality score of elderly people in the experimental group and selected demographic

variables (Age, Sex, Educational status, Marital status, Economic status, Number of children and Number of hours of day time sleep).

H_{07}: There will be a significant association between the pre test level of daytime sleepiness of the elderly people in the experimental group and the selected demographic variables (Age, Sex, Educational status, Marital status, Economic status ,Number of children and Number of hours of day time sleep).

Major Findings of the study:

Demographic characteristics of the samples:

Little over half in the experimental group (53.3%) and two thirds in the control group (66.7%) belonged to the age group of 60-70 years. Majority (83.3%) in the control group were females where as in the experimental group a little over half (56.7%) were females. Majority in both the groups were married (76.7% and 80% in the control group in experimental group respectively). Nearly two thirds (60%) were Hindu by religion. Majority (i.e) 73.3% and 70% in the control and experimental group) were literates. In the experimental group and control group all the samples spend their leisure time by watching TV.

The major findings of the study are:

1. All the elderly people of the study were poor sleepers (PSQI >5) and had abnormal daytime sleepiness in the pretest.
2. After the administration of progressive muscle relaxation technique to the elderly people in the experimental group, 30% of them experienced good sleep by 8^{th} day and 90% by 15^{th} day.
3. After the administration of progressive muscle relaxation technique to the elderly people, 66.7% experienced abnormal daytime sleepiness on 8^{th} day. 86.7% retrieved to normal level.

4. All the elderly in the control group remained as poor sleepers and abnormal daytime sleepiness both in post $test_1$(8^{th} day) and post $test_2$(15^{th} day)
5. Progressive muscle relaxation technique was effective in improving the sleep quality and daytime sleeping which is evident in the following statistics.

- Pretest sleep quality Vs Post $test_1$ sleep quality in experimental group: (t=21.56, P= <0.001***)
- Pretest sleep quality Vs Post $test_2$ sleep quality in experimental group: (t=33.19, P = <0.001***)
- Pretest daytime sleepiness Vs Post $test_1$ daytime sleepiness comparison on experimental group: (t=35.84, P= <0.001***)
- Pretest daytime sleepiness Vs Post $test_2$ daytime sleepiness comparison on experimental group: (t=44.01,P =<0.001***)
- Pretest sleep quality Vs Post $test_1$ sleep quality comparison on control group: (t=1.68, P= 0.102)
- Pretest sleep quality Vs Post $test_2$ sleep quality comparison on control group: (t=1.689,P = 0.102)
- Pretest daytime sleepiness Vs Post $test_1$ daytime sleepiness comparison on control group: (t=1.72, P= 0.255)
- Pretest daytime sleepiness Vs Post $test_2$ daytime sleepiness comparison on control group: (t=1.72,P =0.255)
- Post $test_1$ sleep quality (control group) Vs Post $test_1$ sleep quality (experimental group) : (t=18.82, P=<0.001***)
- Post $test_2$ sleep quality (control group) Vs Post $test_2$ sleep quality (experimental group) : (t=29.12, P=<0.001***)

- Post $test_1$ daytime sleepiness (control group) Vs Post $test_1$ daytime sleepiness (experimental group) : (t=18.07, P=<0.001***)
- Post $test_2$ daytime sleepiness (control group) Vs Post $test_2$ daytime sleepiness(experimental group) : (t=37.44, P= <0.001***)

- Post hoc Bonferroni estimates reveal that there was a statistically significant difference the sleep quality scores of pretest and post $test_1$, (p=0.000), pretest and post $test_2$(p=0.000), post $test_1$ and post $test_2$(p=0.000).
- A statistically significant difference was noted. Post hoc Bonferroni estimates reveal that there was a statistically significant difference the scores of daytime sleepiness pretest and post $test_1$, (p=0.000), pretest and post $test_2$(p=0.000), post $test_1$ and post $test_2$(p=0.000).
- There is a weak positive relationship between level of sleep quality and level of daytime sleepiness (r = 0.1) which is not statistically significant at p = 0.44.
- There was no significant association between the post test level of sleep quality score of the elderly people in the experimental group and selected demographic variables (Age, Sex, Educational status, Marital status, Economic status ,Number of children and Number of hours of day time sleep).
- There was no significant association between the post test level of daytime sleepiness of the elderly people in the experimental group and the selected demographic variables (Age, Sex, Educational status, Marital status, Economic status ,Number of children and Number of hours of day time sleep).

