OUTCOME OF ACTIVITY MODIFICATION IN MANAGEMENT OF MECHANICAL LOW BACKACHE AMONG THE MOTORBIKE DRIVERS IN DELIVERY SERVICE

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Abstract
Background: Mechanical low backache (LBA) is prevalent among motorbike drivers in the delivery service industry and significantly affects their quality of life and work productivity. The aim is to comprehensively assess the impact of activity modification on the management of LBA among motorcycle drivers. **Materials and Methods:** A prospective interventional study involving 74 motorbike riders clinically diagnosed with LBA was conducted in Chennai, India. Demographic details, disease characteristics, and quality of life assessments were collected using the Numerical Pain Rating Scale (NPRS), Oswestry Disability Index (ODI), and EQ-5D-5L questionnaire. **Result:** The majority of participants were under 30 years of age (43.2%), predominantly male (71.6%), and had a normal BMI (48.6%). Most of the drivers did not smoke (77%). The median rest interval was 8.00 minutes, with variability noted between 6.00 and 10.00 minutes. The median riding duration was 7.50 hours, with half of the drivers riding for less than 7.50 hours. This study found significant reductions in pain scores and improvements in various clinical parameters following activity modification interventions, indicating their potential effectiveness in enhancing the well-being of motorbike drivers with LBA in the delivery services sector. **Conclusion:** This study highlights the importance of tailored interventions to address the unique challenges faced by motorcycle drivers in the delivery service industry. Future research should focus on larger-scale longitudinal studies to assess long-term effectiveness and identify optimal strategies for managing LBA in this occupational group.

INTRODUCTION

Mechanical low backache (LBA) is a prevalent and debilitating musculoskeletal condition that affects a significant proportion of the global population. LBA has a particularly high incidence among motorcycle drivers engaged in delivery services. The nature of this occupation places unique physical stress on individuals, contributing to the development and worsening of lower back pain. Prolonged periods spent on bikes, navigating through traffic, lifting, and transporting packages all increase the risk of chronic back problems. It is crucial to address the impact of activity modification on managing LBA among motorbike drivers in the delivery service industry. This will help to alleviate the burden of this condition on both individuals and the workforce.[1,2]

The delivery service sector has experienced substantial growth in recent years, leading to an increased reliance on motorbike drivers for e-commerce and rapid deliveries.[3] This growth has drawn attention to the occupational hazards faced by motorbike drivers, with LBA emerging as a significant concern.[2] The unique ergonomic challenges and physical demands of the job require a tailored approach to effectively address and manage LBA. Activity modification, as a therapeutic intervention, involves adjusting daily tasks and routines to reduce strain on affected body parts. For motorbike drivers in delivery services, activity modification could include changes in driving posture, lifting techniques, rest intervals, and specific exercises.[4] With the goal of minimising mechanical stress on the lumbar spine and surrounding structures, creating a healthier work environment, and reducing the incidence and severity of LBA.[5] While existing literature has provided some insights into the association between occupational factors and the development of LBA,

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there is a lack of research specifically investigating the outcomes of activity modification interventions among motorbike drivers in the delivery service industry.

This study aimed to fill this gap by exploring the effectiveness of tailored activity modification programs in managing LBA among this specific occupational group. The significance of this research lies not only in improving the well-being of motorbike drivers but also in contributing valuable data to occupational health and safety practices.[6] By understanding the outcomes of activity modification in managing LBA among motorbike drivers in delivery services, targeted interventions can be developed to address the unique challenges posed by this occupation. Through an extensive analysis of the relevant literature and the integration of real-world evidence, this research aims to provide evidence-based guidelines and recommendations to improve the quality of life of motorcycle drivers facing the burden of LBA.

Aim

To analyse the primary and secondary outcomes of activity modification in the management of mechanical low back pain among motorbike drivers in delivery services. The outcome of activity modification in terms of job control by correcting work patterns, engineering control by correcting bike alignment and fittings, and health promotion, bringing efficiency and engagement of musculoskeletal elements of the spine.

