

ASSOCIATION BETWEEN YEARS OF EXPERIENCE, LOW BACK DISABILITY LEVEL AND HIP ANGLE IN CYCLE RICKSHAW PULLERS OF BEGUSARAI: A DESCRIPTIVE STUDY

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ABSTRACT

Purpose: The aim of this study is to determine that whether there is any presence of low back disability along with changes in hip angle in cycle rickshaw pullers and does the years of experience of working will have any effect on these parameters. A study is done on cycle rickshaw pullers of Begusarai. **Methodology:** A descriptive study sample is divided into 3 groups with different years of experience i.e group A (3-10 y), group B (11-20y), group C (21-30 y). Total of 70 subjects was included based on the inclusion and exclusion criteria. Convenience Sampling was used for the selection of participants. Descriptive Statistics has been used for the analysis of the data. **Results:** A sample of 70 cycle rickshaw pullers with Mean of hip angle ± 144.46 and mean of Oswestry low back disability score ± 14 . **Conclusion:** There was significant correlation between years of experience, low back disability level and hip angle.

KEY WORDS

Low back disability score, hip angle,

INTRODUCTION

The cycle rickshaw is a modified tricycle, which is used extensively as a mode of transport for carrying passengers and luggage. The cycle rickshaw pullers undergo heavy physical work during carrying passengers. Besides, the pullers have to work in hot summer and rainy season. About 8.5 lakh population involved in rickshaw pulling in India. This is the cheapest non polluting mode of transport in urban and rural areas. The ergonomic studies indicate that the design of existing rickshaw does not match well with the body structure and dimension of the rickshaw pullers¹. More over they used to pull 2 times or sometimes 3 times of the weight of them. During rickshaw pulling they maintain a lumbar flexion position for lengthy period of time.

Constant compression of any joint over a long period can lead to the transmission of noxious stimuli,

muscles fatigue and trigger point will lead to further compression and chronic muscle pain. Any prolonged position will also result in cumulative tensile stress on joint capsules and ligaments, which can bring both pain and long term structural changes to the joint arthrokinematics². Low back discomforts are very similar to this principle except that the aggravating position is prolonging flexion. Cycle rickshaw pullers have same body mechanics as the cyclist during driving but they have additional load to pull in their back seat

Posture typically refers to how the body positions itself as a whole. "Good" posture indicates a certain positioning, with alignment of the neck, torso, pelvis, arms and legs in such a manner that our "natural" spinal curves remain neutral, or not bent, as we sit, stand or move about. This assures optimal balance and proportion of our body mass and framework,

affecting breathing, bodily fluid circulation and muscle and joint control, with minimized stress to the joints, muscles, vertebrae and tissue. "Poor" posture is defined as when our spine is carried or positioned in unnatural positions, in which the curves are accentuated, thus positioning the joints, muscles and vertebrae in stressful positions. Prolonged poor positioning or use of stressful movements results in accumulation of pressure on these tissues. Over time, dysfunction will occur because these tissues are overused, resulting in pain, difficulty with breathing, increased joint wear and tear, decreased endurance and weakness and possibly entrapment of nerves, arteries, veins and tendons. Compensatory movements and/or positions (abnormal movements and/or positions that are utilized to offset dysfunction) are the result; the body is unbalanced, certain muscles and joints are over utilized and others are underutilized resulting in body asymmetry. Postural dysfunction, typically, is a result of an individual's lifestyle and/or occupational demands.

Disability may be physical, cognitive, mental, sensory, emotional, developmental or some combination of these. Disabilities is an umbrella term, covering impairments, activity limitations, and participation restrictions. Impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations. Thus disability is a complex phenomenon, reflecting an interaction between features of a person's body and features of the society in which he or she lives.

Low back pain remains a condition with a relatively high incidence and prevalence following a new episode. The pain typically improves substantially but does not resolve completely during the first 4-6 weeks. In most people the pain and associated disability persist for months, however, only a small proportion remains severely disabled. Risk factors for the development of back pain include heavy physical work, frequent bending, twisting, lifting and prolonged static postures.

Kendall states that "postural faults that persist can give rise to discomfort, pain and disability. The range effect from discomfort to incapacitating disability is

related to the severity and persistence of the faults".¹ There is no single posture that can be maintained for long period of time. Any prolonged posture will lead to static loading of the muscles and joint tissues and consequently can cause discomfort.³ Need of the study is several studies highlight neck and back as the main sources of overuse injuries in Cyclists but to my knowledge there is no study done yet about cycle rickshaw pullers in whom lumbar area is maintained in prolong flexion in addition to their added loads which they have to pull.

