Correlation between Neck Pain and Disability among People Wearing Helmet

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Highlights:

- Current study was a cross sectional survey to find the correlation between neck pain and disability among people wearing helmet during bike ridings
- Neck disability index questionnaire was used and data was collected from the University of Lahore, Pakistan.
- It was concluded that there was moderate positive correlation between neck pain and disability scores of those participants.

Abstract:

Helmet is an effective gear to protect from life threatening injuries during road traffic accidents (RTA).Parameters such as neck pain and disability while wearing helmet should be analyzed as independent concepts and two different dimensions because various factors might affect this relationship.

Objective:

To find out the correlation between neck pain intensity and disability of bike riders who wear helmet.

Methods:

This was a cross sectional study in which NDI (Neck disability Index) was used to find out level of disability among helmet wearing bike riders. Data was collected from 2017 August to 2018 January from department of physiotherapy, University of Lahore. Convenient sampling technique was used for data collection. Sample size was 184. Male motorbike rider of age 19-35 years old who wear helmet were included. Participants having Tumor, Infection, fracture of spine and its surrounding tissues/Structures were excluded.

Results:

Mean of age was 22.52±3.57 years. Out of total 184, 126(68.5%) respondents reported no pain at all. Majority of the participant 78(44.2%) had no disability 35(19%) bike riders had no pain and were also not disable according to NDI scoring .The correlation between pain intensity and NDI score was 0.601 (p= 0.000).

Conclusion:

Among all bike rider wearing helmet, majority had no neck pain and disability but few were suffering from mild neck pain. This was concluded that there was moderately positive correlation between neck pain and disability scores of those participants.

Keywords:

Disability, Neck pain, helmet.

Introduction:

Neck pain is common medical problem that occurs from any biomechanical disturbances or diseases. In nonspecific or mechanical neck pain, muscles become spastic that leads to decrease mobility of neck[1,2] .In non-specific chronic neck pain patients develops more limitations of functions, may cause disability and negatively effects normal health condition. Helmet is used to protect us from head injuries and while driving it is mandatory to wear in our land for bike or bicycles riders.[3] It is used as a life protecting gear. Using helmet is the best way in minimizing head trauma and also reduces the risk of having severe trauma among bike riders[4-6.] These factors are highly associated and strongly affect quality of life.[7,8] More likely poor body posture, injuries and age related degenerative

changes, tumors, infections and inflammation are the contributing risk factors of neck pain.[9,10] Due to hours of study and poor body mechanics while using computer and reading the student are at high risk of developing neck pain[11,12]. Helmet is an effective gear to protect from life threatening injuries during road traffic accidents (RTA). It consists of layer of foam and outer protective shell. Outer force is dispersed between these layers. Foam absorbs this force which could be catastrophic if it hits the skull directly. Shell on the other hand decreases the impact of penetrating force during RTA[13,14]. The relation between neck pain and disability is complicated. These two parameters should be analyzed as independent concepts and two different dimensions because various environmental, social, physiological and psychological factors might affect this relationship[7]. The average weight of helmet is approximately four pounds. With the average weight helmet approximately four pounds and weight of the head approximately eight pounds, the helmet and the head must be held by ligament, muscles and 7 cervical vertebrae[15,16]. In Pakistan there are very few studies on neck pain among bike riders. Therefore, the purpose of this research is to find that if there is any correlation between intensity of neck pain and disability among bike riders who wear helmet. Finding out association between these two parameters would direct further studies, aiming to predict the extent of correlation and related risk factors.

Methodology:

This Cross-sectional survey was conducted in which NDI (Neck disability Index) was used to find out level of disability among helmet wearing bike riders. Data was collected from 2017 August to 2018 January from department of physiotherapy, University of Lahore, Lahore and convenient sampling technique was used for data collection.184 participants who wear helmet were selected for this survey. To find the population the sample size was calculated with 95% confidence level by conducting a pilot study. It is also adjusted for 10% dropout rate. In this study male motorbike rider of age 19-35 years old who wear helmet were included. Participants with tumor, Infection, fracture of spine and its surrounding tissues/Structures were not included in this survey. Data about neck pain intensity and disability was gathered through NDI (neck disability index) in which 0-4 points (0-8%) represents no disability, 5-14 points (10-28%) mild disability, 15-24 point (30-48%) moderate disability, 25-34 point (50-64%) severe disability and 35-50 points (70-100%) demonstrates complete disability.()Descriptive analysis and neck disability was statistically analyzed through SPSS version 22.0. Correlation statistics was used to find association between different parameters of NDI.

