

Effects of Sleep Restriction Therapy versus Progressive Muscles Relaxation Technique on Sleep Quality among Older Adults

Reham Magdy Mohammed Abd Elsalam ⁽¹⁾, Samia El Hussein Abd El Mageed El Kholy ⁽²⁾

(1) Assistant Professor Gerontological Nursing, Faculty of Nursing, Alexandria University

(2) Assistant Professor Gerontological Nursing, Faculty of Nursing, Alexandria University

Abstract

In comparison to younger adults, older adults show age-related sleep changes and greater sleep problems with substantial adverse short- and long-term health consequences. Although behavioral training is recommended for sleep problems, the value of sleep restriction therapy (SRT) in comparison to progressive muscles relaxation technique (PMR) on sleep quality among older adults remains unknown and not well established. **Objective:** Determine the effect of sleep restriction therapy versus progressive muscles relaxation technique on sleep quality among older adults. **Setting:** Four assisted living facilities affiliated to Alexandria Governorate, Egypt were included. **Subjects:** 50 older adults who aged 60 years and more were randomly assigned to two equal study groups; group 1, older adults who received sleep restriction therapy (SRT) and group 2: older adults who received progressive muscles relaxation technique (PMR). **Tools:** Four tools were used for data collection: 1) Mini-Mental State Examination (MMS) Scale. 2) Geriatric Depression Scale- Short Form (GDS-SF). 3) Sleep quality of older adults structured interview questionnaire. 4) Socio-demographic and health profile of older adults structured interview questionnaire. **Results:** sleep quality significantly increased after implementation of proposed interventions with mean percent score of 63.0 ± 5.05 for SRT and with mean percent score of 44.50 ± 5.50 for PMR with statistically highly significant differences, $P < 0.001$. A higher significant reduction in sleep latency among the studied subjects who received SRT than those who received PMR was observed, $P < 0.001$. **Conclusion:** Sleep restriction therapy showed highly statistically significant greater improvement on sleep quality among the studied older adults than progressive muscles relaxation technique. **Recommendations:** implementation of suitable cost effective cognitive behavioral therapies such as SRT and PMR by the gerontological nurses to enhance sleep quality among older adults at the assisted living facilities. Also, gerontological nurses should Develop and conduct educational programs to all care providers and older adults themselves about; age related changes in sleeping patterns, and how to enhance sleep quality in old age.

Keyword: Older adults; Sleep quality; Sleep restriction therapy; progressive muscles relaxation technique.

I. INTRODUCTION

Older adults are more liable to poor sleep quality in contrast to younger people due to ageing changes in their sleep patterns such as; s reduced sleep duration, low efficiency of sleep, decreased slow-wave sleep, and frequent wakefulness after onset of sleep (Mander et al., 2017).

Older adults who live in institutions like assisted living facilities more liable to sleep disturbance than others. They spend a high fraction of their daily life being inactive or alone and spend many hours in bed. They rarely participate in activities and frequently take naps during the day which disturbs their sleeping patterns (Pollak & Perlick, 2016).

Institutional environment influences older adults' sleep quality. For example; light

exposure, noise, extreme temperature, uncomfortable mattress, work schedules, and watching television in bed could affect sleep quality. This situation frequently occurs among older adults who live in assisted living facilities (Cohen et al., 2018).

Sleep disturbance is common in old age due to sleep phases' changes among older adults. Usual sleep is arranged into diverse stages that cycle during the night. Stages 1 and 2 are considered light sleep, while, stages 3 and stage 4 are named deep sleep. In old age, duration of stage 1 and the number of shifts into this stage increased. Stages 3 and stage 4 are severely decline with age and may disappear completely after 90 years old and more (Roepke & Ancoli-Israel, 2018).

With age advance, there are several other factors which may predispose sleep problems.

Physical illnesses such as; orthopedic disorders: degenerative joint disease, chronic back pain, and muscle pain affect sleep quality. Also, psychological conditions like depression, anxiety, and fear of death could result in sleep difficulty and it could reduce the sleep quality (Bliwise, 2015; Peng et al., 2020).

The older adults, who suffer from sleep disturbance, expend greater time in the bed and may feel frustrated and worried of being incapable to sleep. Scattering sleep at night over too extended period of time will result in light interrupted sleep with more night alertness and day fatigue. Body tension and mental stress brought on by poor sleep quality may be the cause of this fatigue (Yaremchuk, 2018). Inadequate sleep is concomitant with undesirable health consequences such as; memory disorders; reduced concentration, irritability, low quality of life, more liability to psychiatric and medical disorders, and even mortality. So, proper interventions are needed and necessary to manage poor sleep quality among older adults (Lee et al., 2017).

There are many intervention approaches which considered safer and potentially effective over the longer term for sleep disturbance in old age. One of the most effective treatments for sleep disturbance is sleep restriction therapy (SRT). SRT was developed by Spielman et al., (1987). There are several studies over the years that have established the effectiveness of this therapy on older adults (Joshi, 2017; Kyle et al., 2015; Riedel & Lichstein, 2015; Schlitzer et al., 2016).

Sleep Restriction therapy is a behavioral therapy that use for treating poor sleep quality. The SRT is an evidence based approach for sleep disturbance, as a standalone intervention. The foundation for this therapy is that sleep disturbance is aggravated by spending too much bed time. Spending long bed time in relation to little sleep leads to less efficient sleep⁽¹¹⁾. One objective of SRT is to increase efficiency of sleep through decreasing the length of time being in bed in relation to actual sleeping time. For illustration, if elderly usually sleep six hours only, but lies in bed for eight hours, then the clue is that elderly should avoid spending more than six hours in bed. This will confirm that sleep only happen between the

wakeup time and set bedtime. Then, sleep will be of higher quality over a shorter period (Joshi, 2017; Schlitzer et al., 2016).

Progressive muscle relaxation technique (PMR) is another approach to improve sleep quality. The PMR is one of the easiest and simplest to learn techniques for relaxation. It is a widely-used procedure that was originally developed and published by Jacobson (1938). This technique includes contracting all body muscles groups one by one and then relaxing them again. The goal of relaxation technique is to attain mental and physical relaxation. They are intended to decrease physical strain and intersect the processes of thought which affect sleep. Studies display that individuals, who practice relaxation therapy, have longer night sleep. The main relaxation techniques' benefit was the ability to fall asleep somewhat more quickly (Francis & D'silva, 2016; Khakha et al., 2015; Örsal et al., 2015; Yona & Dahlia, 2020).

The gerontological nurses play an important role in decreasing sleep disturbance among older adults. This can be achieved by early identification of signs of sleep disturbance and the application of appropriate and cost effective interventions, in order to prevent the negative consequences of poor sleep quality (Joshi, 2018).

