
THE ROLE OF PHYSIOTHERAPY IN ERGONOMICS IN MANAGING NECK PAIN FOR BUS OPERATORS

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ABSTRACT

Background and Purpose: Musculoskeletal disorders, particularly neck pain, are more common in bus operators due to poor posture, uncomfortable perch position, prolonged working time, vehicle vibration, and repetitive movements involved in long travel such as steering, bending forward, and prolonged sitting can cause excessive strain on the cervical spine, resulting in cervical pain. Bus operators often experience physical as well as psychological problems such as low spirits and stress while operating the bus. This significantly affects the body parts in which discomfort may be experienced, most notably the neck. The purpose of the study is to assess the ergonomic exposure and physiotherapy management for neck pain among bus operators.

Case Description: A case of a 30-year-old male bus operators who was working for six hours per day for the past five years has chronic neck pain with reduced neck mobility.

Objective: To determine the effect of onsite physiotherapy for bus operators and to create awareness of ergonomics among them. The purpose of the study is to assess the ergonomic exposure and physiotherapy management for neck pain among bus operators.

Intervention: The incidence and severity of neck pain can be effectively decreased with the use of proper intervention techniques. According to estimates, effective ergonomic design for bus operator includes posture correction, cognitive behavioral therapy, as well as physiotherapy management for neck pain that includes stretching, strengthening exercises, traction, and manual therapy.

Outcome Measure: The outcome measure is recorded using the Numerical Pain Rating Scale [NPRS] and Neck Disability Index Scoring.

Conclusion: This case study has proven that the bus operators are exposed to a high risk of neck pain due to their poor ergonomics. Therefore, it is important to provide proper ergonomics guidelines for bus operators and implement physiotherapy management in the workplace to prevent the incidence of neck pain and other musculoskeletal disorders among bus operators.

Paper Type: A Case Study Research.

Keywords: Neck pain, Bus operators, Neck Disability Index, Ergonomics, Physiotherapy.

INTRODUCTION

One of the most demanding and deleterious jobs in the contemporary world is driving. According to research from the past 40 years, bus drivers or operators are more likely to experience musculoskeletal disorders than employees in other occupations.⁽¹⁾ The term “work-related musculoskeletal diseases” (WRMSDs) refers to conditions where the working environment compromises the efficiency and functionality of a number of articulation, bone, tendons, nerve and cartilage. Uncomfortable seating, exposure extending to vibration and improper postures are risk factors for WRMSDs.⁽²⁾ The repetitive motions involved in long-distance driving, such as serving, crouching, and slouching can cause sluggish stress along the frisky chain and have an impact on the operators social and confidential life.⁽²⁾

According to a recent worldwide analysis, bus operators who drive for long distance were more likely to experience neck discomfort and upper limb WRMSDs than people with other skeletal anatomical characteristics.⁽²⁾ Individual factors such as lifetime, identity, load, body mass index, and general fitness status are also associated with work-related ailments of operators.⁽³⁾ Operators must practice defensive driving techniques while considering the bus’s passengers’ safety as well as their own, other operators and pedestrians’ safety, as well as the requirement to follow traffic laws and corporate policies.⁽⁴⁾ Emplacement of a variety of different things can cause discomfort in the neck and shoulder blades. Poor posture is a major contributor to discomfort and is the main cause of cervical pain. Hunching forward causes an excessive amount of pressure on the neck muscles while standing or sitting because the head’s weight is not being supported in an upright position.⁽⁵⁾ There is a strong correlation between the shoulder muscles’ capacity to contract and the location of the scapula. Shoulder pullout is a result of bad posture, which is harmful to muscular performance. The location of the scapula is essential for maintaining muscle harmony.⁽⁵⁾

