Research Article

INTERNATIONAL JOURNAL OF CURRENT ADVANCED RESEARCH
ISSN: O: 2319-6475, ISSN: P: 2319-6505
Available Online at www.journalijcar.org
Volume 14; Issue 07; July 2025; Page No.334-337
DOI: http://dx.doi.org/10.24327/ijcar.2025.0337.0071

Subject Area : Physiotherapy

WORKPLACE BASED NECK SPECIFIC EXERCISE VERSUS HEALTH PROMOTION FOR DIAMOND WORKERS TO MANAGE WORK RELATED NECK PAIN

Prerana Saravanan[1*], Saravanan Murugan[2], Pipaliya Isha[3], Shah Yashvi[3], Lathiya Nutanben[3], Moradiya Krishnaben[3]

[1]Lecturer,The Sarvajanik College of Physiotherapy, Surat, Gujarat. [2]Professor, Shree Bhartimaiya College of Optometry and Physiotherapy, Surat, Gujarat, [3]Private Practitioners-Physiotherapist, Surat, Gujarat

ARTICLE INFO

Received 18th June 2025
Received in revised form 28th June, 2025
Accepted 15th July 2025
Published online 28th July, 2025

Key words:

Neck pain, Diamond workers, McKenzie Exercises, Health promotion, Occupational health

ABSTRACT

Background: The diamond cutting and polishing industry requires meticulous attention to detail and precision, exposing workers to various challenges. While the craftsmanship demands specialized knowledge and skill, it also poses risks to workers' physical and psychological well-being, particularly concerning non-specific neck pain. **Objective:** Aims to compare the effectiveness of implementing Neck Specific Exercise and Health Promotion Strategies to identify the most beneficial approach for reducing neck pain and enhancing workers' well-being. **Methods and Materials:** 60 diamond polish workers were divided into two groups in this study namely, Neck Specific Exercise and Health Care Promotion. This protocol is continued 2 times / week for 4 weeks under the supervision of physiotherapist. Pre and post Numeric Pain Rating Scale and Neck Disability Index were outcome measures. **Results:** The result of comparison between both groups regarding neck pain and neck disability depicts statistically significant outcomes. There is a significant reduction in pain statistically but mild difference in pain clinically among groups. **Conclusion:** McKenzie Neck Specific Exercise group has shown better outcome in neck disability as compare to Health Promotion Group. Long term effects of Neck Specific Exercises Versus Health Promotion can be checked for pain relief and neck disability for work related musculoskeletal disorders.

Copyright©

Copyright© The author(s) 2025,This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Work-related Musculoskeletal Disorders (WMSDs) are complicated conditions that are impacted by organizational, psychological and biomechanical elements. A complete strategy is needed for effective prevention, which includes lowering workplace stressors, early diagnosis, management and possible workplace modifications for ongoing employment[1]. WMSDs are brought on by a complex interplay of individual traits, environmental circumstances, psychosocial dynamics, and physical job conditions. The danger is also raised by elements including fatigue, shift rotations, repetitive work, lack of job control, job dissatisfactionand lack of vacation time [2]. The use of sit-stand desks (SSDs) to cut down on sitting time has grown in favor. Sedentary behavior, which involves little movement and little energy expenditure, poses health concerns. SSDs can encourage standing and decrease sitting, although it is yet unclear how exactly they affect health outcomes [3].

*Corresponding author: **Prerana Saravanan**

Lecturer,The Sarvajanik College of Physiotherapy, Surat, Gujarat

A major cause of pain, disability and economic effect, neck pain is a global health concern. In order to lessen the future burden of neck pain on people and healthcare systems around the world, increased knowledge of the condition and its risk factors is crucial, as is early detection and management [4].A considerable percentage of people, particularly those in their middle years, suffer from non-specific neck pain, which is a prevalent problem. The intricacy of treating non-specific neck discomfort emphasizes the necessity of continuous research and improvement of therapeutic approaches [5].

One well-known classification-based therapy strategy is the McKenzie technique, which divides patients into biomechanical categories according to postural evaluations and neck movement [6].A key component of McKenzie exercises is posture correction, which guarantees correction maintenance. The cervical spine is prone to tension, strain and exhaustion due to its impaired posture or integrity. Research has demonstrated the effectiveness of McKenzie method in reducing cervical postural syndrome-related neck pain. Following a 4-week intervention period, notable improvements in pain and disability

were noted [7].