Significance of the study:

Behavioral and Cognitive interventions like SRT and PMR can assist older adults solve their sleep problems head on, involving the emotional, behavioral, and patterns of thoughts that considered as obstacles for falling asleep at night. The American College of Physicians now reported that SRT and PMR as primary treatment lines for older adults with poor sleep quality. Through SRT and PMR, older adults can acquire the confidence and consciousness wanted to improve better behaviors about sleeping and waking (Qaseem et al., 2016).

Interventions like SRT and PMR can decrease helpless thoughts, creating means for high quality of life through relaxation, deep sleep and better health outcomes. For some older adults, medication may be necessary to treat their insomnia if other psychiatric disorders are also involved. But, pharmacological managements are often

temporary interventions to uncomfortable nights. SRT and PMR can act hand-in-hand with pharmacological managements to provide longer-range solutions for adapting practices and avoiding deterioration after stoppage of the medication (Mander et al., 2017)

Although SRT and PMR are currently recommended as treatments of poor sleep quality and frequently included in cognitive behavioral therapies, the value of SRT in comparison to PMR on sleep quality among older adults remains unknown and not well established (Friedman et al., 2019). The present study aimed to determine the effect of sleep restriction therapy versus progressive muscles relaxation technique on sleep quality among older adults.

Aim of the study:

The present study aimed to determine the effect of sleep restriction therapy versus progressive muscles relaxation technique on sleep quality among older adults.

Research objectives:

- 1- Explore the relation between sleep quality and sociodemographic characteristics of studied subjects.
- 2- Evaluate the effect of SRT on sleep quality among one group of the studied subjects
- 3- Evaluate the effect of PMR on sleep quality among another group of the studied subjects
- 4- Compare the effect of SRT versus PMR on Sleep quality among the studied subjects

Research hypotheses:

- 1- Older adults who receive sleep restriction therapy exhibit higher sleep quality than before it.
- 2- Older adults who receive progressive relaxation technique exhibit higher sleep quality than before it.
- 3- After application of the proposed interventions, older adults who receive sleep restriction therapy exhibit higher improvement in sleep quality than those who receive progressive relaxation technique.

II. MATERIALS AND METHOD

Materials

Design: The study followed a quasi-experimental research design.

Setting: The present study was conducted at four assisted living facilities namely Dar

Elhanaa for females elders, Dar Elhedaya for females, Dar Elhedaya for males and Dar Elwedad for females and males elders which affiliated to Alexandria Governorate, Egypt. The conditions for admitting these elderly homes were as follows; reaching the age of 60 years or more; free from any infectious diseases; had a sponsor; and followed the working system of the institution.

Subjects: A purposive sample of fifty (50) older adults was used according Epi info V 7.0 program calculation based on the following statistical parameters ; Population size: 150, expected frequency: 50%, confidence coefficient: 95%, acceptable error: 10%, minimum sample size = 50.

The study included fifty (50) older adults aged 60 years and more and fulfilling the following criteria:

Inclusion criteria

- 1- Able to read and write.
- 2- Had normal cognitive function: score of 24 and more based on the Mini Mental State Examination Scale (MMSE).
- 3- Had no depression: score of 0 to 4 using the Geriatric Depression Scale Short Form (GDS_SF).
- 4- Had poor sleep quality: score 10 to 29 on the sleep quality of older adults` structured interview schedules.
- 5- Accepted participation in the study.
- 6- Available at the selected setting during the data collection time.

Exclusion criteria

- 1- Suffered from health problems which are aggravated by deep sleep or sleepiness, as those who are diagnosed with parasomnias, epilepsy, sleep apnea, and bipolar disorder. They should not engage in sleep restriction therapy.
- 2- Suffered from conditions that are exacerbated by tense/release activities, such as heart diseases. They should not practice Progressive Muscle Relaxation technique.

The selected study subjects (50) were randomly assigned to two equal groups of 25 older adults each as flows;

Group 1: included older adults who received SRT.

Group 2: included older adults who received the PMR.

The researchers applied the proposed interventions as follow; SRT on Dar Elwedad

for females and males elders. While, PMR done on Dar Elhanaa for females, Dar Elhedaya for females and Dar Elhedaya for males elders to prevent contamination between the both study groups.

Tools:

In order to collect the necessary data, four tools were used.

I) Mini-Mental State Examination (MMS)

Scale

The MMS scale was developed by Folstein et al., (1975). It used to assess cognitive function of the older adults. It contained questions concerning registration, orientation, calculation, recall, attention, and language. The MMS scale score was 30 point and classified as follows:

- Normal cognitive function: Score of 24-30.
- Mild cognitive impairment: Score of 18-23.
- Severe cognitive impairment: Score of 0-17.

The MMS was translated into Arabic and approved to be valid and reliable ($r=0.96$) by ElHusseini (2008). The Arabic version of this scale was used in the present study.

II) Geriatric Depression Scale- Short Form (GDS-SF)

The Geriatric Depression Scale – short Form (GDS-SF), a self-report tool with 15-item developed by Yesavage et al. (1983) to assess general well-being and depression in the elderly. The older adults selected one answer either yes (1) or no (0) for their feelings over the past week. The scores ranged from 0 to 15. Items' score calculated for the total score. A score of 0 to 4 meant no depression, score of 5 to 8 meant mild depression, score of 9 to 11 meant moderate depression, and 12-15 meant severe depression.

The GDS-SF was translated into Arabic and approved to be reliable ($r=0.70$) and valid by ElHusseini (2013). The Arabic version of this scale was used in the current study.

III) Sleep quality of older adults' structured interview questionnaire

This tool was developed by the researchers based on literature review (Backhaus et al., 2002; Buysse et al., 1989; Moghaddam et al., 2012) to assess sleep quality among older adults within the past 4 weeks. It consisted of 10 items where each item was ranked on a 1

(all of the time) to 5 (none of the time) numerical rating scale. It included questions such as; how often did you feel during the past 4 weeks that your sleep was not calm, awoken with headache or difficult breathing? Have prolonged period to fall asleep? Awaken during the time of sleep and have problem in falling asleep again? Snore during your sleep? Have Feeling of drowsiness or being sleepy during the day? The total score ranged from 10 (poor sleep quality) to 50 (high sleep quality). The total score was classified into three levels as follows;

- 1- Poor sleep quality: score from 10 to 29
- 2- Moderate sleep quality: score from 30 to 39
- 3- High sleep quality: score from 40 to 50

IV) Socio-demographic and health profile of older adults structured interview questionnaire.