MATERIALS AND METHODS

This study employed a prospective interventional study design and sourced data from motorbike riders in a delivery service in Chennai City, India. The study population consisted of motorbike riders actively involved in delivery services, with a sample size of 74 individuals selected using a convenient sampling method. Ethical approval and informed consent were obtained from all participants.

Inclusion Criteria

Participants had to belong to the age group of 18 to 50 years, encompassing both males and females. The study specifically targeted motorbike riders in the delivery service with a driving experience exceeding six months and engaging in a minimum of four hours of driving per day. Additionally, participants who operated both petrol and electric motorcycles were included in the study.

Exclusion Criteria

Individuals with low back pain resulting from injuries, surgeries, or historical incidents were excluded. Additionally, those experiencing organic low back pain attributable to conditions such as disc injury, spondylosis, sciatica, lumbar canal stenosis, vertebral fractures, and other related factors were not included. Participants reporting back pain due to inflammatory, neoplastic, or infectious causes were also excluded.

74 participants were given a comprehensive explanation of the study and signed consent forms before administering the questionnaire. The participants were observed in the survey study following the inclusion criteria. Of the initial 110 participants, 36 withdrew from the study before providing their consent. Subsequently, the Numerical Pain Rating Scale (NPRS) score, Oswestry Disability Index (ODI) questionnaire, and health-related outcomes using the European Quality of Life Index EQ-5D-5L were completed by the remaining 74 participants on the first and 14th days of the study.

Statistical Analysis

Statistical analysis of the collected data was performed using Microsoft Excel. Excel was employed not only for data analysis but also for the generation of graphs and tables to present the findings effectively. The ODI was used as a measurement tool to evaluate the outcome of the activity modifications.

RESULTS

The majority of participants fell within the age range of <30 years (43.2%), with the 31-40 age group closely following at 39.2%. Male drivers dominated the sample population, constituting 71.6%, whereas females accounted for 28.4%. The distribution of BMI categories revealed that 48.6% were normal weight, 25.7% were overweight, 17.6% were obese, and 8.1% were underweight. Additionally, the majority of drivers did not smoke (77%), whereas 23% engaged in smoking. [Table 1]

The median rest interval is 8.00 minutes, with the 25th and 75th percentiles at 6.00 and 10.00 minutes, respectively, revealing a central tendency and variability in rest times. In terms of riding hours, the median duration was 7.50 hours, with an interquartile range spanning from 6.00 to 8.00 hours. These data indicate that half of the drivers rested for less than 8.00 minutes and remained ridden for less than 7.50 hours. [Table 2]

For the NPRS, the median pain score significantly decreased from 6.00 (Pre) to 2.00 (Post), with a p-value of <0.0001. Similar statistically significant improvements were observed in ODI, mobility, self-care, activities of daily living, pain, and anxiety/depression scores, as indicated by the respective p-values. [Table 3]

Table 1: Demographic Characteristics of Motorbike Drivers in Delivery Services

		Number of patients (%)
Age group	<30	32(43.2)
	31-40	29(39.2)
	41-50	13(17.6)

Sex	Female	21(28.4)
	Male	53(71.6)
BMI	Underweight	6(8.1)
	Normal weight	36(48.6)
	Overweight	19(25.7)
	Obese	13(17.6)
Smoking	No	57(77)
	Yes	17(23)

Table 2: Distribution of Rest Intervals (in minutes) and Riding Hours among Motorbike Drivers in Delivery Services

	Median	Percentile 25	Percentile 75
Rest in min	8.00	6.00	10.00
Ride hrs	7.50	6.00	8.00

Table 3: Outcome Measures Before and After Activity Modification Intervention among Motorbike Drivers in Delivery Service