IMPLICATIONS:

The results obtained from the present study proved that, Progressive muscle relaxation technique improved the sleep quality and reduced the daytime sleepiness among the elderly people. The researcher also recommended the following implications in the nursing professional areas such as:

- ❖ Nursing practice
- ❖ Nursing education
- ❖ Nursing administration
- ❖ Nursing research

Nursing practice

- The progressive muscle relaxation technique can be used among clients with sleep disturbances to improve the sleep quality.
- Nurse practising in health care setting are to be equipped with the knowledge on progressive muscle relaxation technique to reduce their job stress.
- Study findings signify the importance of formulation of guidelines and implementation of progressive muscle relaxation technique especially in old age homes where literature reveals lack of non pharmacological interventions.
- Nurses, specializing in geriatrics need to be empowered in administering progressive muscle relaxation technique.

Nursing Education

- Current concepts and trends in geriatric care, especially sleep should be included in nursing curriculum.

- Under graduate and post graduate nursing students should be trained in administering progressive muscle relaxation technique..
- Nursing personnel working in geriatric ward and old age home should be given in service education regarding progressive muscle relaxation technique.

Nursing Administration

- The nursing administrators especially of nursing homes and geriatric wards can organize continuing nursing education on sleep problems and progressive muscle relaxation technique.
- The administrators can encourage the nurses to use different, safe, cost effective, non pharmacological intervention in reducing sleep problems among elderly.
- A considerable amount in the budget can be allocated for organizing the continuing nursing education programme and in preparing and maintaining progressive muscle relaxation technique.
- Nursing administrators can design a progressive muscle relaxation technique protocol for the elderly collaboratively.

Nursing Research

The findings of the present study has added knowledge to the already existing literature and the implication's for the nursing research are given in the form of recommendation. This study can be a baseline for future studies to build upon and motivate other investigators to conduced further studies.

Limitations

The present study had encountered the following limitations:

- The study was conducted among the elderly from selected old age homes at Madurai city.
- The data was collected from a small number of samples (60), hence generalization has to be done cautiously.
- The response were based on self report of the study samples that could not be counter checked.
- Long term follows up was not feasible.

RECOMMENDATIONS:

On the basis of the present study the following recommendations have been made for the study.

- A similar study may be done with larger sample for the generalization of results.
- A similar study can be conducted to compare the effects of progressive muscle relaxation technique with any other alternative and complementary therapies.
- A descriptive study could be done to assess the prevalence of sleep problems and the factors affecting sleep among elderly people.
- A longitudinal follow up can be done to assess the long term effects of progressive muscle relaxation technique.
- Psychological intervention along with progressive muscle relaxation technique can be given among the elderly people with sleep problems.

SUMMARY:

This chapter delt with summary of the study, major findings of the study, discussion, conclusion, implication to the field, limitations of the study and recommendation for further studies.

CONCLUSION:

These findings of the study have been discussed in terms of the objectives, theoretical base and hypothesis. The following conclusions were drawn from the study findings:

1. Most of the people residing in the old age home suffer from sleep problems.
2. Progressive muscle relaxation technique were effective in improving the quality of sleep among the elderly in old age homes.

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- www.pubmed.com
- www.healthline.com
- www.ncbi.nim.nih.gov

APPENDIX I

ETHICAL CERTIFICATE

ULTRA TRUST

4 / 235, COLLEGE ROAD,
THASILDAR NAGAR,
MADURAI - 625 020.
TAMILNADU, INDIA.
PHONE : 0452 - 2534593
Email : ultratrust@rediffmail.com

Ref : UT : SHNC: Ph.D(N) : 2017

Date : 17.01.2017

ETHICAL COMMITTEE

The following members of the ethics committee were present at the meeting held on 12.01.2017 at 2.15 pm in Sacred Heart Nursing College.