Programs for workplace wellness can lower expenses for companies and greatly enhancing employee health. These programs' high return on investment (ROI) highlights how crucial it is to put them into place for monetary benefits, increased productivity, and improved general health. Employers can lower healthcare expenses and develop a more engaged and productive workforce by emphasizing preventative measures and encouraging a wellness-focused workplace [8].A prevalent problem among office workers, musculoskeletal discomfort results in high medical expenses. To lower disability and absence, occupational health specialists advise early therapy of musculoskeletal complaints. By creating ergonomic solutions and offering therapeutic interventions, industrial physical therapists can enhance treatment regimens and preventative measures [9].

Workstation adjustments and postural advice are common ergonomic components which probably helped explain the significant decreases in neck pain. With potential productivity benefits more noticeable for those participating in exercise programs, the study supports the scalability and cost-effectiveness of health promotion interventions in managing neck pain among all office workers [10]. Studies show that McKenzie exercises are more effective than isometric strengthening exercises at reducing neck pain. According to one study, the best way to manage pain, functional disability and cervical mobility in people with chronic neck pain is to combine McKenzie exercises with traditional physical therapy [11].

Diamond workers are required to work long hours in static neck postures, putting more pressure on themselves. To be consistent with the trend for comparative effectiveness research, health promotion strategies are more scalable alternative, requiring less specialized services to deliver than neck-specific exercises and if found effective in preventing and managing neck pain, could benefit all employees in terms of health of employees, resulting in improved productivity and performance in daily life and at work. This study aims to determine the effects of four weeks of work place-based Neck Specific Exercises and Health Promotion Education for diamond workers to manage work related neck pain and to compare the effects of four weeks of work place-based Neck Specific Exercises and Health Promotion Education for diamond workers to manage work related neck pain.

MATERIALS AND METHODS

Approval from Institution Ethics Committee was taken prior data collection. ThisQuasi-experimental design included30 male and 30 female diamond polish workers by a convenient sampling method from the diamond offices in Surat, Gujarat, India. The inclusion criteria included non-specific neck pain, participants with neck pain rating≥3 on Numeric Pain Rating Scale (NPRS) and age 18 to 55 years. Congenital cervical abnormalities, history of neck surgery,radiculopathy, inflammatory arthritis, anticipated prolonged absence from work during the study periodphysical activity program (Gym, Yoga) and on analgesics for neck pain were excluded.

After considering written consent, participants with NPRS ≥ 3 were clustered (5–8) randomly to either group 1 (Neck Specific Exercise Group) or group 2 (Health Promotion Group) using computer generated randomization. The baseline data included demographic details; NPRS, Neck Disability Index (NDI), Work Ability Index (WAI)and International Physical Activity Questionnaire-Short Form (IPAQ-SF). The protocol is continued 2 times / week for 4 weeks under the supervision of physiotherapist in both groups. Handouts were given to the participants for self-exercising without supervision of physiotherapist daily at their work place.

Neck specific exercise technique

- For extension dysfunction, the participant was in a comfortable sitting posture with a proper back support, then asked to pull the head back as far as possible, keeping the head forward-facing, without up or down inclinations (10 to 15 times). Then, restored the neutral sitting posture and at the end of the range of motion (ROM), participant exerted an extra force by pushing the chin with his fingers (10 to 15 times).
- About rotation dysfunction, from the aforementioned same sitting position, the participant was asked to partially retract his head and rotate it to the pain side as much as possible for a second before returning to the original position. This motion was repeated 10 to 15 times in a rhythmic pattern.
- For lateral flexion dysfunction, the participant was asked to flex his head laterally and retract it towards the painful side from the sitting position mentioned earlier. Then, he was instructed to return to the original position after a brief period in this position. This action was repeated 10 to 15 times in a rhythmic pattern from the same position.
- The therapist then stood at the participant's back with his head relaxing on the therapist's chest, with slight head retraction. Then, the therapist's right hand was put in opposition to the right side of the participant's head, the elbow resting on the clavicle, the therapist's forearms were parallel to each other, and the fingertips were put on the participant's head.

Health Promotion Intervention

Health promotion group includes the educational intervention content. Health Promotion Intervention content was divided into following eight sessions. Each session will include 30 minutes of educational session followed by 15 minutes of question answer session.

Session: 1. Understanding of occupational neck pain and its Causes

Session: 2. Benefits of healthy neck pain preventive behaviors

Session: 3. Improving self-efficacy in adopting & performing neck pain preventive behaviors

Session: 4. Stress management technique

Session: 5. Neck pain prevention ergonomics

Session: 6. Appropriateneck movements

Session: 7. Properly Sleeping, sitting and standing

Session: 8. Postural correction

After completion of 4 weeks protocol of both the groups, NPRS and NDI were assessed post-intervention. As the exercise protocol were lasting for 4 weeks, it's important to check and

monitor the adherence of exercise protocol by the participant throughout the study.

RESULTS

with protocolsamong participants.