This tool was developed by the researchers and included two parts:

- Part 1: Socio-demographic data of the studied older adults: such as; sex, age, social status, level of education, occupation prior to retirement, duration of stay at the assisted living facility, and monthly income.
- Part 2: health profile: such as; medical health history, practice of physical exercise, and the time needed to fall asleep throughout the past 4 weeks (sleep onset latency).

Method

- 1- Permissions were obtained from the responsible authorities (Faculty of nursing, Ministry of social solidarity and the Head of each selected assisted living facility) to carry- out the study.
- 2- Tool III, sleep quality of older adults structured interview questionnaire, was developed by the researchers after reviewing the related literature to assess the sleep quality among older adults. This tool was tested for its content validity by 7 experts in the related fields. Also, it was tested for its reliability by the researchers using Cronbach coefficient alpha test ($r=0.88$).
- 3- The Arabic version of tool I and tool II, and tool III, Mini-Mental State Examination (MMS) Scale, Geriatric Depression Scale-Short Form (GDS-SF), and sleep quality of older adults structured interview questionnaire, were used to select the study

subjects according to the study inclusion criteria.

- 4- Tool IV, Socio-demographic and health profile of older adults structured interview questionnaire was developed by the researchers to assess the Socio-demographic and health profile of the study subjects.
- 5- A pilot study was carried out on 10% of the study sample (5) older adults who selected from the study setting to assess the clarity and feasibility of the study tools. They were not included in the study sample.
- 6- Each study subject who fulfilled the study inclusion criteria was interviewed individually at his/her room to collect the necessary data using tool IV before the implementation of the proposed interventions.

The selected study subjects (50) were randomly assigned to two equal groups of 25 older adults each as follows; **Group 1:** older adults who received SRT which applied in Dar Elwedad for females and males elders and **Group 2:** older adults who received PMR which applied in Dar Elhanaa for female, Dar Elhedaya for females and Dar Elhedaya for males elders.

- 7- **A** - The study subjects of group 1 received the SRT through 3 phases that conducted within 7 weeks on individual bases. Before starting the SRT, The researchers provided simple introduction about basic facts about sleep changes in sleep patterns in old age, the aim and steps of SRT. This Therapy was conducted as follows;

Phase 1- Two -weeks of sleep diary and planning of sleep schedule:

1. ***Determine the older adult's allowed Time in Bed:***

The older adults asked to fill in a sleep diary for two weeks. It provided by the researchers to the older adults to record the total sleep amount they got each night regardless the time they spent at the bed. After these two weeks, the researchers added of these recorded data up and divided by 14 to get older adult's **Average Total Sleep Time (ATST)** and added 30 minutes to this value which equal the older adult's **Allowed Time in Bed**.

2. ***Set a wake time:***

The researches planed with each study subject to stay in bed for only their calculated

Allowed Time in Bed. They instructed to wake up every morning at the same time regardless sleep amount they got during the night.

3. ***Set a bed time:***

The researchers planned with the study subjects to select the times which they would go to bed and not to get into bed before the planned bed time even if they were sleepy and thought they could fall asleep. So, the researchers planed with each older adult some simple interesting activities to keep them away of bed before their bed time. Study subjects were helped to follow their time schedule by providing alarms to them.

Phase 2- Two -weeks sleep schedule implementation:

4. ***Stick to the planned schedule of sleep for at least two weeks:***

The study subjects were instructed to stick to the planned sleep schedule for at least two weeks. The researchers informed the older adults that on the first nights they would still have some awakening. So, their actual sleep time would be less than usual. They should not be worried for that sleep loss; this would assist them to be sleeper later on and help them through filling their bed time with sleep. Also, they told to continue estimating their average actual sleep time and average time being in bed at each week end.

Phase 3- 3 weeks sleep schedule follow up,

5. At the end of the second two weeks, older adults asked to calculate their Average Total Sleep Time again. If the time they slept that period was not near to the time they spent in the bed (difference was more than 45 minutes), then they asked to maintain their fixed sleep schedule for another week. Then after this week, if the difference still more than 45 minutes, they advised to reduce their bed time by 30 minutes until the difference decreased less than 45 minutes.
6. If the sleep time of older adults at these weeks was close to the time spent the in bed (difference was less than 45 minutes), after that they encouraged to extend their time on bed again by 15 to 30 minutes for the following week.
7. The researchers advised study subjects to maintain this gradual increasing of bed time on a weekly base until they felt that they

were having enough sleep and to feel alert and refreshed throughout the day.

8. The researchers advised older adults to use dim lights during evening and bright light in the morning using sunlight or artificial light lamp for 30 minutes upon awakening is enough for sleep/wake cycle regulation.
 9. The researchers advised older adults to avoid napping by practicing interesting activities.
 10. The researchers encouraged older adults to practice healthy habits such as not to watch T.V in bed, avoiding use of bright light, the use of dim light and avoid drinking caffeine before bedtime.
- 7- B- The studied subjects of group 2 received the PMR as follows;**
1. This technique was implemented individually in 10 sessions; (2 days per week for 5 weeks). Each session took about 30 minutes.
 2. Before each session, the researchers used to prepare the environment by minimizing distractions and decreasing light. Also, the study subjects encouraged to wear loose clothes, take off their shoes, and sit on a comfortable chair.
 3. The researchers advised the studied subjects to avoid having big meals before the proposed exercises and to move in a sequence. For example, they can start at their head if they want to, and move down their body.
 4. For each exercise, the studied subjects instructed by the researchers to
 - Take deep breathe, and contract the first group of muscle (hardly but not to the point of cramping or pain) from 5 to 10 seconds.
 - Exhale breathe, and rapidly relax the muscle completely (avoid relaxing it slowly).
 - 10 to 20 seconds of relaxation needed before starting exercise the following group of muscle.
 5. Each session, the researchers used to show the studied subjects a video of PMR technique; this helped them to remind them of the technique.
 6. The researchers practiced the exercises with the studied subjects in order to encourage and motivate them.
 7. The researchers observed the studied subjects while performing the exercise to ensure that the exercises were done

correctly. The researchers asked the studied subjects to repeat it twice per day on a daily base during the day and before bedtime.