CHAIR PERSON

1. Dr. SABHESAN, M.B.B.S. DPM, MNAMS, Ph.D.
   Head, Department of Psychiatry
   CSI Mission Hospital, Madurai.

DEPUTY CHAIRMAN

2. Dr. NALINI JEYAVANTH SANTHA, M.Sc., (N) Ph.D.
   Principal. Sacred Heart Nursing College. Madurai – 625 020.

MEMBER SECRETARY

3. Dr. DEVAKIRUBAI, M.Sc., (N) Ph.D.
   Head, Department of MEDICAL-SURGICAL Nursing,
   Sacred Heart Nursing College, Madurai–625 020.

MEMBERS

4. Dr. VIJAYALAKSHMI, M.D.S.,
   Principal,
   Best Dental College, Ultra Trust.

5. Dr. RAJASEKARAN, M.B.B.S, D.F.M. D.Diab
   Pathologist
   Best Dental Science College,
   Ultra Trust, Madurai.

6. Dr.R.VARADHARAJAN, M.Sc., MPHIL.,M.ED.,Ph.D.,
   Former District Educational Officer,
   Madurai.

7. Mr. CHINNAKARUPPAN M.A., B.L., DCFSC
   Advocate and Notary Public,
   14, Asari Street, Thallakulam, Madurai – 2.

APPENDIX I

ETHICAL CERTIFICATE

SACRED HEART NURSING COLLEGE

ULTRA TRUST

4 / 235, COLLEGE ROAD,
THASILDAR NAGAR,
MADURAI - 625 020.
TAMILNADU, INDIA.
PHONE : 0452 - 2534593
Email : ultratrust@rediffmail.com

Ref : UT : SHNC: Ph.D(N) : 2017 Date : 17.01.2017

-2-

8. Dr.S.RAVIKUMAR, MBBS, DNB(Family Medicine).,F.Diab.,
Tutor, Department of Medicine,
Best Dental Science College.

RESOLUTION – 2/2017

It is resolved to accept Mr. R. SAM ASIR SUGANTHA RAJ to conduct "A study to assess the effectiveness of progressive muscle relaxation technique on sleep quality and day time sleepiness among the elderly in selected old age homes, Madurai".

The Institutional Ethics Committee expects to be informed about the progress of the study, any changes in the protocol, patient information and asks to be provided a copy of the final report.

Yours Sincerely

17.1.17.

Chair Person
Ethics Committee

Member Secretary
Ethics Committee

Dr.SABHESAN, M.B.B.S. DPM, MNAMS, Ph.D.

Dr. E.DEVAKIRUBAI M.Sc., (N) Ph.D

APPENDIX -II (A)

PERMISSION LETTER TO CONDUCT RESEARCH

Dr.NALINI JEYAVANTH SANTHA M.Sc(N), Ph.D,
PRICIPAL,
SACRED HEART NURSING COLLEGE.

4/235, COLLEGE ROAD,
THASILDAR NAGAR,
MADURAI – 625020.
PHONE: 2534593

Ref.UT: SHNC: 2017

To,

The manager,

Inba illam,

Pasumalai,

Madurai.

Respected Sir/ Madam,

Sub: Sacred Heart Nursing College, Madurai – project work of M.SC (Nursing) student –permission requested- Reg.

We wish to state that **Mr.SAM ASIR SUGANTHARAJ.R**, Final year M.SC (Nursing) student of our college has to conduct a research project, which is to be submitted to the Tamil Nadu Dr.M.G.R. Medical University, Chennai in partial fulfillment of university requirements.

The topic of research project is "A study to assess the effectiveness of progressive muscle relaxation technique on sleep quality and day time sleepiness among elderly in selected old age home, Madurai".

We therefore request you to kindly permit him to do the research work in your organization under your valuable guidance and suggestion.

Thanking you,

Yours faithfully,

Principal

SACRED HEART NURSING COLLEGE

S. B. Shamila

C. NALINI JEYAVANTH SANTHA, M.Sc., Ph.D.
Principal
SACRED HEART NURSING COLLEGE
Madurai - 625 020.

APPENDIX -II (B)

PERMISSION LETTER TO CONDUCT RESEARCH

Dr.NALINI JEYAVANTH SANTHA M.Sc(N), Ph.D,
PRICIPAL,
SACRED HEART NURSING COLLEGE.

