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Effectiveness Of Home Based Stretching And Strengthening Program For Cervical Spine Dysfunction In Housewives.

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ABSTRACT

Introduction: Cervical spine dysfunction is a prevalent issue among housewives, often stemming from prolonged hours of household chores, poor posture and repetitive nature of domestic activities. As housewives doing their chores, it is difficult for them to travel back and forth for treatment. Most activities can cause rounded shoulder and forward neck which cause pain and difficulty in movement of neck

Methods: The study was conducted to explore and evaluate the effectiveness of a home-based stretching and strengthening program specifically designed to ease cervical spine dysfunction in 90 housewives according to the inclusion and exclusion criteria of the study. The outcome measures of the study were visual analogue scale (VAS), neck disability index (NDI) and cervical range of motions using goniometer. The Intervention protocol was for 4 weeks, 6 days a week 45 minutes. Subjects were given home based stretching and strengthening program of 4 weeks to determine its effect on the pain and range of motion of cervical area.

Result: Results revealed statistically significant difference (<0.0001) in cervical range of motion and reduction in neck pain. As per neck disability index there is less difficulty in daily household work as compare to before the exercise program.

Conclusion: There is improvement in range of motion after the home based stretching and strengthening program and pain has reduced. The post neck disability index result define that there is less difficulty faced by housewives as compared to pre neck disability test.

Keywords: Cervical spine dysfunction, neck pain, housewives, home based program

Introduction

Cervical spine dysfunction represents a pervasive health concern, particularly among housewives, whose daily routines often involve extended periods of household chores, repetitive movements, and prolonged sitting. The demands of managing domestic responsibilities, combined with poor ergonomic practices, contribute significantly to musculoskeletal issues in the cervical region¹. As housewives form a substantial portion of the global population, addressing and reducing cervical spine dysfunction in this demographic is of greatest importance for improving overall well-being.

The cervical spine, comprising seven vertebrae, plays a crucial role in supporting the head and facilitating various movements. However, the prevalence of cervical spine dysfunction is on the rise, and housewives are particularly vulnerable due to the nature of their daily activities. Prolonged time is spent in positions that strain the neck, such as bending over chores or looking down at tasks, contribute to the development of discomfort, pain, and reduced functionality in the cervical region^{1,2,9}.

Neck pain in cervical spine dysfunction is a very frequent ailment. Poor posture can induce muscular imbalance, resulting in a defective interaction between various body parts. One of the most common cervical irregularities that predisposes individuals to pathological diseases like neck pain is forward head posture³.

High level prevalence of cervical pain is associated with a high level of neck flexion as well as static and awkward postures during sitting. The prevalence of neck pain is higher in females than in males. Neck muscles have an important role in normal mobility and stability of cervical spine. Researches advice that weakness of cervical muscles can have a direct link with neck pain. Impairment of Deep Cervical Flexors (DCF) as well as superficial and deep extensors of cervical spine in patients with neck pain is the generally accepted cause of pain. Postural neck pains can be treated with long-term exercises that include stretching exercises, positional release, isometrics strengthening exercises and postural correction exercises^{4,5}.

Neck pain can also be associated with mechanisms as mechanical, neuropathic, or secondary to other reason. Mechanical pain refers to pain originating in the spine or its supporting structures, such as ligaments and muscles. Physiotherapy Treatment given are, exercise therapy, traction which is used to relieve pressure on the spine, electrotherapy with active or passive physical exercises designed to strengthen or stabilize the spine will reduce pain, prevent injuries, and improve posture and body mechanics. Spinal manipulation where manual therapy is used to maximize painless movement, reduce muscle tightness, improve joint mobility, and correct alignment problems along with hot Moist Pack^{6,7}.

Challenges Faced by Housewives: Housewives face unique challenges that exacerbate cervical spine issues. Repetitive motions, lifting heavy objects, and maintaining static postures during household chores can lead to muscle imbalances and joint stiffness. Furthermore, the lack of proper ergonomic design in household tools and furniture often contributes to poor posture, amplifying the risk of cervical spine dysfunction. The cumulative effect of these factors underscores the need for targeted interventions to alleviate and prevent cervical spine issues in this population⁸.