Results:

This cross section survey was conducted on 184 young bike riders who used to wear helmet while riding. All participants were male. Age was between 19-35 years. Mean age was 22.52±3.57 years. Worst imaginable pain was present in 1 (0.5%), very severe pain in 4(2.2%), fairly severe in 16 (8.7%), moderate pain in 15(8.2%) and very mild pain in 22(12%). Remaining 126(68.5%) respondents reported no pain at all. Majority of the participant 78(44.2%) had no disability and 2(1.1%) very completely disable (Table 1).The bar chart shows that 35(19%) had no pain and were also not disable according to NDI scoring (fig 1).The correlation between pain intensity and NDI score was 0.601 (p= 0.000). Correlation between pain intensity and other variables of NDI is summarized in Table 2.

Disability	Frequency (%)
No Disability	78 (42.4)
Mild Disability	74 (40.2)
Moderate Disability	22 (12)
Severe Disability	8 (4.3)
Complete Disability	2 (1.1)

Table I: Frequency of level of disability among respondents according to NDI scoring

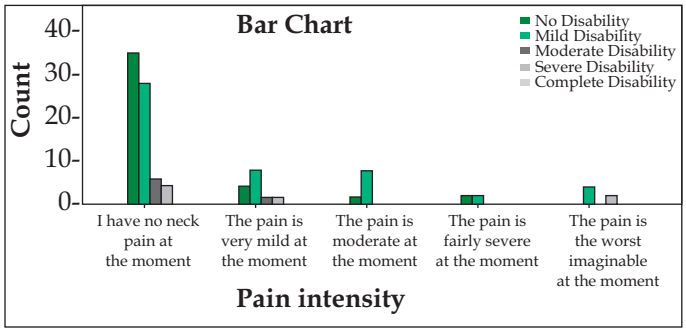

Figure 1: Bar chart representing pain and disability among participants

Spearmans rho	Personal care	lifting	Reading	Headaches	Concentration	Work	Driving	Sleeping	Recreation	NDI Score
Pain intensity	0.409	0.525	0.532	.317	.352	.421	.552	.404	.464	.601
Personal care		.337	.522	.393	.553	.354	.545	.513	.470	.709
Lifting			.343	.313	.319	.374	.265	.314	.370	.553
Reading				.430	.584	.576	.421	.423	.458	.629
Headaches					.575	.475	.371	.401	.310	.515
Concentration						.488	.437	.414	.535	.622
Work							.410	.576	.613	.635
Driving								.358	.471	.575
Sleeping									.548	.676
Creation										.606

Table II: Correlation between pain intensity and different variables of NDI

Discussion:

This was a cross sectional survey conducted on bike riders who use helmet while riding bike, Helmet is a protective device but wearing helmet can put extra stress on head, neck and shoulder complex, especially in case of previous neck pain, wearing helmet can increase load and thus stress on helmet. A study by Punitha Kumar R.K et.al was conducted and, in his study, demonstrated the relationship between the various variables and cervical discomfort among Helmet Users. His results demonstrated strong +ve correlation in different kind of helmets and distance travelled with neck discomfort. On contrary, there was a strong -ve correlation found in different size, types and alteration of helmets.[15] In a study Julio A. Chalela et.Al found that commonly occurring headache in military personnel was migraine along with aura and more than quarter of participants had helmet induced headaches. Some of their patient's demonstrated sign and symptoms of occipital neuralgia and their symptoms were alleviated through occipital nerve block. Most of the participants experienced headache even after removal of headgear, suggesting that helmet aggravated the primary headache disorder. It was also found that helmet use was a common risk factor of headache which can lead to sleep disturbance.[18] According to research conducted by Harrison MF et al., it was concluded that night vision goggle along with the helmet can increase the muscle activation in few smaller muscle groups of neck and shoulder. In this study it was suggested that posture and position of the head and neck influence the effect of helmet weight in causing stress on neck. This implies that posture is an important factor while determining effect of helmet wearing[19] Saeed Bin Ayaz et al., in their study also found that forward flexion posture can contribute to neck pain in females of women medical college.[11] Seven cervical vertebrae, ligament and muscles hold the weight of helmet and head. Due to this cervical muscles are prone to get fatigued thus causing stress, discomfort and pain.[3,5] Helmet wearing is very useful while one is riding a bike, because it acts as a life protecting gear. The main purpose of wearing helmet is to reduce the impact thus decreasing head trauma severity and saving lives. As head trauma is the primary cause of death and disability among bike riders during road traffic accidents, using helmet is the most effective way in decreasing head trauma and it also reduces the impact of injury among riders.[5,20] Our study concluded that there is a moderate positive correlation between neck pain and helmet wearing but we cannot rule out the fact that posture disturbance while driving might be one of the reasons effecting this association. Thus, further studies should be conducted to access the load of helmet in different head and neck postures while driving.