4/235, COLLEGE ROAD,
THASILDAR NAGAR,
MADURAI – 625020.
PHONE: 2534593

Ref.UT: SHNC: 2017

To,

Mr. A.M.Rajasekaran,

President,

Christian seva sangh old age home ,

Madurai.

Respected Sir/ Madam,

Sub: Sacred Heart Nursing College, Madurai – project work of M.SC (Nursing) student –permission requested- Reg.

We wish to state that **Mr.SAM ASIR SUGANTHARAJ.R**, Final year M.SC (Nursing) student of our college has to conduct a research project, which is to be submitted to the Tamil Nadu Dr.M.G.R. Medical University, Chennai in partial fulfillment of university requirements.

The topic of research project is "A study to assess the effectiveness of progressive muscle relaxation technique on sleep quality and day time sleepiness among elderly in selected old age home, Madurai".

We therefore request you to kindly permit him to do the research work in your organization under your valuable guidance and suggestion.

Thanking you,

Yours faithfully,

Principal

SACRED HEART NURSING COLLEGE

C. NALINI JEYAVANTH SANTHA, M.Sc., Ph.D.
Principal
SACRED HEART NURSING COLLEGE
Madurai - 625 020.

APPENDIX-III

LETTER REQUESTING OPINION AND SUGGESTION OF EXPERTS FOR ESTABLISHING CONTENT VALIDITY AND VALITY OF TOOL

From:

Mr.Sam Asir Sugantharaj,
M.SC(N) II year,
Sacred Heart Nursing College,
Madurai- 20

To,

Respected Sir/ Madam:

Sub: Requesting opinions and suggestion of experts for the content validity and validity of tool.

I am a post graduate student (Medical Surgical Nursing Specialty) of the Sacred Heart Nursing College. I have selected the below mentioned topic of the research project submitted to The TN. DR.M.G.R. Medical University, Chennai as a fulfillment of Master of Science in nursing.

Title of the study:

"A study to assess the effectiveness of progressive muscle relaxation technique on sleep quality and day time sleepiness among the elderly people in selected old age home, Madurai".

With regard to this may I kindly request you to validate my content and tool for its relevancy. I am enclosing the objectives of the study. I would be highly obliged and remain thankful if you could validate and send it as early as possible.

Thanking you

Place: Madurai
Date: 15/12/2016

yours faithfully,
R.Sam Asir Sugantharaj.

APPENDIX IV

LIST OF EXPERTS CONSULTED FOR THE CONTENT VALIDITY OF RESEARCH TOOL

1. Dr. Raja , M.D, (Geriatrics),
   Consultant Geriatrician.
   Mahathma Gandhi Nagar,
   Madurai.

2. Dr. Nalini Jeyavanth Santha, M.Sc., (N) Ph .D(N),
   Principal,
   Sacred Heart Nursing College.
   Madurai.

3. Dr. Devakirubai, M.Sc., (N) Ph .D(N),
   HOD in Medical Surgical Nursing,
   Sacred Heart Nursing College.
   Madurai.

4. Dr. Jeya Thanga Selvi. M.Sc., (N) Ph .D(N),
   HOD in Medical Surgical Nursing,
   C.S.I Jeyaraj Annapackiyam College Of Nursing,
   Madurai.

5. Mrs. Jothilakshmi, M.Sc., (N) Ph.D,
   Professor,
   Sacred Heart Nursing College.
   Madurai.

6. Mrs. Shakthi Bharathi, M.Sc.,
   Sacred Heart Nursing College.
   Madurai.

7. Dr.Mrs.Anandhavalli, M.Sc., M.A., M.Phil., Ph.D.,
   Director and Secretary,
   The Valliammal Institution.

APPENDIX V
WRITTEN CONSENT FORM

All the details of this study was being explained to me. I am aware that the information collected from me will be used for the purpose of the study. I am also assured that there is no complication in doing progressive muscle relaxation technique to promote sleep quality and reduce daytime sleepiness among elderly people and that all the information collected will be highly confidential. Thereby I am willing to participate in this study on my own interest and wish.