Current Interventions and Limitations: Traditional interventions for cervical spine dysfunction include physical therapy such as manipulation or mobilization, medications, and ergonomic modifications. While these approaches have demonstrated efficacy, they often require access to healthcare facilities, which may be a logistical challenge for many housewives. Additionally, the sustainability of treatment gains are influenced by adherence to prescribed exercises and lifestyle modifications, posing potential challenges in busy household schedules^{9, 10, 11}.

Home-Based stretching and strengthening Interventions: Recognizing the unique circumstances of housewives, home-based interventions emerge as a practical and accessible solution. Customized stretching and strengthening programs to be performed at home acknowledges the limitation of time and resources while providing a viable strategy for promoting cervical spine health. Such programs can empower housewives to take an active role in their well-being and self-care¹². This comprehensive study seeks to investigate the effectiveness of home-based stretching and strengthening programs specifically designed for housewives experiencing cervical spine dysfunction. This study aims to delineate the impact of these programs on pain reduction, functional improvement, and overall quality of life for housewives¹³. The findings of this study are anticipated to have far-reaching implications for the development of targeted interventions that align with the unique needs and constraints of housewives. If proven effective, home-based stretching and strengthening programs could serve as a practical, cost-efficient, and empowering strategy for managing and preventing cervical spine dysfunction in this vulnerable demographic^{14, 15}.

METHOD

The present study was an experimental study that was started after being approved by the Institutional ethical clearance committee of Krishna institute of medical sciences deemed to be university, Karad. The present research comprised of 90 individuals. The study duration was period of six months with a 4 weeks protocol period. Housewives ranging from 30-45 years of age experiencing neck pain for more than 90 days and have a high neck disability index according to the neck disability index (NDI) assessment and falling under 4-7 score of Visual analog scale were included. Patients were excluded if they had history of neck/back surgery, recent history of trauma or fracture, congenital disorder of cervical spine and psychiatric disease or drug abuse.

OUTCOME MEASURES:

1) Visual Analog Scale (VAS):

It is a measurement tool that seeks to measure a characteristic that believed to range across a continuum of values and cannot easily be directly measured. VAS is a uni-dimensional measure of pain intensity, which has been extensively used in various adult people¹⁸.

2) Neck Disability Index (NDI):

NDI is a disorder specific functional status survey with 10 items inclusive of pain, personal care, lifting, reading, headaches, concentration, work, driving, sleeping and recreation. A higher score indicates more patient-rated disability¹⁹.

3) A Goniometer:

A goniometer is a medical instrument used to measure angles, typically the range of motion in joints. In the context of cervical spine dysfunction, a goniometer can be employed to assess the flexibility and movement of the neck. Here are a few ways in which a goniometer might be used for cervical spine evaluations:

Cervical Range of Motion (ROM) Measurement:

Flexion and Extension: The goniometer can be used to measure the range of motion during flexion (forward bending) and extension (backward bending) of the neck by placing the fulcrum over the external auditory meatus.

Lateral Flexion: Assessing the range of lateral flexion, or side bending, is another important aspect. The goniometer is applied to measure the angle achieved during lateral movement to the right and left by placing the fulcrum over C7 spinous process.

Rotation Assessment:

Cervical rotation can be evaluated using a goniometer to measure the degree of rotation to the right and left. This assessment is valuable in identifying any restrictions or asymmetries in the rotational movement of the neck by placing the fulcrum over the vertex of the head.

Tilt Measurement:

The goniometer can be utilized to measure the tilt of the head, helping to assess the ability to tilt the head sideways.

Posture Analysis: Goniometers can also be employed to assess neck posture. By measuring the angles between various anatomical landmarks, clinicians can gain insights into the alignment of the cervical spine²⁰.

