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Effectiveness of Structured Restorative Rehabilitation on Sleep Quality and Pain in Elderly Suffering with Osteoarthritis of Knee

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ABSTRACT

Introduction: Disturbance and pain is a tale of two common problems in the elderly. In the long-term, it leads to the debility and worsening of chronic health problems. Pain joins two related concerns stress and poor health as key correlates of shorter sleep durations and worse sleep quality. But there are restorative paths to resolve the problem.

Objective: The study aims to compare the effectiveness of a structured restorative rehabilitation exercise program with conventional exercises on elderly suffering with chronic knee pain and sleep disturbance using the outcome scores of the KOOS score (Knee Injury and Osteoarthritis Outcome Score) and SQQ (Sleep Quality Questionnaire).

Methods: The data has been collected from 96 elderly residents of Satara district suffering from chronic knee pain independent in ambulation. Inclusion criteria: Elderly aged above 60 years suffering from chronic knee pain more than six months duration and willing to take part in the study. Exclusion criteria: Institutionalized elderly, uncooperative patients, and mentally or physically disabled elderly. Outcome measures: KOOS pain score questionnaire measuring knee pain and function & Sleep quality questionnaire.

Results: Group A (Structured Restorative Rehabilitation) has shown extremely significant improvement than Group B (Conventional Rehabilitation) with relation to KOOS score (Knee Injury and Osteoarthritis Outcome Score) and SQQ (Sleep Quality Questionnaire).

Conclusion: Sleep and pain have a bidirectional and reciprocal relationship. Sleep impairments reliably predict new incidents and exacerbation of chronic type of pain. Deprivation of sleep which is happening as a result of aching is going to have an impact on life quality. It becomes pertinent in such case to understand the extent of relationships that exist if it exists between disorder relating to sleeping and the pain or aching.

Key Words: Knee Pain, Sleep quality, Restorative exercises, Reablement exercises, Reactive balance, Cognitive behavioural therapy, Fatigue fighting exercises

INTRODUCTION

The deepest sleep resembles death and there are many references for it from the bible & Talmud. A sedentary lifestyle leads to an endemic of lifestyle disorders.¹⁻⁴ A right restorative rehabilitation program consists of a series of therapeutic exercises to promote elderly towards a healthy and active lifestyle post health disorders or any form of trauma. The program should be fine-tuned to meet the needs of the person receiving the care and keep up the skills necessary to enjoy as much independence as possible. A successful program re-

stores wellness and optimal functional levels promoting encouragement in even simple walking, providing necessary support to help maintain independence, happiness, and dignity of the elderly.

It's necessary to overlook specific causes of fatigue and sleep disturbance in the elderly. The majority of the symptoms, including depression, mood swings and anger are the response of fatigue. Further, physiological decline like anaemia, dehydration, hyperkalemia, thyroid as well as mental & emotional stresses lead to co-morbidity. Fatigue is a major

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side effect and it can be incredibly tiring in chronic pain. Non-pharmacological holistic approaches that can prove effective are to be practised.

The study is based on the supportive mechanisms that have resulted in a guided exercise pattern and a cognitive-based approach aiming to restore sleep quality. Also, the research works on the restorative exercise pattern as a treatment for chronic knee pain and restless leg syndrome among the elderly. We aimed to assess the Pretest and post-test measures of pain and sleep quality of elderly undergoing structured restorative rehabilitation exercises using KOOS score (Knee Injury and Osteoarthritis Outcome Score) and SQQ (Sleep Quality Questionnaire). Then we assessed the pretest and posttest measures of pain and sleep quality of elderly undergoing conventional exercises using KOOS scores and SQQ and compared the effectiveness of structured restorative rehabilitation exercises and conventional exercises with the outcome scores of KOOS and SQQ.

Restorative exercises is a form of exercise that focuses on easing pain and restoring joint function through simple movements. Reablement exercises is a planned exercise therapy approach that aims to restore joint function and establish daily living skills to get back on their feet. Cognitive behavioral therapy is mindful walking simply means being aware of each step and our breath to restore a sense of focus. Fatigue fighting exercises: Incorporating simple exercise therapy approaches into the daily routine to beat tiredness and worn out the situation. Modified mobility training: A scientific approach creating purposeful movement patterns to develop a lifelong movement practice. In this study, effectiveness refers to determining the extent to which the structured restorative rehabilitation has achieved the desired effect by reporting the reduction of pain and improvement in sleep quality.