Participant's Signature

Researcher's Signature

Place:

Date:

APPENDIX VI

ஒப்புதல் படிவம்

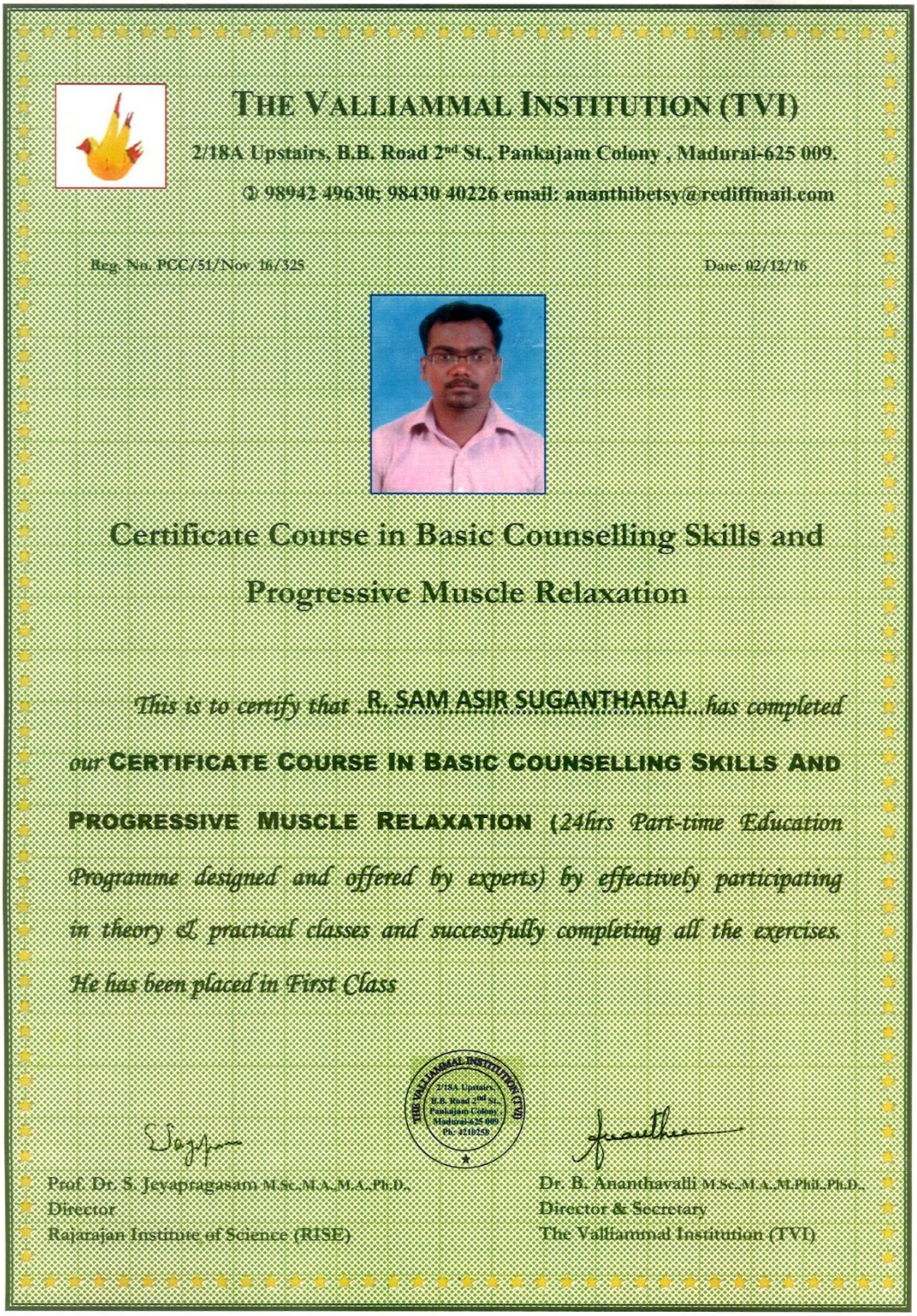
இந்த ஆராய்ச்சிப் பயிற்சி எனக்கு முழு விவரம் அளிக்கப்பட்டுள்ளது. என்னை பற்றிய புள்ளி விவரங்கள் அனைத்தும் ஆராய்ச்சியின் பயன்பாட்டிற்காக சேகரிக்கப்படும் என்பதை நான் நன்றாக அறிந்துள்ளேன். இந்த ஆராய்ச்சியில் பங்கு பெறுவதால் எந்த வித தீங்குகள் ஏற்படாது என்பதும், மேலும் இதன் விபரங்கள் பிறர் அறியா வண்ணம் வைக்கப்படும் என்பதையும் அறிந்துள்ளேன். மேலும் இந்த ஆராய்ச்சியில் பங்கேற்க முழு ஒப்பதல் அளிக்கிறேன்.