PROCEDURE

The study protocol was presented for approval in front of the Protocol Committee and the Institutional Ethics Committee of KIMSDU, Karad. After finding the suitability of the subjects as per the inclusion and exclusion criteria the participants were briefed about the nature of the study and the intervention. The informed consent was obtained from the participants who are willing to participate and were recruited for the study. All the subjects were assessed for the symptoms such as neck pain, decreased range of motion or any kind of disability faced on daily basis which could have been the cause of a cervical spine dysfunction. Subjects were selected according to the inclusion criteria. The 4 week protocol was given to the subjects after the proper assessment. Once the 4 week protocol is done the assessment was repeated and output was recorded.

The 4 weeks home based stretching and strengthening program for housewives with cervical spine dysfunction was as follows

PROTOCOL

Sr No.	Stretching Protocol	Initial Stage	Once there is reduction in pain
1	Upper trapezius stretch	10 second hold, 3 Reps	30 sec hold, 3 Reps
2	Levator scapulae stretch	10 second hold, 3 Reps	30 sec hold, 3 Reps
3	Deep anterior neck flexor stretch	10 second hold, 3 Reps	30 sec hold, 3 Reps
4	Suboccipital stretch	10 second hold, 3 Reps	30 sec hold, 3 Reps
5	Rhomboid and middle trapezius	10 second hold, 3 Reps	30 sec hold, 3 Reps

	stretch		
6	Crossover arm stretch	10 second hold, 3 Reps	30 sec hold, 3 Reps
7	Thoracic expansion	10 second hold, 3 Reps	30 sec hold, 3 Reps

Sr No.	Strengthening Protocol	Initial Stage	Once there is reduction in pain
	Chin tucks	10 Reps	30 Reps
	Neck flexion isometrics	Hold Relax 10 Reps	15 sec hold relax 10 Reps
	Neck extension isometrics	Hold Relax 10 Reps	15 sec hold relax 10 Reps
	Side Flexion isometrics B/L	Hold Relax 10 Reps	15 sec hold relax 10 Reps
	Shoulder Shrugs	10 Reps	30 Reps
	Shoulder rotations	10 Reps	30 Reps
	Shoulder retraction protraction	10 Reps	30 Reps
	Neck Flexion	10 Reps	30 Reps
	Neck Extension	10 Reps	30 Reps
	Neck Rotation B/L	10 Reps	30 Reps
	Neck Side Flexion B/L	10 Reps	30 Reps