Level of physical activity in the current study demonstrated 72% participants were physically inactive, 25% participants

Table 1. Difference of Post Value Vs Pre Value of NPRS

Variable	Group	Mean Difference	SD	df	T	Sig.
Right Now	Health Care Promotion	-1.03	0.72	58	7.13	0.000*
	McKenzie	-2.97	1.29			
Usual	Health Care Promotion	-1.13	1.33	58	5.01	0.000*
	McKenzie	-2.90	1.39			
Best	Health Care Promotion	-1.57	1.43	58	2.95	0.005*
	McKenzie	-2.87	1.94			
Worst	Health Care Promotion	-1.67	1.54	58	5.38	0.000*
	McKenzie	-3.93	1.72			

Table 2. Pre Value of NDI between Groups

Variable	Group	Mean	SD	df	T	Significant
Neck Disability Index	Health Care Promotion	13.20	4.44	58	-.147	0.884
	McKenzie	13.04	5.99			

Table 3. Post Value of Neck Disability Index between Groups

Variable	Group	Mean	SD	df	T	Significant
Neck Disability Index	Health Care Promotion	4.40	3.84	58	2.95	0.005*
	McKenzie	2.07	1.99			

DISCUSSION

In this study the mean age of participants was 35.92 years and mean Body Mass Index (BMI) is 25.32. The High range of BMI can be correlated with high number of working hours per week and minimal level of physical activity. Billy C. L .SO et al[12] reportedBody Mass Index (BMI) with calculated mean value as 22.7.Level of physical activity was measured using International Physical Activity Questionnaire – short form. Mean level of physical activity was found to be 639.27 in this study. As working hours in sitting are higher, less opportunities for physical activity seems to be the reason why diamond workers fall in category of minimally physically active group. Ekalak Sitthipornvorakul et al [13] reported in the study regarding working hours of participants per day (in hours per day) were found to be 8.0 for the intervention group and 7.7 for the control group. Similarly, the working days per week (in days per week) were reported as 5 for both groups. Therefore, average number of working hours per week for participants is approximately 40 hours.

Majority of participants in this study did not finish their 12th-grade education. In a study reported by Sihao Lin et al[14], regarding educational qualification majority of participants completed high school and joined college. Ekalak Sitthipornvorakul et al[13] concluded that majority of participants completed their graduation. Educational qualification may affect their understanding regarding the health promotion status. As in current study one group followed the McKenzie Neck Specific intervention and the other group followed the health promotional sessions, the level of educational qualification matters to follow and adhere

physically minimally active and only 3% participants were belonging to Health Enhancing Physically Active (HEPA). According to FortúnRabadán, et al[9] the participants in their study were categorizedaccording to their level of physical activity as follows: 25% are classified under High physical activity, 41.7% under Moderate physical activity, and 33.3% under Low physical activity**.** It is important to understand that the level of physical activity is directly associated with work related musculoskeletal problems. High working hours and less physically activeparticipants may end up creating musculoskeletal issues related to their occupation. According to present study,one fifth of participants are categorized as good and three fourth of participants were categorized as excellent according to work ability index.In a study reported by Sihao Lin et al[14] distribution of participants across different WAI categories included very few in poor categories and almost one fourth in moderate and excellent categories and one third in good category.

Table 2 depicts the difference between Post versus Pre Numerical Pain Rating Values across all four categories of pain measurement namely; pain right now, usual pain, best pain and worst pain among the participants. The mean difference between the groups shows statistically significant reduction in pain among both the groups. This suggests that both the McKenzie and Health Care Promotion Intervention have effect on pain reduction in four-week protocol among the diamond workers in pain right now, usual pain, best pain and worst pain. It suggests that both the neck specific exercises and educational sessions effective tools to reduce work related neck pain among the diamond workers. According to FortúnRabadán, et

al [9] degree of pain experienced in the cervical region over the past week was assessed using the Numeric Rating Scale which ranges from 0 to 10. The results indicate a significant decrease in neck pain baseline to post-treatment and further decreased pain at follow-up**.**In a study by Yousef M. Alshehre et al[15], the significant reduction in chronic neck pain was found after four weeks and further relief of neck pain was significant after 8 weeks of exercise protocol. In this study long term effect of neck specific exercise on pain reduction was prevalent among the participants.

Table 3 presents the results of the Pre value of Neck Disability Index between Neck Specific Exercise group and Health Care Promotion group. Pre value of Neck Disability Index data reveals that there is no statistical significance between the groups at the baseline. As data are homogenous in distribution, Post value of Neck Disability Index between Neck Specific Exercise group and Health Care Promotion group can be assessed.Table 4 presents the results of the Post value of Neck Disability Index between Neck Specific Exercise group and Health Care Promotion group. Post value of Neck Disability Index between Neck Specific Exercise group and Health Care Promotion group shoes a strong statistical significance. It means that there a significant reduction in neck disability scores in both the groups after 4 weeks protocol among the participants. Furthermore, the mean difference between groups suggests that neck disability was reduced drastically among the group who underwent Neck Specific Exercises (McKenzie Exercise) compare to group who continued Health Care Promotion Sessions.