இடம் **பங்கேற்பவரின் கையொப்பம்**

நாள் **ஆராய்ச்சியாளரின் கையொப்பம்**

APPENDIX VII

COPY OF CERTIFICATE FOR PROGRESSIVE MUSCLE RELAXATION TECHNIQUE



THE VALLIAMMAL INSTITUTION (TVI)

2/18A Upstairs, B.B. Road 2nd St., Pankajam Colony , Madurai-625 009.

✆ 98942 49630; 98430 40226 email: ananthibetsy@rediffmail.com

Reg. No. PCC/51/Nov. 16/325 Date: 02/12/16

Certificate Course in Basic Counselling Skills and Progressive Muscle Relaxation

This is to certify that R. SAM ASIR SUGANTHARAJ *has completed our* **CERTIFICATE COURSE IN BASIC COUNSELLING SKILLS AND PROGRESSIVE MUSCLE RELAXATION** *(24hrs Part-time Education Programme designed and offered by experts) by effectively participating in theory & practical classes and successfully completing all the exercises. He has been placed in First Class*

Prof. Dr. S. Jeyapragasam M.Sc.,M.A.,M.A.,Ph.D.,
Director
Rajarajan Institute of Science (RISE)

Dr. B. Ananthavalli M.Sc.,M.A.,M.Phil.,Ph.D.,
Director & Secretary
The Valliammal Institution (TVI)

APPENDIX VIII

DEMOGRAPHIC DATA

1. Sample No :

2. Age of Elderly
   - 61 – 70 years :
   - 71 – 80 years :

3. Gender
   - Male :
   - Female :

4. Marital Status
   - Married :
   - Single :

5. Religion :
   - Hindu :
   - Christian :

6. Education
   - Literate :
   - Illiterate :

7. Leisure time activity
   - Reading/watching TV :
   - Garden :

APPENDIX – IX

மக்களவியல் விவரங்கள்

1. **பதக்கூறு எண்**

2. வயது (வருடங்கள்)

   அ. 60 – 70

   ஆ. 71 – 80

3. பாலினம்

   அ. ஆண்

   ஆ. பெண்

4. திருமண நிலை

   அ. திருமணமானவர்

   ஆ. தனியாக வாழ்பவர்

5. சமயம்

   அ. இந்து

   ஆ. கிறிஸ்தவர்

6. படிப்பு

   அ. படிக்காதவர்

   ஆ. ஆரம்பப்பள்ளி

   இ. நடுநிலைப்பள்ளி

   ஈ. உயர்கல்வி

7. பொழுதுபோக்கு

   அ. டி.வி பார்த்தல் / செய்தித்தாள் வாசித்தல்

   ஆ. தோட்டவேலை

APPENDIX – X

MODIFIED INSOMNIA SCREENING QUESTIONNAIRE

Over the past month:		Circle the best answer				
		Never	**Rarely**	**Occasionally**	**Most nights/days**	**Always**
1	Do you have trouble falling asleep?	1	2	3	4	5
2	Do you have trouble staying asleep?	1	2	3	4	5
3	Do you wake up un-refreshed?	1	2	3	4	5
4	Do you take anything to help you sleep?	1	2	3	4	5
5	Do you use alcohol to help you sleep?	1	2	3	4	5
6	Do you have any medical condition that disrupts your sleep?	1	2	3	4	5