		Median	Percentile 25	Percentile 75	P value
NRS	Pre	6.00	5.00	7.00	<0.0001
	Post	2.00	1.00	3.00	
ODI	Pre	59.00	42.00	72.00	<0.0001
	Post	22.00	14.00	32.00	
Mobility	Pre	3.00	3.00	4.00	<0.0001
	Post	2.00	1.00	2.00	
Self-care	Pre	3.00	2.00	3.00	<0.0001
	Post	1.00	1.00	2.00	
Activities of Daily Living	Pre	3.00	2.00	3.00	<0.0001
	Post	1.00	1.00	2.00	
Pain	Pre	3.00	3.00	4.00	<0.0001
	Post	1.00	1.00	2.00	
Anxiety/Depression	Pre	3.00	3.00	3.00	<0.0001
	Post	1.00	1.00	2.00	

DISCUSSION

Mechanical low backache (LBA) is one of the most common and devastating musculoskeletal conditions affecting a large percentage of people worldwide. The frequency of LBA is especially high among motorcycle riders who provide delivery services. The demographic profile of our study participants revealed that a significant portion of motorbike drivers in this sector were young adults, with the majority falling within the age range of <30 and 31-40 years. This finding aligns with the trends observed in the study conducted by Gautam et al. (age 20-30; 57.0%).[7] Additionally, the predominance of male drivers in the sample population reflects the gender distribution commonly observed in this occupation. These results were similar to those of a study conducted by Sultan et al.[8]

The analysis of BMI and smoking habits among motorbike drivers highlights potential risk factors for the development of mechanical low backache. The relatively high prevalence of overweight and obesity among drivers, coupled with a significant portion engaging in smoking, underscores the importance of addressing lifestyle factors in the prevention and management of low back pain in our study population and this aligns with a study conducted by Okunribido et al.[9]

Temporal patterns in the work routines of motorbike drivers, as evidenced by rest intervals and riding hours, provide valuable insight into the physical demands of their jobs. Our study showed that a median rest interval of 8.00 minutes and a median riding duration of 7.50 hours indicate typical practices among drivers in this industry. These findings emphasise the need for interventions aimed at optimising work schedules and promoting adequate rest to mitigate the risk of developing low backache, as stated by the World Health Organization (WHO) guidelines for non-surgical management of chronic primary low back pain in adults in primary and community care settings. Geneva: World Health Organization.[10]

The observed reductions in pain scores and improvements in functional and psychological outcomes following activity modification interventions among motorbike drivers in the delivery services sector echo findings from recent studies.[11,12] Comparable research within the past decade has highlighted the effectiveness of targeted interventions in reducing low back pain among various occupational groups. For example, workplace ergonomic interventions among office workers, a study conducted by Driessen et al., and manual labourers in construction settings by Sundstrup et al. have demonstrated significant improvements in pain severity and functional capacity.[13-15] The current study, reinforces the importance of tailored interventions to address the unique needs of motorbike drivers.

The current study adds to the growing body of evidence supporting the effectiveness of activity modification interventions in enhancing the well-being and functional capacity of motorbike drivers experiencing mechanical low backache. By

demonstrating significant improvements across multiple clinical parameters, including pain, functional status, and psychological well-being, this study reinforces the importance of targeted interventions tailored to the unique needs of motorcycle drivers in the delivery services sector.

CONCLUSION

In conclusion, these findings contribute to the growing body of evidence supporting the efficacy of activity modification interventions in enhancing the overall well-being and functional capacity of motorbike drivers experiencing low backache. Future research should focus on larger-scale longitudinal studies to assess the sustainability of intervention effects as well as comparative effectiveness studies to identify optimal low back pain management strategies in this occupational group. In addition, implementing ergonomic interventions and promoting healthy lifestyle habits among motorbike drivers could help reduce the burden of low backaches and improve occupational health outcomes in this population.

Limitations

The limitations of the study include the relatively small sample size and lack of long-term follow-up data to assess the sustainability of the intervention effects. Future research should focus on larger-scale longitudinal studies to assess the sustainability of intervention effects, and comparative effectiveness studies to identify optimal strategies for managing low back pain in this occupational group.

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