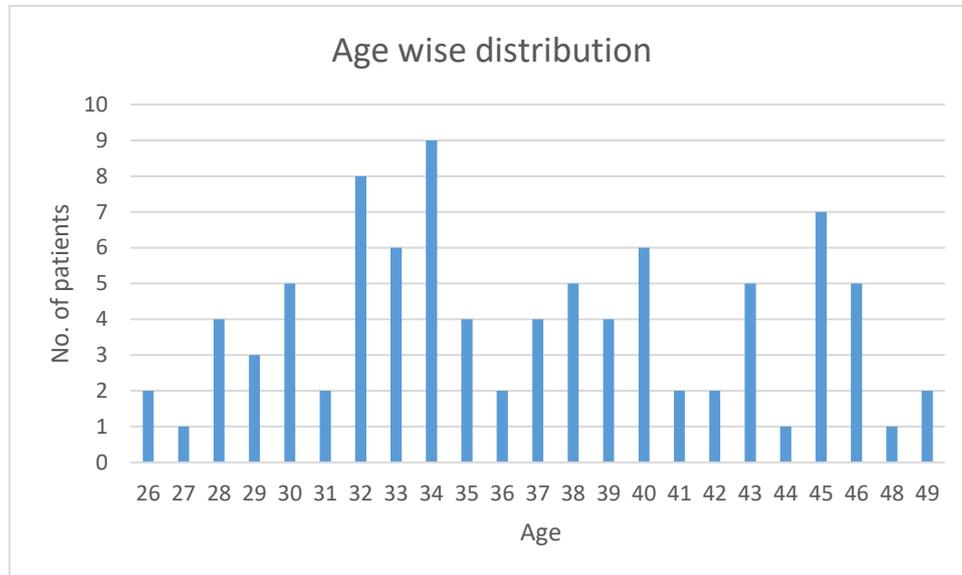
RESULTS

This study was an experimental study, with the sample size of 90 housewives with cervical spine dysfunction who had complaints related to decreased range of motion and neck pain. The below chart shows the age wise distribution of the total sample size, which shows the no. of patients affected by cervical spine dysfunction in particular age. The span from early 30's to late 40's have the most patient with cervical spine dysfunction. The result has three main interpretation i.e. visual analog scale, cervical range of motion with the help of goniometer and neck disability index. The pre and post visual analog scale interpretation was taken which shows that before the home based stretching and strengthening exercise protocol the VAS was between 7-10 and after the home based stretching and strengthening exercise protocol the VAS was between 2-5 which shows that the home based exercises for housewives with cervical spine dysfunction is effective way to treat the pain in cervical area.

All the cervical range of motion was taken by using goniometer which included range of motion of cervical flexion, cervical extension, neck rotation, and lateral flexion of neck of each side. The pre cervical range of motions was ranged between 10 to 25 degrees for cervical flexion, 9 to 21 degrees for cervical extension, 15 to 30 degrees for right neck rotation and 15 to 30 degrees for left neck rotation. Right lateral flexion ranged between 10 to 30 degrees and 10 to 30 degrees for left lateral rotation. Post range of motion was taken after the 4 weeks home based stretching and strengthening program, so the range of motion was ranged between 15 to 33 degrees for cervical flexion, same for cervical extension, 20 to 38 degrees for right neck rotation and left neck rotation. Right and left lateral flexion ranged between 21 to 40 degrees.

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Neck disability index was used to detect the daily life disability faced by the housewives during their household work. In pre test the neck disability had shown the score of 25 to 34 which describe that there is moderate to severe neck disability in housewives. After the 4 weeks of protocol neck disability index scouring was done again this showed 2 to 14 scoring which indicates that there is no disability or mild disability



Graph no.1: Age wise distribution of housewives with cervical spine dysfunction.

The below chart shows the age wise mean and standard deviation of housewives with cervical spine dysfunction.

Table no.1: Age (Mean and Standard deviation)

Variable	Housewives with cervical spine dysfunction (Mean and Standard deviation)
Age	36.80 ± 6.010

OUTCOME MEASURES

1. Visual Analogue Scale (VAS):

Comparison of pre and post Mean and Standard deviation scores of VAS. (At rest and On activity)

Variable	Pre	Post	P value
At rest	4.41±1.069	1.11±0.725	<0.0001
On activity	7.63±1.033	2.07±0.851	<0.0001

2. Neck disability index (NDI):

Comparison of pre and post Mean and Standard deviation scores of neck disability index. (NDI)

Variable	Pre	Post	P value
Neck disability index	25.33±5.006	8.68±3.049	<0.0001

3. Goniometer

I. Cervical flexion:

Variable	Pre	Post	P value
Cervical flexion	14.54±2.950	20.93±2.910	<0.0001

Interpretation: Above table shows comparison of pre and post mean values of cervical flexion which was measured by help of goniometer. Values were found to be statistically extremely significant ($p < 0.0001$).

II. Cervical extension:

Variable	Pre	Post	P value
Cervical extension	13.08±1.906	21.95±2.283	<0.0001

Interpretation: Above table shows comparison of pre and post mean values of cervical extension which was measured by help of goniometer. Values were found to be statistically extremely significant ($p < 0.0001$).

III. Lateral flexion (Right):

Variable	Pre	Post	P value
Lateral flexion (Right)	20.02±4.070	30.32±4.175	<0.0001

Interpretation: Above table shows comparison of pre and post mean values of cervical lateral flexion to right side which was measured by help of goniometer. Values were found to be statistically extremely significant ($p < 0.0001$).