One of the uttermost frequently used anatomy parts when operating bus is the neck and shoulder region. In the operators sitting position, the neutral lumbar lordosis gradually decreases, and there is either an increase or decrease in neck flexion. Multiple effects may result from overusing and supporting the muscles in this area improperly. Numerous muscles that support the joints and vertebrae are located in the body's neck and shoulder regions ⁽⁵⁾. Bus operators work longer shifts—more than eight hours per day—have historically adjusted their scapular posture to compensate for bad posture, which contributes to musculoskeletal diseases. Bus operators often begin their journeys correctly by leaning forward. After a few minutes, the torso leans forward, the shoulders tense, and the gluteal and hip flexor muscles become overworked. ⁽⁵⁾ Even a chair that is cosy in fixed circumstances may have bad moving properties that make it uncomfortable while operating bus. The seating position and duration of usage are other factors that influence whether a seat is deemed comfortably by a user. The ideal chair for automobile might shall not be the ideal chair for another and one person's perch position might not be ideal for another. Therefore, when creating a seat, it's crucial to keep the user in mind. ⁽⁶⁾ According to the research's findings, professional bus operators who have postural neck pain have an unusual and important impression of improper posture. Musculoskeletal conditions including neck discomfort, sprains, and strains can develop in the event that the work environment is not designed with drivers in mind and involves manual, visual, foot, seat, or a combination of these jobs. ⁽⁷⁾ The intend of this study was to analyze both the drivers' posture and the frequency of neck pain in onsite assessment. Effective ergonomic design for bus operators on onsite, including posture correction, cognitive behavioral therapy, and cervical pain management using manual therapy, stretching, strengthening exercises, and traction, is considered to be essential.

Role of Ergonomics in Bus Operators:

The profession of ergonomics makes an entreaty of speculation, postulation, statistics, and methodologies to design in order to maximize human wellness and total organization performance. Workplace efficiency is a concept that focuses on understanding interactions between humans and machines. ⁽¹⁴⁾ Science underlies the field of ergonomics. It combines expertise in engineering, psychology, anatomy and physiology, and statistics to make sure that the designs enhance the skills and capacities of those who use them. ⁽¹⁵⁾ It is used to boost productivity and provide employees with more comfort. ⁽¹⁶⁾ Human anatomical, anthropometric, physiological, and biomechanical aspects are taken into account by physical ergonomics, which is primarily concerned with workplace ergonomic. It all comes down to creating a better workplace with positions created to match people's strengths and improve the working environment. It is a strategy or treatment for a range of musculoskeletal conditions associated with the workplace. ⁽¹⁷⁾ The positioning of the cervical and upper back when someone is sitting is influenced by the location and incline of the work area. As a result, it is crucial to consider both the seat and the task at hand. ⁽¹⁸⁾ In operators with LBP, weariness and neck-shoulder pain were more severe. ⁽¹⁹⁾

Neckdisabilityindex

The Neck Disability Index (NDI) is regarded as a reliable tool for measuring cervical pain and disability in patients with cervical pain brought on by acute or chronic illnesses, which can lead to people facing repetitive motion dysfunction. ⁽¹⁰⁾ Case-completed, condition-specific handy status form with 10 items including torment, self-help, elevating, interpreting, migraine, attention, duty, operating, dozing, and leisure. The NDI has a good hold and is useful in maintaining its current position as the most commonly used self-reported proportion for cervical pain. ⁽¹¹⁾ Scoring: The maximum outcome for each section is 5. If the first statement is marked, the section score is 0, and if the last statement is marked, the section score is 5. The score is determined if all ten portions are completed. ⁽¹²⁾ The NDI can be evaluated using a raw outcome or after being twice reported as a rate. Each part is graded on a scale from 0 to 5, with 5 denoting the most severe pain imaginable and 0 denoting no discomfort at all. A score is calculated by adding all the points. A raw score, with a maximum score of 50, or a rate, might be used to represent the test. No activity restrictions are indicated by 0 points or 0%, and total activity restrictions are shown by 50 points or 100%. More patient-rated impairment translates to a higher score. ⁽¹³⁾

Case Description

A case of a 30-year-old man who was a bus operator for the past five years experienced neck pain for the past three months. He used to operate a bus for six hours per day, six days a week. He was a known alcoholic and had a habit of chewing tobacco. He reported being satisfied with his present job but often experiencing mild stress due to traffic while driving. He engaged him in recreational and physical movement during his rest time, but his neck pain sometimes affected his routine physical activity. His symptoms first appeared on his right side of the neck during the first week of July 2022. He initially consulted his primary care doctor, who recommended pain medication and rest, but this did not relieve his symptoms. During the onsite ergonomic evaluation, we noticed his daily task routine. It was proven that his neck pain was due to poor posture for an

extended period of time, which is hunching forward while driving. However, the pain gets aggravated only while driving and relieved during inactivity.