METHODOLOGY

Design

This is an observational study. All the subjects were recruited from the Begusarai

Sampling

Total of 70 subjects were chosen as per the inclusion and exclusion criteria, and informed consent was obtained from all the subjects after the procedure was explained to them.

Procedure:

A total of 112 cycle rickshaw pullers were surveyed for the study. Out of which only 70 met the inclusion criteria. The study was explained to these 70 subjects and an informed consent form was obtained from them. These subjects were then divided into three groups based on years of experience through convenient sampling. Group A (3-10) years of experience, Group B (11-20) years of experience and Group C (21-30) years of experience. Then the subjects were made to complete low back disability score index by explaining them each point of scale by the researcher. Later the hip angle of all subjects was measured. The data was noted and given for data analysis to obtain results.

For measuring hip angle the subjects were instructed to wear shorts so that bony landmarks were exposed properly. Subject was positioned in relaxed standing position and the distance between both feet was kept equivalent to the width of shoulders. Bony landmarks such as ASIS, Greater trochanter, Lateral femoral condyle were manually palpated. Reflective markers were adhering to those points. The digital camera is fixed on the tripod stand at a distance of 150cm on lateral aspect of the subjects; height of the tripod

stand was kept approximately at height between the ASIS, greater trochanter and lateral femoral condyle. The angle corresponding to greater trochanter. The angle femoral condyle was recorded on Image J Tool.

Fig 1: position for measuring hip angle



RESULTS

The subjects included were from 20-65 years of age; of these 38% subjects were in the age category of 20-35 years, 41% were in 36-50 years and 21% in 51-65 years of age category.

Correlation between years of experience, low back disability score and hip angle of overall subjects and of different group is presented on **Table 1**.

Table 1: Represents correlation between different variables

	R	p
Experience and olbds	.663	.000
Experience and hip angle	-.543	.000
Hip angle and olbds	-.301*	.011
Experience and olbds(group a)	.758	.000
Experience and hip angle(group a)	-.609	.000
Experience and olbds(group b)	-.157	.520
Experience and hip angle(group b)	-.122	.618
Experience and olbds(group c)	-.122	.618
Experience and hip angle(group c)	-.420	.094
Intergroup comparison of disability score	F=23.318	.000
Intergroup comparison of hip angle	F=8.800	.000

DISCUSSION

The occupation of cycle rickshaw pulling is burdened with strenuous work and over exertion. They have to pull in adverse weather condition like scorching heat or incessant rains and of course physical exhaustion. Leading morbidity among them was found to be musculoskeletal disorders, acid peptic diseases and impaired hearing.

In this present study we found out that there was a major association seen between the years of experience, disability and hip angle of cycle rickshaw pullers. In our study the subjects included were from 20-65 years of age, of these 38% subjects were in the age category of 20-35 years, 41% were in 36-50 years and 21% in 51-65 years of age category.

Further on seeing the proportion of disability score it was seen that in 20-35 years of age group 17 subjects lied in (0-10) disability score, 10 in (10-20) disability score and more above that. In 36-50 years age group, 9 were in (0-10) score, 12 in (10-20), 5 in (20-30) and 3 above 30 disability score. In 51-65 years of age group 1 was in (0-10) score, 5 in (10-20) and (20-30) each and 4 in above 30 disability score.

From above statistics it was seen that in younger age group i.e. 20 – 35 years the level of disability was very low as compared to other age groups. In 36-50 years the disability score lied between (10-30) which shows a gradual increase in this age group. In 51-65 years the disability score again lied 10 and above 30. It again showed gradual increase in disability levels with age. This age group was the only one which shows highest level of disability score.

In **Table 1**, we saw a positive, significant correlation between years of experience of working and the disability score of all cycle rickshaw pullers while there was a significant negative correlation between the years of experience and hip angles. This trend shows that with advancing years of experience the disability level also increases and their occurs long term structural changes to the joint arthrokinematics. Moreover the numbers of subjects in this group were relatively larger than group B and group C, which could also have affected the results.