Conclusions:

Among all bike rider wearing helmet, majority had no neck pain and disability but few were suffering from mild neck pain. This was concluded that there was moderate positive correlation between neck pain and disability

scores of those participants.

Recommendations:

The neck pain is also associated with other factors including previous history, weak muscles surrounding neck, body posture. It is recommended to conduct this study by considering these factors. It is also recommended to conduct this study in other institutions and on larger scale.

References:

01- Riaz F, Haider R, Qamar M, Basharat A, Manzoor A, Rasul A, et al. Effects of static stretching in comparison with Kaltenborn mobilization technique in nonspecific neck pain. BLDE University Journal of Health Sciences. 2018;3(2):85-8.

02- Khan M, Soomro RR, Ali SSJPJPS. The effectiveness of isometric exercises as compared to general exercises in the management of chronic non-specific neck pain. 2014;27(5):1719-22.

03- Maheshwari R. Bongoni. LZ, Priyanka, in HaAKPoNP, Neck QSPHUU, Disability Index IJoC, Advanced Research, pp. 15564-15566.

04- Senthilnathan C, Gurulakshmi A, Kumar Gm. Effects Of Isometric Neck Exercises In Improving Cervical Range Of Motion In Long Time Helmet Wearers.

05- Ibrahim E. The effects of neck posture and head load on the cervical spine and upper extremities 2015.

06- Faryabi J, Rajabi M, Alirezaee SJAotr. Evaluation of the use and reasons for not using a helmet by motorcyclists admitted to the emergency ward of shahid bahonar hospital in kerman. 2014;3(3).

07- Castaldo M, Catena A, Chiarotto A, Villafañe JH, Fernández-de-Las-Peñas C, Arendt-Nielsen L. Association Between Clinical and Neurophysiological Outcomes in Patients With Mechanical Neck Pain and Whiplash-associated Disorders. The Clinical journal of pain. 2018;34(2):95-103.

08- Nijs J, Van Houdenhove B, Oostendorp RAJMt. Recognition of central sensitization in patients with musculoskeletal pain: application of pain neurophysiology in manual therapy practice. 2010;15(2):135-41.

09- Park SJ, Lee R, Yoon DM, Yoon KB, Kim K, Kim SH. Factors associated with increased risk for pain catastrophizing in patients with chronic neck pain: A retrospective cross-sectional study. Medicine. 2016;95(37):e4698.

10- Dimitriadis Z, Kapreli E, Strimpakos N, Oldham JJJob, rehabilitation m. Do psychological states associate with pain and disability in chronic neck pain patients? 2015;28(4):797-802.

11- Ayaz Sb, Malik R, Khan Aa, Gill Za, Akhtar N, Matee S. Intensity Of Neck Pain Secondary To Excessive Flexion Posturing, Its Association With Study Activities And Duration Of Posturing And Impact On Sleep In Students Of Women Medical College, Abbottabad. Editorial Advisory Board. 2016;66:22.

12- Fatima S, Arsh A, Daud M, Gohar M, Ahmad A, Shah AMJPM, Rehabilitationsmedizin, Kurortmedizin. Upper Back Pain among Physical Therapy Students and Its Association with Gender, Body Mass Index, Study Hours and Use of cell Phones. 2019;29(03):156-60.

13- Gandhi VS, Kumaravelan R, Ramesh S, Venkatesan M, Ponraj M. Performance Analysis of Motor Cycle Helmet under Static and Dynamic Loading. Mechanics and

Mechanical Engineering. 2014;18(2):85-96.

14- Dhiresh D, Muzaffar A, Nasiruddin S, Rafeeuddin N, Hardipsinh V. Review of Analysis of Motorcycle Helmets.

15- Clifford SLJV. Relationship between the Different Variable and Neck Pain among Helmet Users.5(11.19):11.9.

16- Ramli R, Oxley JJI. Motorcycle helmet fixation status is more crucial than helmet type in providing protection to the head. 2016;47(11):2442-9.

17- Farooq MN, Mohseni-Bandpei MA, Gilani SA, Hafeez A. Urdu version of the neck disability index: a reliability and validity study. BMC musculoskeletal disorders. 2017;18(1):149.

18- Chalela JA. Helmet-induced occipital neuralgia in a military aviator. Aerospace medicine and human performance. 2018;89(4):409-10.

19- Harrison MF, Coffey B, Albert WJ, Fischer SL. Night vision goggle-induced neck pain in military helicopter aircrew: a literature review. Aviation, space, and environmental medicine. 2015;86(1):46-55.

20- Senthilnathan C, Gurulakshmi A, Kumar Gm. Effects Of Isometric Neck Exercises In Improving Cervical Range Of Motion In Long Time Helmet Wearers. International Journal Of Current Advanced Research. 2018;7(15564-15566).