APPENDIX – XI

பின்னிணைப்பு

தூக்கமின்மையை பரிசோதிக்கும் வினாக்கள்

வ.எண்.	கடந்த மாதத்தில்	கீழ்கண்டவற்றுள் சரியான விடையை வட்டமிடுக				
		இல்லை (ஒரு போதும் இல்லை)	அரிதாக	எப்போதாவது	மிகவும் இரவு	எப்பொழுதும்
1.	நீங்கள் தூங்குவதற்கு சிரமப்படுகிறீர்களா?	1	2	3	4	5
2.	நீங்கள் உறங்குகின்றபோது இடையூறுகள் உள்ளனவா?	1	2	3	4	5
3.	நீங்கள் உறங்கி எழுந்தபின் புத்துணர்ச்சியின்றி காணப்படுகிறீர்களா?	1	2	3	4	5
4.	நீங்கள் உறங்குவதற்காக ஏதாவது (மருந்து மாத்திரைகள்) காரணிகளை உபயோகப்படுத்துகிறீர்களா?	1	2	3	4	5
5.	உங்கள் உறக்கதிற்கு ஏதுவாக மதுவை உட்கொள்கிறீர்களா?	1	2	3	4	5
6.	உங்கள் உறக்கத்தை இடையூறு செய்யும் ஏதேனும் உடல் உபாதைகள் உள்ளனவா?	1	2	3	4	5

APPENDIX – XII

MODIFIED EPWORTH DAYTIME SLEEPINESS SCALE (EDSS)

Sl. No. **Date:**

Date of birth: **Age:**

SITUATION	CHANCE OF DOZING			
Sitting and reading	0	1	2	3
Watching TV	0	1	2	3
Sitting, inactive in a public place	0	1	2	3
Lying down to rest in the afternoon when circumstances permit	0	1	2	3
Sitting and talking to someone	0	1	2	3
Sitting quietly after a lunch without alcohol	0	1	2	3

APPENDIX – XIII

பின்னிணைப்பு

எப்வொர்த் பகல்நேரத்தில் தூங்குவதற்குரிய அளவுகோல்

வ. எண் நாள் :

பிறந்த தேதி : வயது :

நிலைமை	தூங்குவதற்கான வாய்ப்புகள்			
அமர்ந்திருந்து வாசித்தல்	0	1	2	3
டி.வி. பார்த்துக் கொண்டிருத்தல்	0	1	2	3
பொதுவான இடத்தில் அமர்ந்திருந்து வேலை செய்யாதிருத்தல்.	0	1	2	3
சூழ்நிலைக்கு ஏற்றவாறு மதிய வேளைகளில் படுத்து இளைப்பாறுதல்	0	1	2	3
அமர்ந்திருந்து யாருடனாவது பேசிக் கொண்டிருத்தல்	0	1	2	3
மதிய உணவுக்குப்பின் ஆல்ஹகால் இல்லாமல் அமைதியாக அமர்ந்திருத்தல்	0	1	2	3

APPENDIX – XIV

PITTSBURGH SLEEP QUALITY INDEX (PSQI)

Instructions:

The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, what time have you usually gone to bed at night? _____

2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night? _____

3. During the past month, what time have you usually gotten up in the morning? _____

4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.) _____

5. During the past month, how often have you had trouble sleeping because you…	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
a.Cannot get to sleep within 30 minutes				
b. Wake up in the middle of the night or early morning				
c.Have to get up to use the bathroom				
d. Cannot breathe comfortably				
e. Cough or snore loudly				
f. Feel too cold				

g. Feel too hot				
h. Have bad dreams				
i.Have pain				
6. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?				
7. During the past month, how often have you had trouble staying awake while driving, eating meals,or engaging in social activity?				
	No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem
8. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?				
	Very good	Fairly good	Fairly bad	Very bad
9. During the past month, how would you rate your sleep quality overall?				