A previous study supports this finding. In this study on cyclist it was seen that any prolong position resulted in cumulative tensile stress on joint capsules and ligaments, which brought both pain and long term structural changes to the joint arthrokinematics². Another study states that any prolong posture leads to static loading of muscles and joint tissues and consequently can cause discomfort.³

Yet another fluoroscopic\biomedical study on cyclist states that low back can be attributed in part to the anatomical extension between the pelvis and the spine. This results in tensile forces along the anterior longitudinal ligament of lumbar spine, which increase as the result of sitting on saddle and reclining on the handle bar, as seen in this kind of work.⁴

In this present study all the subjects were divided into three groups based on their levels of experience. In Group A (3-10) years of experience, the correlation between experience and disability score was positive while with hip angle it was negative. But both were statistically significant. Again these results can be supported by the previous studies as seen above.^{2, 3, 4}

In Group B (11-20) years of experience, there was trend seen which was just opposite to Group A. Here the perception of disability decreased with years of experience. Here we saw a negative correlation but it was statistically not significant. The probable reason behind this could be the fact that maximum musculoskeletal changes and problems have occurred in initial 8-10 years of work approximately. After 10 years of so the changes must have already established themselves and must have become chronic in nature. Hence this group did not perceive disability as effectively as group A subjects.

At the time the correlation between years of experience and the hip angle was negative although not statistically significant. It again correlate with the overall trend of all subjects where we saw that with increase in working years the angle keep becoming more and more acute. But since it was not statistically significant, the reason could be again that significant musculoskeletal changes must have occurred in the

initial years of their working. Again an important point is consider here is that number of subjects in this group were less as compared to Group A which could have affected the result.

A previous study on teachers found that teachers with ten or less years of profession have a higher prevalence of musculoskeletal problems. It also states that younger workers face greater work demands, being exposed to risk factors, as they take over more activities and tasks in beginning of career.⁵

In the third Group i.e. C (21-30) years of experience, it was seen that there was a positive correlation between years of experience and disability score, the reason for which have already been given previously. Also in a study done on aging male steelworker found that cases of back problems complaints of musculoskeletal symptoms become more frequent as age increases.⁶

In another study done it was seen that between the ages of 51-62 years, the prevalence of musculoskeletal disorder may increase as much as 15% among workers. It has also been suggested that biological changes related to the aging process, for example, degenerative changes to muscles, tendons, ligaments and joints contribute to the pathogenesis of musculoskeletal disorder.⁷

But it was not statistically significant; it can be attributed to the fact that the numbers of subjects in this group were least among other groups. In the same above group, correlation between experience and hip angle was negative but statistically not significant, the reason for which could attributed to small group size and the fact that maximum musculoskeletal changes must have taken place in their initial years of working.

In one study it was seen that numbers of hours spent in pulling reduced in older long duration pullers. Hence with this the level of musculoskeletal changes will also reduced in the older. Since in Group C the ages of subjects was 45-65 years hence , this can be another explanation given for the fact that the hip

angle changes were not statistically significant in this group

On intergroup comparison between Group A, B and C, it was seen that there was a statistically significant difference between the years between the year of experience with their disability score with Group C (mean=23.64) showing highest disability score followed by Group B (mean=17.00) and then Group A (mean=7.5).

On intergroup comparison between groups A, B and C, it was seen that there was a statistically significant difference between the years of experience with their hip angle with Group A (mean =149.52) showing lowest angle decrease followed by Group B (mean=144.53) and then Group C (mean=135.01).

These two intergroup comparisons matched with the results of our overall correlation for disability and hip angle with their working years.

CONCLUSION

A significant correlation was found between years of experience of working, disability score and hip angle. The overall results of this study show disability score increases and hip angle decreases with year of experience.

Clinical significance

The results of the present study suggest that there is a need for creating awareness among cycle rickshaw pullers at a very early stage of their career regarding the musculoskeletal changes might occur in their musculoskeletal framework at the low back region, over the years of their work and which can cause disability in them. In addition to this postural and core stability exercises should be taught to them in free camps so as to decrease the bad effects of their occupation on their back.

REFERENCE

1. ICMR Annual Report 2002-2003
2. Sean Fyfe; Cycle injury overview; *Eastbourne Rovers*; Nov 2006. Page 10.
3. Florence Peterson kendall, Elizabeth kendall and Patricia Gelse Province , Muscle Testing And Function, 5th edition, page 51

4. Moshe Salai, et al ; Effect of changing the saddle angle on the incidence of low back pain in recreational bicyclists; *Br J Sports Med* 1999;33:398–400.
5. Nilufer Cetisli Korkmaz, Ugaur Cavlak and Emine Aslan Telci. Musculoskeletal pain, associated risks factors and coping strategies in school teachers. *Scientific Research And Essays February* 2011; 6(3): 649-657.
6. Won-jun choi, young-joong kang, ji-young kim and sang-hwan han. Symptoms prevalence of musculoskeletal disorders effects of prior acute injury among ageing male steelworkers; *journal of occupational health*, 2009; 51: 273-282.
7. Ageing and work-related musculoskeletal disorders. *Health and Safety Executive* 2010.



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