8. The sessions were done according to the following sequence;
 - **The First session:** The session included a brief introduction about basic facts about sleep, changes in sleep patterns in old age, and the steps and benefits of progressive muscle relaxation technique. This was followed by teaching demonstration of deep breathing exercise for the studied subjects.
 - **The second session** included exercises to face muscles (forehead – eyes – mouth)
 - **The third session** included exercises to arm and shoulder muscles (shoulders – upper arms – and forearm)
 - **The fourth session** included the exercises of (the neck – chest- abdomen)
 - **The fifth session** included exercises to leg muscles (the hip – leg – foot)
 - **The sixth to tenth session:** were planned to encourage the older adults to perform all the exercises learned in the previous sessions under the researchers' supervision twice/ week. For the other days, the researchers followed the elders by calling them to remind and confirm them to practice exercise.
9. At the end of each session, when the studied subjects have finished all the muscle groups' exercises, the researchers asked them to practice deep breathing exercise.
10. Study subjects of both groups were evaluated immediately after the implementation of the proposed interventions to assess sleep quality using tool III (sleep quality of older adults structured interview questionnaire) and to assess sleep onset latency by the question that asking about the time needed to fall asleep in tool IV.
11. Evaluating the effectiveness of the proposed interventions and comparison between their effectiveness were determined using the proper statistical analysis.

Ethical considerations:

An informed verbal consent was obtained from each study subject after clarification of the study purpose. Anonymity and the study subjects' privacy were maintained and the collected data confidentiality was assured. The

desire of the study subjects to withdraw from the study at any time was respected.

Statistical analysis:

For analyzing the data, IBM SPSS software package version 20.0 (Armonk, NY: IBM Corp) was used. Number and percent were used to describe qualitative data. To identify the normality of distribution, Kolmogorov-Smirnov test was used. Range (maximum and minimum), median, mean, and standard deviation were used to describe quantitative data. Significance of the obtained results was judged at the 5% level. The used tests were Chi-square test, Fisher's Exact or Monte Carlo correction, Student t-test, Paired t-test, Mann Whitney test, and Wilcoxon signed ranks test.

III. RESULTS

Table (1): shows the distribution of the studied subjects according to their sociodemographic characteristics. The table indicates that more than one half, (52.0%), of the studied subjects aged from 60 to less than 75 years, with mean age of 72.70 ± 4.56 . Females older adults constituted 58.0% of the study subjects, 68.0% were widows and 52.0% completed the basic education. 42% and 30% of the studied subjects were housewives or employees prior to retirement respectively. All the studied subjects did not have current work and reported inadequate monthly income with the same percent, 100%. Concerning the duration of stay at the assisted living facilities, 60.0% of the studied subjects stayed for 5 years and more with mean of 5.62 ± 3.23 . There are no statistical significant differences between the studied groups in relation to their sociodemographic characteristics, $P > 0.05$.

Table (2): shows the relation between sleep quality and sociodemographic characteristics of the studied subjects. The table illustrates that there were no statistical significant differences in sleep quality among the studied subjects in relation to their sociodemographic characteristics before the implementation of the proposed interventions. While after the interventions, males studied subjects showed higher mean score of sleep quality, 57.86 ± 8.63 than females, 50.78 ± 11.20 . The difference was statistically significant, $T=2.420$, $P=0.019$. In the same context, younger age group, from 60 to less than 75 years, showed higher sleep quality, 57.61 ± 10.35 than those who

aged 75 years and more, 50.69 ± 9.90 . The variance was statistically significant, $T=3.9959$, $P=0.062$.

Table (3): shows the distribution of the studied subjects according to their health profile. The table illustrates that hypertension prevailed among the studied subjects 90.0%, followed by diabetes mellitus 40.0%, osteoarthritis 18.0%, gastrointestinal diseases 16.0%, neurological diseases as lumber disc prolapse 12.0%, and then respiratory diseases as bronchial asthma 8.0%. There was no statistically significant difference between the both studied subjects concerning the diseases they suffered from, $P > 0.05$. All the studied subjects reported that they did not practice any type of exercises.

Table (4): shows the effect of SRT (group 1) versus PMR (group2) on the sleep onset latency among the studied subjects. Concerning group 1, sleep latency reduced from more than 60 minutes among the majority of the studied subjects, (96%), before SRT to be from 16 to 30 minutes or from 31 to 45 minutes among 68.0% and 28.0%, of them respectively after it with a statistically significant difference, $P < 0.001$. At the same time, the studied subjects of group 2 showed reduction in their sleep latency from more than 60 minutes among all the study subjects before the PMR to be from 46 to 60 minutes among the same percentage 100% after PMR with a statistically significant difference, $P < 0.001$. Although there was no significant difference between group 1 and group 2 before the proposed interventions concerning sleep onset latency among the studied subjects, $P = 1.00$, a significant difference between them is observed after the implementation, $P < 0.001$. The mentioned results implies that although both proposed interventions significantly reduced sleep latency among the studied subjects, there was a higher significant reduction in sleep latency among studied subjects who received SRT than those who received PMR. The difference was statistically significant $P < 0.001$.

Table (5): shows the effect of SRT (group1) versus PMR (group2) on sleep quality among the studied subjects. The table shows that although all the study subjects of group 1 reported poor sleep qualities with mean percent of (23.0 ± 5.54) before SRT, 92.0% of them reported moderate sleep qualities with a mean percent of ($63.0 \pm$

5.05) after it. The difference was statistically significant, $P < 0.001$.

Concerning studied group 2, although all the studied subjects reported poor sleep quality with percent score of 22.30 ± 7.757 before the PMR, 24.0% of them reported moderate sleep quality with percent score of 44.50 ± 5.50 . The difference was statistically significant, $P < 0.001$.

This result indicates that both proposed interventions significantly enhance sleep quality among the studied subjects. However, studied subjects at group 1 who received SRT showed higher significant improvement in their sleep quality than those at group 2 who received PMR. The difference was statistically significant, $P < 0.001$.

Table (1): Frequency and percentages of the studied subjects according to their sociodemographic characteristics