APPENDIX – XV

பிட்ஸ்பெர்க் தூக்கத்தின் தரத்திற்கான அட்டவணை

முன்னுரை

பின்வரும் கேள்விகள் கடந்தமாதத்தில் உங்களுக்கு இருந்த வழக்கமான தூக்க பழக்கவழக்கத்தைச் சார்ந்ததாக உள்ளது. உங்கள் பதில்கள் கடந்த மாதத்தில் இருந்த அதிகபட்சமான நாட்கள் மற்றும் இரவுகளைத் துல்லியமாக குறிப்பிடுவனவாக இருக்க வேண்டும். தயவு செய்து அனைத்து கேள்விகளுக்கும் பதிலளிக்கவும்.

1. கடந்த மாதத்தில் வழக்கமாக இரவில் நீங்கள் எத்தனை மணிக்குப் படுக்கைக்குச் செல்வீர்கள்? _____
2. கடந்த மாதத்தில் ஒவ்வொருநாள் இரவிலும் நீங்கள் தூங்குவதற்கு எவ்வளவு நேரம் (நிமிடத்தில்) ஆனது?_____
3. கடந்த மாதத்தில் வழக்கமாக நீங்கள் எத்தனை மணிக்கு காலை எழுந்தீர்கள்? _____
4. கடந்த மாதத்தில் இரவில் நீங்கள் எத்தனை மணிநேரம் நல்ல தூக்கத்தைப் பெற்றீர்கள்? _____

   (இது நீங்கள் படுக்கையில் செலவழித்த நேரத்தைக் காட்டிலும் வித்தியாசமானது)

5. கடந்த மாதத்தில் எத்தனை முறை அடிக்கடி தூக்கத்தில் தொந்தரவு ஏற்பட்டது ஏனென்றால் நான்	கடந்த மாதத்தில் இல்லை	வாரத்தில் ஒரு நாளுக்கும் குறைவாக	வாரம் ஒரு முறை அல்லது இரண்டு முறை	வாரத்திற்கு மூன்று அல்லது அதற்கு மேற்பட்ட முறை
a) 30 நிமிடத்திற்குள்ளாக தூங்க முடியாத நிலை				
b) நடு இரவில் அல்லது அதிகாலையில் விழித்து எழுவது				
c) கழிப்பிடத்திற்குச் செல்வதற்காக எழுந்திருப்பது				
d) சுலபமாக மூச்சுவிட முடியாத நிலை				

e) இருமல் அல்லது சத்தமான குறட்டை				
f) அதிகமான குளிரை உணர்தல்				
g) அதிகமான வெப்பத்தை உணர்தல்				
h) கெட்ட கனவுகள் வருதல்				
i) வலிகள் இருத்தல்				
6) கடந்த மாதத்தில் நீங்கள் தூக்கத்திற்காக எத்தனை முறை மருந்து எடுத்திருக்கிறீர்கள்? (பரிந்துரைக்கப்பட்டது அல்லது பரிந்துரைக்கப்படாதது)				
7) கடநத மாதத்தில் எத்தனை முறை விழித்திருந்து வாகனம் ஓட்டும் போது சாப்பிடும் போது அல்லது சமூக காரியங்களில் ஈடுபடும் போது தொந்தரவு அனுபவித்தீர்கள்?				
	எந்தத் தொந்தரவும் இல்லை	மிகவும் சிறிதளவே தொந்தரவு	சிறிய தொந்தரவு	பெரிய தொந்தரவு
8. கடந்த மாதத்தில் ஒரு காரியத்தைச் செய்து முடிப்பதற்குப் போதுமான உற்சாகத்தையும் ஆர்வத்தையும் பெற்றுக் கொள்ள எவ்வளவு தொந்தரவு இருந்தது?				
	மிகவும் நல்லது	பரவாயில்லாமல் நல்லது	பரவாயில்லாமல் கெட்டது	கெட்டது
9. கடந்த மாதத்தில் உங்களுடைய தூக்கத்தின் தரத்தை மொத்தமாக எப்படி மதிப்பிடுவீர்கள்?				

APPENDIX-XVI

INVESTIGATOR ADMINISTERING PROGRESSIVE MUSCLE RELAXATION TECHNIQUE