IV. Lateral flexion (Left):

Variable	Pre	Post	P value
Lateral flexion (left)	20.21±2.798	29.67±2.902	<0.0001

Interpretation: Above table shows comparison of pre and post mean values of cervical lateral flexion to left side which was measured by help of goniometer. Values were found to be statistically extremely significant ($p < 0.0001$).

V. Rotation (Right):

Variable	Pre	Post	P value
Rotation (Right)	19.86±3.095	29.36±2.814	<0.0001

Interpretation: Above table shows comparison of pre and post mean values of cervical rotation to right side which was measured by help of goniometer. Values were found to be statistically extremely significant ($p < 0.0001$).

VI. Rotation(Left):

Variable	Pre	Post	P value
Rotation (Left)	19.77±3.027	29.57±3.013	<0.0001

Interpretation: Above table shows comparison of pre and post mean values of cervical rotation to left side which was measured by help of goniometer. Values were found to be statistically extremely significant ($p < 0.0001$).

DISCUSSION

Numerous studies have reported positive outcomes associated with stretching and strengthening programs tailored for cervical spine dysfunction in housewives. These outcomes include a reduction in neck pain, improved functional capacity, enhanced muscle strength, and increased flexibility. The incorporation of targeted exercises aimed at specific muscle groups surrounding the cervical spine has shown to contribute significantly to alleviating discomfort and enhancing overall neck health. Improved Posture and Body Awareness. One notable benefit of these programs is the improvement in posture and body awareness. Housewives, who often engage in repetitive and physically demanding household tasks, may develop poor posture habits. The incorporation of exercises promoting muscle balance and proprioception can positively influence posture, helping individuals maintain a more neutral and ergonomically sound position during daily activities. Enhanced Quality of Life. The reduction in neck pain and improvement in functional abilities contribute to an enhanced quality of life for housewives. A decrease in pain allows for greater engagement in daily activities without discomfort, fostering a sense of well-being. Improved physical function further empowers individuals to perform their domestic duties more efficiently and with reduced physical strain^{21, 22}.

Long-term adherence to stretching and strengthening programs is crucial for sustained benefits. While several studies report positive short-term outcomes, more research is needed to investigate the long-term effects of these interventions. Strategies to enhance program adherence, such as incorporating enjoyable exercises and providing ongoing support, should be explored to ensure sustained benefits over time. Comparisons with traditional interventions, such as physical therapy or pharmacological approaches, reveal the potential advantages of home-based programs. These programs offer the convenience of being performed at home, addressing potential barriers to accessing healthcare facilities. While not necessarily a replacement for professional care, home-based interventions provide an accessible and cost-effective complement to traditional approaches. Cervical spine dysfunction can manifest differently among individuals, requiring a personalized approach. Studies exploring the customization of stretching and strengthening programs based on individual needs and symptoms could provide valuable insights. Tailoring interventions to specific impairments and addressing individual variations in response to exercises may enhance overall program effectiveness²³.

CONCLUSION

In conclusion, the effectiveness of home-based stretching and strengthening programs for cervical spine dysfunction in housewives is a promising avenue for improving musculoskeletal health and overall well-being. The observed improvements in posture and body awareness are particularly noteworthy, as poor posture is often a contributing factor to neck pain in this demographic. Through targeted exercises, housewives can develop better habits, leading to sustained benefits and a reduced risk of future musculoskeletal issues. While

the findings are encouraging, it is essential to recognize certain limitations. The long-term effects of these programs, as well as factors influencing adherence, warrant further investigation. Ongoing research should explore individualized approaches, considering the diverse presentations of cervical spine dysfunction among housewives. The comparison of home-based interventions with traditional approaches underscores the potential advantages of these programs, especially in terms of accessibility and cost-effectiveness. While not intended to replace professional care, home-based programs serve as a valuable complement to traditional interventions, offering individuals the flexibility to manage their neck health within the comfort of their homes.

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