MATERIALS AND METHODS

The data has been collected from 96 elderly residents of Satara district suffering from chronic knee pain independent in ambulation. It has further been tabulated to do the T-test. Inclusion criteria: Elderly aged above 60 years suffering from chronic knee pain more than six months duration and willing to participate in the study. Exclusion criteria: Institutionalized elderly, uncooperative patients, and mentally or physically disabled elderly. Outcome measures: KOOS pain score questionnaire measuring knee pain and function⁵ & Sleep quality questionnaire⁶. The study was carried out in Krishna Institute of Medical Sciences, Karad, (KIMS/IEC-043/2011). The specific designed Knee Injury and Osteoarthritis Outcome Score (KOOS) questionnaire is meant for assessment of short as well as long term results. There are five things that we check here namely a) symptoms, b) sport

along with recreation function c) pain d) daily living activities e) knee-related life quality.

Structured restorative rehabilitation

The structured restorative rehabilitation approach has been framed acknowledging the barriers to regular rehabilitation and physical activity adherence as a pathway to change compulsion & boredom in promoting exercise participation among the elderly. Ref: Institute on Aging (IOA) Direct links and assistance regarding concerns about the needs of older adults and adults with disabilities as well as community services.

1. Restorative exercises: Active functional training program in the form of modified exercises promoting self-care with safety, activities of daily living & instrumental activities of daily living functions is recommended for the elderly struggling with fatigue.
2. Reablement exercises: Restorative active exercises which help improve osteo-kinematics of knee joint helps in decreasing pain and Reactive balance training.
3. Cognitive Behavioral Therapy: Cognitive behavioural therapy deviating attention processes and working towards improving functional activities is an ideal therapeutic remedy. Eg. Mindfulness practices, talking while walking.
4. Fatigue fighting exercises: Regular exercises in the form of chair aerobics, low-intensity gentle body movements promoting combined body movements helps to treat fatigue and enhance sleep quality.

RESULT

The statistical analysis done shows that the post-treatment scores improved in both the groups which were statistically extremely significant when the within-group analysis was done.

The between-group analysis showed that pretreatment score there was no significant difference. The post-treatment analysis showed that there was an extremely significant improvement in Group A (experimental group) as compared to Group B ($p < 0.0001$) (Table 1). Thus Group A showed extremely significant improvement than group B.

Sleep quality questionnaire

Note: Sleep quality questionnaire, high value shows a good result (Table 2). The within-group analysis showed that sleep quality was an improvement in both the groups which was statistically extremely significant. The between-group analysis showed that pretreatment the difference was not significant, but post-treatment Group A (experimental group) showed an extremely significant difference than Group B ($p < 0.0001$). Thus Group A showed extremely significant improvement than group B.

Table 1: KOOS SCORE: Note: KOOS score low value signifies good results.

	Pre Treatment	Post Treatment	'P' Value	'T' Value	DOF	Level of Significance
Group A (Experimental)	64.64±9.97	31.27±8.814	<0.0001	24.56	47	Extremely Significant
Group B	67.25±4.97	56.72±4.40	<0.0001	26.712	47	Extremely Significant
'P' value	0.1088	<0.0001				
'T' Value	1.619	17.901	Group A Shows Extremely Significant Values as Compared to Group B Post Treatment			
DOF	94	94				
Level of Significance	Not Significant	Extremely Significant				

Table 2: Sleep quality questionnaire result.

	Pre Treatment	Post Treatment	'p' Value	't' Value	DOF	Level of significance
GROUP A (EXPERIMENTAL)	20.37±1.806	31±1.75	<0.0001	28.069	47	Extremely significant
GROUP B	20.66±1.49	27.87±1.3	<0.0001	26.580	47	Extremely significant
'value	0.3905	<0.0001				
't' VALUE	008626	9.890	Group a shows extremely significant values as compared to group b post-treatment			
DOF	94	94				
Level of significance	Not significant	Extremely significant				

Group A (Structured Restorative Rehabilitation) has shown extremely significant improvement than Group B (Conventional Rehabilitation) with relation to KOOS score (Knee Injury and Osteoarthritis Outcome Score) and SQQ (Sleep Quality Questionnaire).

DISCUSSION

Sleep is vital for health as it assists the body to rest, repair, and maintain proper circadian rhythm. Previous studies stressed that pain has a close correlation with the quality of sleep.^{7,8} Poor sleep quality is due to environment, pain, chronic illness, and sleep disturbance^{9,10} and it contributes to a higher risk of heart disease, depression, falls, and accidents.