Socio demographic characteristics	Total (n = 50)		Group 1, SRT (n = 25)		Group 2, PMR (n = 25)		Test of sig.	P
	No.	%	No.	%	No.	%		
Sex								
Male	21	42.0	12	48.0	9	36.0	$\chi^2=0.739$	0.390
Female	29	58.0	13	52.0	16	64.0		
Age (years)							$\chi^2=6.827$	^{MC} p=0.122
60 < 75	26	52.0	9	36.0	17	68.0		
75 ≤ 80	24	48.0	16	64.0	8	32.0		
Min. – Max.	63.0 – 80.0		63.0 – 78.0		65.0 – 80.0		t=1.279	0.207
Mean ± SD.	72.70 ± 4.56		73.52 ± 4.55		71.88 ± 4.52			
Median	74.0		75.0		73.6			
Duration of stay at the assisted living facility							$\chi^2=1.333$	0.248
<5 years	20	40.0	12	48.0	8	32.0		
≥5 years	30	60.0	13	52.0	17	68.0		
Min. – Max.	2.0 – 15.0		2.0 – 15.0		2.0 – 9.0		U=303.0	0.851
Mean ± SD.	5.62 ± 3.23		6.12 ± 4.20		5.12 ± 1.79			
Median	5.0		5.0		5.0			
Social status							$\chi^2=2.511$	^{MC} p=0.535
Widow	34	68.0	15	60.0	19	76.0		
Divorced	9	18.0	5	20.0	4	16.0		
Single	5	10.0	3	12.0	2	8.0		
Married	2	4.0	2	8.0	0	0.0		
Educational level							$\chi^2=1.530$	^{MC} p=0.804
Read and write	24	48.0	13	52.0	11	44.0		
Basic education	26	52.0	12	48.0	14	56.0		
Occupation prior to retirement							$\chi^2=0.576$	^{MC} p=1.00
Housewife	21	42.0	11	44.0	10	40.0		
Employee	15	30.0	8	32.0	7	28.0		
Skilled workers	9	18.0	4	16.0	5	20.0		
Unskilled workers	5	10.0	2	8.0	3	12.0		
Current work							-	-
No	50	100.0	25	100.0	25	100.0		
Yes	0	0.0	0	0.0	0	0.0		
Monthly income							-	-
Inadequate	50	100.0	25	100.0	25	100.0		
Adequate	0	0.0	0	0.0	0	0.0		

χ^2 : Chi square test, MC: Monte Carlo, t: Student t-test, U: Mann Whitney test

p: p value for comparing between the studied groups

*: Statistically significant at $p \leq 0.05$ SD: Standard deviation

Table (2): Relation between sleep quality and sociodemographic characteristics of the studied subjects

Sociodemographic characteristics	Sleep quality	
	Pre interventions	Post interventions
	Mean \pm SD.	Mean \pm SD.
Sex		
Male	20.60 \pm 6.02	57.86 \pm 8.63
Female	24.14 \pm 6.66	50.78 \pm 11.20
t(p)	1.933(0.059)	2.420*(0.019*)
Age (years)		
60 < 75	24.33 \pm 6.58	57.61 \pm 10.35
75 \leq 80	20.87 \pm 6.33	50.96 \pm 9.90
t(p)	1.831 (0.172)	3.953*(0.026*)
Duration of stay at the assisted living facility		
<5 years	24.75 \pm 6.78	54.38 \pm 10.13
\geq 5 years	21.25 \pm 6.15	53.33 \pm 11.23
t(p)	1.892 (0.064)	0.334(0.740)
Marital status		
Married	23.75 \pm 1.77	63.75 \pm 1.77
Widow	22.50 \pm 6.96	52.06 \pm 11.67
Single	25.00 \pm 6.85	57.50 \pm 8.10
Divorced	21.67 \pm 5.99	55.83 \pm 7.50
F(p)	0.291 (0.831)	1.197 (0.321)
Education level		
Illiterate	24.62 \pm 6.99	53.08 \pm 10.26
Read and write	22.95 \pm 7.73	56.36 \pm 11.31
t(p)	0.727(0.541)	0.539(0.658)
Occupation prior to retirement		
Housewife	21.67 \pm 6.99	54.67 \pm 11.45
Employee	23.57 \pm 6.92	52.26 \pm 10.24
Skilled workers	20.00 \pm 5.59	55.83 \pm 10.23
Unskilled workers	26.50 \pm 3.79	53.50 \pm 13.65
F(p)	1.335 (0.274)	0.274 (0.844)

t: Student t-test F: F for ANOVA test

*: Statistically significant at $p \leq 0.05$ **Table (3):** Frequency and percentages of the studied subjects according to their health profile

Health profile	Total (n = 50)		Group 1, SRT (n = 25)		Group 2, PMR (n = 25)		χ^2	p
	No.	%	No.	%	No.	%		
Chronic illnesses#								
1. Hypertension	45	90.0	22	88.0	23	92.0	0.222	^{FE} p= 1.000
2. Diabetes mellitus	20	40.0	11	44.0	9	36.0	0.333	^{FE} p= 0.564
3. Osteoarthritis	9	18.0	6	24.0	3	12.0	1.220	^{FE} p= 0.463
4. Gastrointestinal diseases	8	16.0	3	12.0	5	20.0	0.595	^{FE} p= 0.702
5. Neurological diseases	6	12.0	3	12.0	3	12.0	0.000	1.000
6. Respiratory diseases	4	8.0	2	8.0	2	8.0	0.000	^{FE} p= 1.000
7. Renal diseases	3	6.0	3	12.0	0	0.0	3.191	^{FE} p= 0.235
Practice of physical exercises								
No	50	100.0	25	100.0	25	100.0	-	-
Yes	0	0.0	0	0.0	0	0.0	-	-

 χ^2 : Chi square test FE: Fisher Exact test

p: p value for comparing between the studied groups

*: Statistically significant at $p \leq 0.05$

#: more than one answer

Table (4): Comparison between both groups under study according to sleep onset latency

Sleep onset latency	Group 1, SRT (n = 25)				Group 2, PMR (n = 25)				Test of sig. (p ₁)	Test of sig. (p ₂)
	Pre		Post		Pre		Post			
	No.	%	No.	%	No.	%	No.	%		
Time needed to fall asleep										
≤15 minutes	0	0.0	1	4.0	0	0.0	0	0.0	$\chi^2=1.020$ FE $p_1=1.00$	$\chi^2=59.5^{*MC}$ $p_2=<0.001^*$
16 – 30 minutes	0	0.0	17	68.0	0	0.0	0	0.0		
31 – 45 minutes	0	0.0	7	28.0	0	0.0	0	0.0		
46 – 60 minutes	1	4.0	0	0.0	0	0.0	25	100.0		
>60 minutes	24	96.0	0	0.0	25	100.0	0	0.0		
p₀	<0.001[*]				<0.001[*]					