METHODOLOGY

A 30-year-old male who was a bus operator for the past 5 years had chronic neck pain due to his poor posture while driving. We assessed him in his work station. A low seat position causes him to extend his neck higher while driving, putting pressure on his neck muscles. The assessment was taken using the Neck Disability Index, which is a valid and reliable tool for assessment. We obtained an informed consent form from the subject before the evaluation and during the intervention. The intervention was education of posture while driving (figure-01), strengthening of neck muscles such as isometric exercises (figure-08), stretching of tight muscles (figure-09) and relaxation techniques such as massage and deep breathing exercises, and creating awareness of the role of ergonomic among bus operators.

Strength exercises were given as three sets, held for 10 seconds, with ten repetitions for a week; stretching was given as four sets, one repetition, held for 15 seconds (figure-02 to 07). Advice was given such as lean back, perch at the right elevation, don't perch too adjacent to the steering, make sure you can depress the peavey properly, correct headrest location, prevent whiplash, have proper lumbar support, take breaks while positioned.

Figure-01



Figure-02

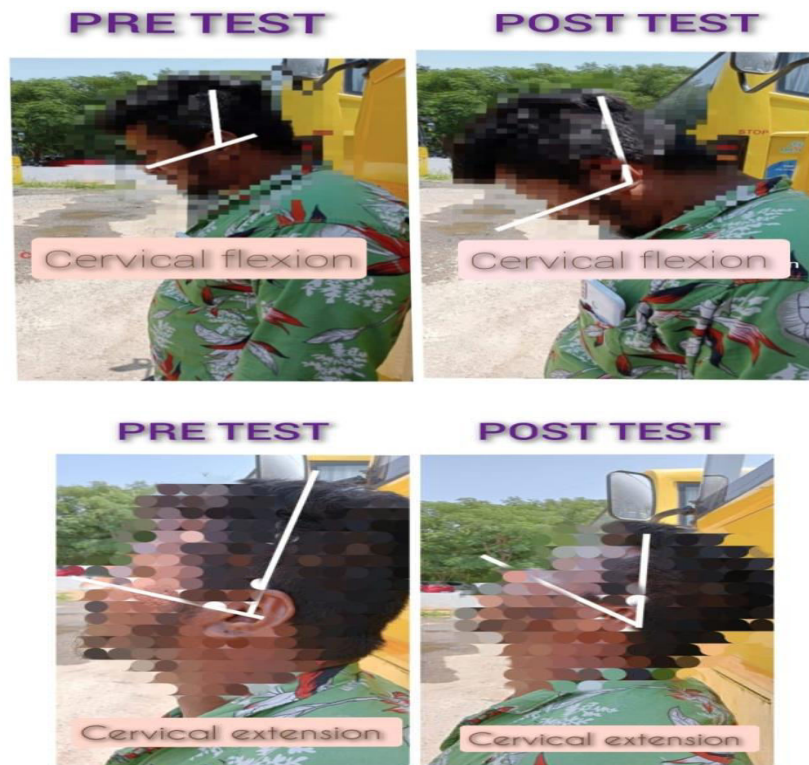


Figure-03

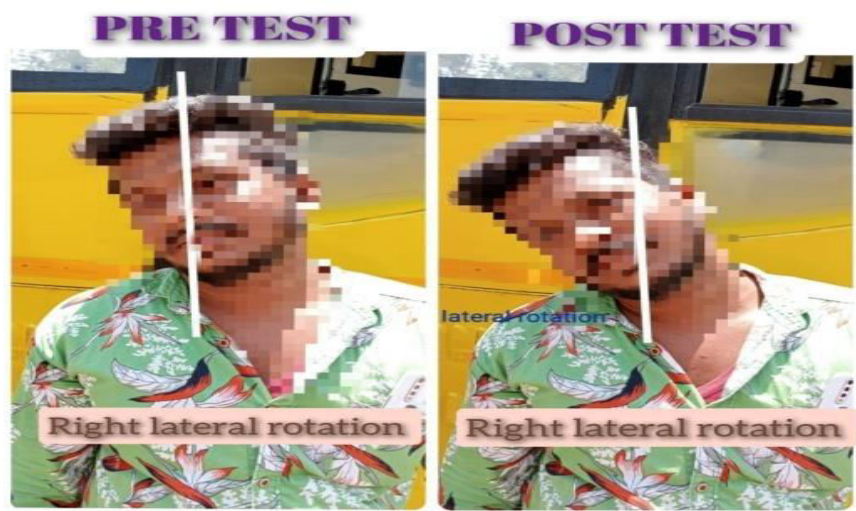


Figure-04



Figure-05



Figure-06



Figure-07

INTERVENTION**Neck isometric exercise****Figure-08****INTERVENTION****Neck stretch****Figure-09****Outcome Measure:**

It was recorded by using Numerical pain rating scale (NPRS) and Neck Disability Index (NDI) ⁽¹³⁾, which has a set of questionnaire

Subject: X**Table-3**

		Pre-Intervention Test	Post Intervention Test
NPRS (0-10cm)		7	5
Cervical Range of Motion	Flexion	35	40
	Extension	38	42
	Right Rotation	80	85
	Left Rotation	83	86
	Right Lateral Rotation	36	41
	Left Lateral Rotation	38	42
Neck Disability Index			
	Pain Intensity	3	2
	Personal Care	3	1
	Lifting	4	3
	Reading	3	1
	Headache	4	1
	Concentration	4	3
	Work	4	3

	Driving	4	3
	Sleeping	3	3
	Recreation	3	1
	Score	70%	21%

DISCUSSION

In this case study a 30 years male bus driver have chronic cervical pain due to poor posture and repetitive movements while driving this leads to neck strain with reduced neck movement. Occupational stress and prolong driving with poor perch posture also affects the operators physical and psychological status. The study assessed the ergonomic exposure and outcome were noted by Neck disability Index ⁽¹³⁾ and NPRS⁽²⁰⁾ as pre and post test. The values are notably reduced after education of posture while driving and after intervention. Therefore, physiotherapy has a vital role in managing neck pain for bus operators.