CONCLUSION

The study concludes that both the Neck Specific Exercises and Health Care Promotion are effective in reducing work related neck pain among diamond workers based on 4 weeks protocol. However, there was small difference in pain reduction but significant improvement in Neck Disability in both the groups. According to the result of the study, Neck Specific Exercise Group has higher improvement in Neck Disability than the Health Promotion Group.

Competing interest: The authors have no competing interests to declare that are relevant to the content of this article.

Funding: No funds, grants, or other support was received.

References

1. Roquelaure Y, Bodin J, Descatha A, Petit A. [Work-related musculoskeletal disorders]. Rev Prat. 2018;68(1):84-90.
2. Stoyneva ZB, Dermendjiev S, Dermendjiev T, Dobrev H. Work-Related Upper Limb Disorders: A Case Report. Open Access Maced J Med Sci. 2015;3(1):146-50.
3. Chambers AJ, Robertson MM, Baker NA. The effect of sit-stand desks on office worker behavioral and health outcomes: A scoping review. Appl Ergon. 2019;78:37-53.
4. Safiri S, Kolahi AA, Hoy D, Buchbinder R, Mansournia MA, Bettampadi D, et al. Global, regional, and national burden of neck pain in the general population, 1990-2017: systematic analysis of the Global Burden of Disease Study 2017. BMJ. 2020;368:m791.
5. Driessen MT, Proper KI, Anema JR, Knol DL, Bongers PM, van der Beek AJ. The effectiveness of participatory ergonomics to prevent low-back and neck pain--results of a cluster randomized controlled trial. Scand J Work Environ Health. 2011;37(5):383-93.
6. Edmond SL, Werneke MW, Young M, Grigsby D, McClenahan B, Harris G, et al. Cognitive behavioural interventions, and function and pain outcomes among patients with chronic neck pain managed with the McKenzie approach. Musculoskeletal Care. 2020;18(1):46-52.
7. Avaghade RR, Shinde SB, Dhane SB. Effectiveness of McKenzie approach and segmental spinal stabilization exercises on neck pain in individuals with cervical postural syndrome: An experimental study. J Educ Health Promot. 2023;12:225.
8. Baicker K, Cutler D, Song Z. Workplace wellness programs can generate savings. Health Aff (Millwood). 2010;29(2):304-11.
9. Fortun-Rabadan R, Jimenez-Sanchez C, Flores-Yaben O, Bellosta-Lopez P. Workplace physiotherapy for musculoskeletal pain-relief in office workers: A pilot study. J Educ Health Promot. 2021;10:75.
10. Johnston V, Chen X, Welch A, Sjogaard G, Comans TA, McStea M, et al. A cluster-randomized trial of workplace ergonomics and neck-specific exercise versus ergonomics and health promotion for office workers to manage neck pain - a secondary outcome analysis. BMC Musculoskelet Disord. 2021;22(1):68.
11. Abdel-Aziem AA, Mohamed RR, Draz AH, Azab AR, Hegazy FA, Diab RH. The effect of McKenzie protocol vs. deep neck flexor and scapulothoracic exercises in subjects with chronic neck pain - a randomized controlled study. Eur Rev Med Pharmacol Sci. 2022;26(9):3138-50.
12. So BCL, Szeto GPY, Lau RWL, Dai J, Tsang SMH. Effects of Ergomotor Intervention on Improving Occupational Health in Workers with Work-Related Neck-Shoulder Pain. Int J Environ Res Public Health. 2019;16(24).
13. Sitthipornvorakul E, Sihawong R, Waongenngarm P, Janwantanakul P. The effects of walking intervention on preventing neck pain in office workers: A randomized controlled trial. J Occup Health. 2020;62(1):e12106.
14. Lin S, Tsai CC, Liu X, Wu Z, Zeng X. Effectiveness of participatory ergonomic interventions on musculoskeletal disorders and work ability among young dental professionals: A cluster-randomized controlled trail. J Occup Health. 2022;64(1):e12330.
15. Alshehre YM, Pakkir Mohamed SH, Nambi G, Almutairi SM, Alharazi AA. Effectiveness of Physical Exercise on Pain, Disability, Job Stress, and Quality of Life in Office Workers with Chronic Non-Specific Neck Pain: A Randomized Controlled Trial. Healthcare (Basel).2023;11(16).