χ^2 : Chi square test, FE: Fisher Exact test, MC: Monte Carlo,

p₀: p value for Wilcoxon signed ranks test for comparing between pre and post in each group

p₁: p value for comparing between the studied groups pre

p₂: p value for comparing between the studied groups post

*: Statistically significant at p ≤ 0.05

Table (5): Comparison between both groups under study according to sleep quality

Sleep quality	Group 1, SRT (n = 25)				Group 2, PMR (n = 25)				Test of sig. (p ₁)	Test of sig. (p ₂)
	Pre		Post		Pre		Post			
	No.	%	No.	%	No.	%	No.	%		
Sleep quality										
Poor sleep quality	25	100.0	1	4.0	25	100.0	19	76.0	-	$\chi^2=29.453^*$ MC $p_2<0.001^*$
Moderate sleep quality	0	0.0	23	92.0	0	0.0	6	24.0		
High Sleep quality	0	0.0	1	4.0	0	0.0	0	0.0		
Total score									t=0.373 p_1 =0.711	t=12.391 [*] $p_2<0.001^*$
Min. – Max.	14.0 – 23.0		29.0 – 40.0		14.0 – 25.0		23.0 – 31.0			
Mean ± SD.	19.20 ± 2.22		35.20 ± 2.02		18.92 ± 3.03		27.80 ± 2.20			
Median	20.0		35.0		18.0		29.0			
Average score										
Min. – Max.	1.40 – 2.30		2.90 – 4.0		1.40 – 2.50		2.30 – 3.10			
Mean ± SD.	1.92 ± 0.22		3.52 ± 0.20		1.89 ± 0.30		2.78 ± 0.22			
Median	2.0		3.50		1.80		2.90			
Percent score										
Min. – Max.	10.0 – 32.50		47.50 – 75.0		10.0 – 37.50		32.50 – 52.50			
Mean ± SD.	23.0 ± 5.54		63.0 ± 5.05		22.30 ± 7.57		44.50 ± 5.50			
Median	25.0		62.50		20.0		47.50			
p₀	<0.001[*]				<0.001[*]					

t: Student t test, χ^2 : Chi square test, MC: Monte Carlo

p₀: p value for Paired t-test for comparing between pre and post in each group

p₁: p value for comparing between the studied groups pre

p₂: p value for comparing between the studied groups post

*: Statistically significant at p ≤ 0.05

IV. DISCUSSION:

Old age is accompanied by disturbed sleep quality. Considering the normal aging changes, and adverse side effects of the drugs to treat old age chronic illnesses, safe and cost effective modalities are necessary to manage sleep disturbance in old age (Mander et al., 2017). The present study aimed to determine the effect of SRT versus PMR on sleep quality among older adults.

The present study revealed that the majority of the studied subjects suffered from long sleep latency (table 4) before the implementation of the proposed interventions. This result can be justified by the personal characteristics of the study subjects. For illustrations, nearly one half of them aged 60 to less than 75 years (table 1). With advancing age, it may be more difficult to fall asleep than before. Older adults may spend long time in bed due to disturbed sleep cycle especially stage III and IIV. In other words, sleep is lighter and more fragmented with brief arousals throughout the night. There are many researches postulated that elders showed sleep changes as reduced slow-wave sleep with early awakening and fragmented sleep Bixler (2019), Kamel & Gammack (2016), and Suzuki et al.(2017).

Being institutionalized at assisted living facility for longer periods of time may have its negative consequences on the studied subjects' sleep. For instance, nearly two third of the studied subjects stayed at the assisted living facilities for five years and more (table 1) which means living in environment with limited stimuli throughout the day and poor information to show the time or difference between night and day making older adults to have irregular sleep / wake cycle patterns with poor sleep quality and long sleep latency. This result is congruent with study done by Raquel and Teodoro (2019) who reported that institutionalization contributed to increase the risk of sleep disorders in older age group.

When return back to the studied subjects characteristics (table 3) it can be noticed that all the studied subjects reported that they did not practice any types of exercises and did not have any current work (table 1). This may indicate low level of physical activity and low energy expenditure which reduce their need for sleep at

night and spending most of their time lying down on their beds. There are studies done by Cunningham et al. (2020), King et al.(2008), and Reid et al. (2010) which revealed that physical activities were significant for better psychological and physical well-being and improving sleep quality mainly among elders with sleep problems.

In the same context, sleep latency among the studied subjects may be affected due to presence of certain chronic illnesses such as osteoarthritis. Osteoarthritis was one of the main chronic illnesses among the studied subjects (table 3). Osteoarthritic pain and stiffness may limit the study subjects' feeling of rest and comfort during their sleep and they may need long time to fall asleep. The study done by Boyoung et al.(2020) reported the significant relation between osteoarthritis and sleep duration in old aged. It indicated a strong relation between inadequate sleep duration and knee joint pain. There are other studies which found that there was association between sleep disturbance and cardiovascular diseases and respiratory diseases Calverely et al., (2018), and Spiegelhalder et al., (2016).

The present study result indicated that sleep quality among the studied subjects was significantly associated with their age (table 2). For instance, studied elders at younger age group showed higher sleep quality than others. This result can be justified by the fact that, as persons become older, they may experience sleep changes due to the influence of their central nervous system (CNS) aging process. With advanced age, there are higher changes in CNS's functions with greater circadian rhythms disturbances which directly influence sleep quality. The study conducted by Madrid-Valero et al.(2017) found that aging contributes progressively to lower sleep quality. They added that, advanced age decreases depth of sleep especially stage III and IV.

Concerning sex, males studied subjects showed higher sleep quality (table 2). This may be due to the fact that, presence at the assisted living facilities presents a great source of stress for both males and females elders. However, it is not a surprise that men and woman react to stress in variant ways both physically and emotionally. Females are negatively affected by

interpersonal events than males which influence their sleep quality. The study carried out by Madrid-Valero et al., (2017) found that women were more likely to suffer from poor sleep quality than men. The difference could be associated with psychological changes that may increase the incidence of sleep related problems.

The present study finding revealed that the implementation of sleep restriction therapy succeeded in significantly reducing sleep latency (table 4) and improving their sleep quality after receiving SRT (table 5). This result can be justified by what the theoretical models suggested that reduction of arousal and potentiation of sleep pressure is the key mechanism of SRT action Leonie et al., (2020). In other word, feeling of sleepiness among the studied subjects during the first weeks of implementing the SRT helps in shortening the time needed to fall asleep. Furthermore, during the implementation of SRT, the studied subjects advised by the researchers to fix their schedule of sleep and try to increase their bed time sleep gradually based on regular sleep diary until reach to the state they feel satisfied with their sleep. Indeed, SRT helps the studied subjects in organizing their sleep cycle and make a fixed and stable sleep – wake up cycle for them. The research was done by Shawn et al., (2015) and Miller et al., (2017) proved that having long bed time may cause daytime fatigue and increase fragmentation of sleep, causing further time in bed and further fragmentation of sleep. Also, they added that SRT was more beneficial for elders, who used to spend excessive time in bed as institutionalized elders who had more sleep fragmentation in comparison to young people.