Importance of perceiving pain and stress: Pain is a perfect stimulus affecting the extent to which the elderly feel they have control over their lives. The elderly can initiate their efforts towards better sleep if they have the confidence to be independently managing the stress stimulus of painful joints. Most of the elderly are particular regarding their sense of autonomy, which leads to changes in behaviour that adversely affect their health and wellbeing.¹¹

Lack of engagement in physical activity is a major cause of poor sleep quality. So, an appropriate physical restorative exercise plan improves exercise participation among the elderly. Engaging in physical activity during the day helps in having better sleep at night.¹¹

A decline in health happens among the elderly due to the ageing processes like arthritis, muscle weakness, hypertension, and diabetes. It causes painful consequences in sleep disorder due to discomfort (Institute of medicine, 2006). Pain has emerged as the main factor of sleep quality according to Alessi.¹²

Cognitive impairment is associated with the decline of functional status¹³ which differs from the severity of the symptoms beginning from normal to dementia and other neuro-cognitive disorders. So, healthy restorative practices prove to be healthy for a conducive living environment and to balance the sleep flip - flop switch with appropriate exercise implementation among the elderly. Several studies have proved that regular physical activity reduces anxiety and promotes sleep.¹⁴

The results of the research prove significantly in breaking the sedentary behaviour, a major negative outcome by improving functional independence with the help of restorative rehabilitation program. The simple modified exercises have been a motivational task challenge improving neuro-motor ability. The various exercise approaches as simple obstacle walking, dual-task activity combining a motor component and cognitive component as counting backwards, mindful walking has all proved effective in improving reactive balance. Valid exercise approaches foster relevant functional activities promoting confidence to participate in everyday tasks without fear and motivation. The simple principle is to be followed is walk more and reduce sedentariness which

is possible by promoting restorative exercise patterns in the elderly with knee pain.¹²

Effect of Reablement exercises: This form of appropriate movements improved mobility, osteo kinematic function on loading adapting to walking over uneven surfaces. The positive effects made the elderly to participate enthusiastically and regularly.^{13,14}

Reactive balance: Restorative exercises improved the perceived competence of performing corrective therapeutic exercises. On continuity, they found to have improved mobility of the knee joints and easier weight-bearing. Symptoms like restless leg pain, Joint discomfort, Positional changes improved. **Effect of combined cognitive-motor activity and mindful activity:** Due to deviation of attention elderly participants were found walking for longer distance with good progression fighting fatigue.

The research has been effective in promoting the SMART outcome (Simple / Measurable / Attainable / Realistic / Time-bound) promoting the behaviour to change the pathway of motivational performance with specific exercise strategies. The structured exercise program has proved as a goal-setting and activities into a daily routine. The target elderly has mastered the habit of exercise practice as per situational or environmental cues in performing effective body movements easing pain patterns. The participants have been empowered with the supreme goal of self-monitoring.^{15,16}

Adverse effects of Pain: Overloading and added stress with repetitive exercises induced painful spasm leading to pain disability resulting in sleep disturbance. Sleep quality is associated with decreased gait speed and increased gait variability under dual-task conditions in the elderly and an increased risk of falls.¹⁸

CONCLUSION

One can now conclude here that getting enough sleep is vital for overall health and wellbeing. A single night sleep disturbance leads to a lack of concentration and energy loss especially in the elderly. In the long term, it leads to the debility and worsening of chronic health problems. All positive ways need to be initiated to improve sleep habits as most of the sleeping problems can be managed properly. Health care professionals should always assess sleep quality and try to eliminate possible barriers to sleep. The best way to promote activity is through innovative exercise programs as per the individual framework. The structured exercise program has proved in bringing out a behavioural change improving exercise adherence for the impaired elderly target population with knee pain. Lack of sleep or poor quality of sleep or continuity of sleeplessness is associated with increased chronic inflammatory responses. Since inadequate sleep including

chronic hurting knees is typically found with knee OA in elders, our research contributes to other findings to help ease pain in the knee as a way to reduce sleep. Future researches are therefore important for confirming these findings, to understand the impact of sleep in knee pain, and if other body pain co-morbidities occur. Moreover, longitudinal research would define the significant correlation among sleep disorders as well as OA-related discomfort that will provide the basis for research studies of treatments for resolving sleep disorders defined as a method to ease the pain associated with OA, including the use of RLS therapies and intermittent bodily movement in sleep. Therefore, the present research will be a guiding work for objectives for the researchers of this field.

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