According to Taklikar C.S et al,(2016) concluded that the majority of bus operators indicated moderate to significant levels of work stress. Bus operators enduring stressful conditions were more likely to experience increased blood pressure, musculoskeletal morbidity such as ache in back region, knee pain, tension and headache, joint stiffness and ligament injuries as well as digestive problems such as dyspepsia and regurgitation.⁽¹⁾ N Rugbeer et al, (2016) concluded that the majority of the bus drivers who was operating a bus continuously without taking break are most commonly affected with work-related musculoskeletal disorder. Some bus drivers were obese due to unhealthy diet, consuming alcohol, smoking, sitting for prolong time while driving and reduced physical activity. Drivers with elevated BMI may be more vulnerable to cardiovascular disease and traffic accidents.⁽²⁾ SandulYasobanetet al,(2015) stated that the probability of bus operators exposed to the existing ergonomic factors might develop WMSDs. Moreover, it was observed that the operators who participated in less physical exercise seemed to have a greater chance of getting WMSDs. The reported discomfort in a specific body part has a higher exposure of developing WMSDs. Overall upper back and lumbar pain were revealed to have the most painful body parts. Further ergonomic research and effective ergonomic intervention are basic components that advised for the bus operators who have a higher risk of acquiring WMSD.⁽³⁾ Muhammad Kashif et al,(2016) reported that balance, head ache, day-to-day activities, cognition, sleep, and numbness were some of the observed issues brought on by neck pain. Providing drivers with advice on positional aware, maintaining good driving posture, taking breaks between long periods of operating and adjusting their seats to fit their bodies will all be beneficial in reducing neck strain.⁽⁷⁾

CONCLUSION

From this study, we found that onsite assessment and physiotherapy intervention benefit the bus operator in preventing work related musculoskeletal disorder. Onsite physiotherapy in the work place benefits those bus operator those who can't reach health care advice for their problems. From this we conclude that doing regular exercise and maintaining good posture while driving can reduce the neck pain and it also helps to prevent other musculoskeletal disorders among bus operators.

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