With reference to PMR technique, the present study result indicated that this type of behavioral therapy significantly shortened sleep onset latency (table 4) and significantly improved sleep quality among the studied subjects (table 5). This may be explained by the fact that cognitive behavioral therapy like PMR induces physical relaxation of the body and relax mind by focusing on the muscle tense and relax. When body relaxed, sleep means comfort and rest. As a result, sleep may be facilitated and the time needed to fall asleep is reduced. This is congruent with studies conducted by Bogdan et al.(2019), Field et al.(2015), Morton et al.(2016), Peciuliene et al.(2018), and Zhao et

al.(2016), which showed that PMR proved to be significantly effective in decreasing sleep disturbance and lowering levels of stress, and anxiety. Form the same perspective, the study carried out by Khakha et al., (2018) who revealed that PMR was effective intervention and significantly improved sleep quality among institutionalized older adults.

According to the present study result, the proposed research hypothesis approved to be correct. The SRT achieved greater significant improvement in sleep quality more than PMR technique. This may be due to the role of SRT on regulating sleep- wake cycle, and limiting the time being on the bed. The study performed by Yesavage et al., (2019) which compared SRT and PMR as treatments for poor sleep quality on subjects of community-residing elderly reported that waking after onset of sleep and sleep latency were significantly decreased among both interventions groups. For both groups, increased sleep quality, and total sleep time, were reported. During follow-up, the improvement for SRT subjects was approximately twice that found in PMR.

V. CONCLUSION

Based on the results of the present study, it can be concluded that, application of sleep restriction therapy and progressive muscles relaxation technique significantly improved sleep quality among the studied older adults and shortened sleep onset latency among them. However, Older adults who received sleep restriction therapy showed significant higher improvement in sleep quality and greater reduction in the time needed to fall asleep than those who received progressive muscles relaxation technique.

VI. RECOMMENDATIONS

Based on the results of the present study, the following recommendations are suggested:

- 1- Evaluation of older adults with disturbed sleep quality should be conducted by the gerontological nurses through comprehensive sleep history and sleep diary when indicated.
- 2- Implementation of suitable cost effective and based evidence cognitive behavioral therapies such as SRT and PMR by the gerontological

nurses to enhance sleep quality among older adults at the assisted living facilities.

- 3- Developing and conducting an educational program by the gerontological nurses to all care providers and older adults themselves that highlight the age related changes in sleeping patterns, how to enhance sleep quality in old age, and the importance of keeping older adults physically active for better sleeping pattern.
- 4- Maintain suitable sleep environment, and help older adults to practice their usual sleeping habits and regular sleep schedule.

The further researches in this field could be:

- 1- The effect of behavioral therapy on sleep quality among community dwelling older adults.
- 2- The relationship between sleep quality and cognitive function among older adults.

REFERENCES

- Backhaus, J., Junghanns, K., Broocks, A., Riemann, D., & Hohagen, F. (2002). Test-retest reliability and validity of the Pittsburgh Sleep Quality Index in primary insomnia. *Journal of psychosomatic research*, 53(3), 737-740.
- Bixler, E. (2019). Sleep and society: an epidemiological perspective. *Sleep Medical Journal*, 10, 3-6.
- Bliwise, N.G. (2015). Factors related to sleep quality in healthy elderly women. *Psychology and aging*, 7(1), 83- 88.
- Bogdan, V., Balázsi, R., & Lupu, V. (2019). Treating primary insomnia: A comparative study of self-help Methods and progressive muscle Relaxation. *Journal of Cognitive and Behavioral Psychotherapies*, 9, 67-82.
- Boyoung, J., Yongkyu, C., Yoon, J., Me-riong, K., Eun, K., & Won-Suk, S. (2020). Association between sleep duration and osteoarthritis and their prevalence in Koreans: A cross-sectional study. *Medicine Journal*, 15(4), 30-42.
- Buysse, D. J., Reynolds III, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry research*, 28(2), 193-213.
- Calverely, P.M., Brezinova, V., Douglas, N.J., Catterall, J.R., & Flenley, D.C. (2018). The effect of oxygen on sleep quality in chronic bronchitis and emphysema. *American Review Respiratory Disease Journal*, 126, 206-10.
- Cohen, D., Eisdorfer, C., Prinz, P., Breen, A., Davis, M., & Gadsby, A. (2018). Sleep disturbances in the institutionalized aged. *Journal of the American Geriatrics Society*, 31(2), 79-82.
- Cunningham, C., O' Sullivan, R., Caserotti, P., & Tully, M .A. (2020). Consequences of physical inactivity in older adults: a systematic review of reviews and meta-analyses. *Journal Medical Society*, 30, 816-27.
- Elhusseini, S. (2008). Factors related to self-care capabilities among institutionalized elders. Unpublished Master Thesis. Faculty of Nursing, Alexandria University.
- Elhusseini, S. (2013). Effect of self-care interventions on the quality of life of older adults with heart failure. Unpublished Doctorate Thesis. Faculty of Nursing, Alexandria University.
- Field, T., Haskell, W. L., Kamel, N.S., & Gammack, J.K. (2015). Progressive muscle relaxation. *Journal of American Medicine*, 16(3), 202- 16.
- Folstein, M.F., Folstein, S.E., & McHugh, P.R. (1975). "Mini-mental state": a practical method for grading the cognitive state of patients for the clinician. *Journal of psychiatric research*, 12(3), 189-98.
- Francis, N., & D'silva, F. (2016). Effectiveness of Progressive Muscle Relaxation Therapy on Quality of Sleep among Patients Admitted in Medical Ward of a Selected Hospital in Mangalore. *International Journal of Nursing Education*, 4(2), 89- 95.
- Friedman, L., Bliwise, D.L., Yesavage, J.A., & Salom, S.R. (2019). A preliminary study comparing sleep restriction and relaxation

- treatments for insomnia in older adults. *Journal of gerontology*,46,1-8.
- Jacobson, E. (1938). Progressive relaxation. *The American Journal of Psychology*,10(3),522-37.
- Joshi, S. (2018). Nonpharmacologic therapy for insomnia in the elderly. *Clinics in geriatric medicine*,24(1),107-19.
- Joshi, S.(2017). Nonpharmacologic therapy for insomnia in the elderly. *Clinics in geriatric medicine*,24,107-19.
- Kamel, N.S., & Gammack, J.K. (2016). Insomnia in the elderly: cause, approach, and treatment. *American Journal Medicine*,119,463-9.
- Khakha, D.C., Satapathy, S., & Dey, A.B.(2015). Impact of Jacobson progressive muscle relaxation (JPMR) and deep breathing exercises on anxiety, psychological distress and quality of sleep of hospitalized older adults. *Journal of Psychosocial Research*,10(2),211- 20.
- Khakha, S., Kalra, D. C., Satapathy, S. D., & Dey, A. D.(2018). Impact of Jacobson Progressive Muscle Relaxation (JPMR) and Deep Breathing Exercises on Anxiety, Psychological Distress and Quality of Sleep of Hospitalized Older Adults. *Journal of Psychosocial Research*,10(2),211-23.
- King, A. C, Oman, R. F, Brassington, G. S, Bliwise, D. L, & Haskell, W. L.(2008). Effects of moderate-intensity exercise on polysomnographic and subjective sleep quality in older adults with mild to moderate sleep complaints. *Journal of Gerontology*,63, 997-1004.
- Kyle, S.D., Aquino, M.R., Miller, C.B., Henry, A.L., Crawford, M.R., Espie, C.A., & Spielman, A.J.(2015). Towards standardisation and improved understanding of sleep restriction therapy for insomnia disorder: A systematic examination of CBT-I trial content. *Sleep medicine reviews*, 23,83-88.
- Lee, M., Choh, A.C., Demerath, E.W., Knutson, K.L., Duren, D.L., Sherwood, R.J., Sun, S.S., Chumlea, W.C., Towne, B., Siervogel, R.M., & Czerwinski, S.A. (2017). Sleep disturbance in relation to health-related quality of life in adults: the Fels Longitudinal Study. *JNHA-The Journal of Nutrition, Health and Aging*,13(6),576-83.
- Leonie, F. M., Colin, A. E., Ximena, O., Richard, E., & Simon, D. K. (2020). The effect of sleep restriction therapy for insomnia on sleep pressure and arousal: a randomized controlled mechanistic trial. *Sleep research society Journal*,30,125- 36.
- Madrid-Valero, J. J., Martínez-Selva, J. M., Couto, B. R. D., Sánchez-Romera, J. F., & Ordoñana, J. R. (2017). Age and gender effects on the prevalence of poor sleep quality in the adult population. *Gaceta sanitaria*, 31, 18-22.
- Mander, B. A., Winer, J. R., & Walker, M. P. (2017). Sleep and Human Aging. *Neuron Journal*, 94(1), 19-36.
- Mander, B.A., Winer, J.R., & Walker, M.P. (2017). Sleep and human aging. *Journal of Neuron*,94(1),19-36.
- Miller, B., Colin, A. E., Epstein, D. R., Friedman, L., Morin, C., Pigeon, W. R., Spielman, A. J., & Kyle, S. D. (2017). The evidence base of sleep restriction therapy for treating insomnia disorder. *Sleep Medicine Reviews Journal*,18(5),415-24.
- Moghaddam, J. F., Nakhaee, N., Sheibani, V., Garrusi, B., & Amirkafi, A. (2012). Reliability and validity of the Persian version of the Pittsburgh Sleep Quality Index (PSQI-P). *Sleep and Breathing*, 16(1), 79-82.
- Morton, A., & Lieberman, P.D. (2016). Institutionalization of the Aged: Effects on Behavior. *Journal of Gerontology*, 24(3), 123-45.
- Örsal, Ö., Alparlan, G.B., Özkaraman, A., & Sönmez, N.(2015). The effect of relaxation exercises on quality of sleep among the elderly: holistic nursing practice review copy. *Holistic nursing practice* ,28(4),265-74.
- Peciuliene, I., Perminas, A., & Gustainiene, L. (2018). Effectiveness of Progressive Muscle Relaxation and Biofeedback Relaxation in Lowering Physiological Arousal among

- older adults. *Journal of Psychiatric health*,205(4), 228- 35.
- Peng, Y.T., Hsu, Y.H., & Chou, M.Y. (2020).Factors associated with insomnia in older adult outpatients vary by gender: a cross-sectional study. *BMC Geriatr J*, 2(1),681- 89.
- Pollak, C.P., & Perlick, D. (2016).Sleep problems and institutionalization of the elderly. *Geriatrics Journal*, 4(4),204-10.
- Qaseem, A., Kansagara, D., Forcica, M. A., Cooke, M., & Denberg, T. D. (2016). Management of chronic insomnia disorder in adults: a clinical practice guideline from the American College of Physicians. *Annals of internal medicine*, 165(2), 125-33.
- Raquel, M., &Teodoro, T. (2019).Comparing sleep quality in institutionalized and non-institutionalized elderly individuals. *Aging and mental health Journal*,7(2),1452- 8.
- Reid, K. J, Baron, K. G., Lu, B., Naylor, E., Wolfe, L., &Zee, P .C.(2010). Aerobic exercise improves self-reported sleep and quality of life in older adults with insomnia. *Sleep Medicine Journal*,11,934–40.
- Riedel, B.W., &Lichstein, K.L. (2015).Strategies for evaluating adherence to sleep restriction treatment for insomnia. *Behaviour research and therapy Journal*, 39(2),201-12.
- Roepke, S.K.,& Ancoli-Israel, S. (2018).Sleep disorders in the elderly. *Indian Journal of Medical Research*,131(2),302-10.
- Schlitzer, J., Heubaum, S.,& Frohnhofen, H. (2016).Sleep and sleep disorders in the elderly. sleep restriction Therapy. *Geriatric Journal*,47(7),611-18.
- Shawn, D., Youngstedt, D. F., &Kripke, A. (2015).Long sleep and mortality: rationale for sleep restriction. *Sleep Medicine Reviews Journal*,8(3),159-74,
- Spiegelhalter, K., Scholtes, C., &Riemann, D.(2016).The association between insomnia and cardiovascular diseases. *National Society Sleep Journal*,2,71–78.
- Spielman, A.J., Saskin, P.,& Thorpy, M.J.(1987). Treatment of chronic insomnia by restriction of time in bed. *Sleep Journal*,10,45-56.
- Suzuki, K., Miyamoto, M., &Hirata, K. (2017).Sleep disorders in the elderly: Diagnosis and management. *Journal Genetic Family Medical*,18(2), 61–71.
- Yaremchuk, K. (2018).Sleep disorders in the elderly.Clinics in geriatric medicine. *Geriatrics Journal*,34(2),205-16.
- Yesavage, J.A., Brink, T.L., Rose, T.L., Lum, O., Huang, V., Adey, M.,& Leirer, O. (1983).Geriatric depression scale. *International Journal of Geriatric Psychiatry*,17,37- 49.
- Yona, S., &Dahlia, D. (2020).Effect of progressive muscle relaxation on sleep quality among patients with chronic diseases: A literature review. *Belitung Nursing Journal*,6(2),30-34.
- Zhao, L., Wu, H., &Zhou, X.(2016). Effects of progressive muscular relaxation training on anxiety, depression and quality of life of older adults. *Journal of American Medicine*,162(2),211-15.