

ASSESSMENT OF WORKING POSTURE OF AN AUTO RICKSHAW DRIVERS USING RAPID UPPER LIMB ASSESSMENT (RULA) METHOD.

Physiotherapy

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ABSTRACT

Aim: To assess static working posture of auto rickshaw drivers using Rapid Upper Limb Assessment RULA (Ergonomic Assessment). **Design:** Observational study. **Methods:** To assess a extend of musculoskeletal disorder risk in auto rickshaw drivers- Rapid Upper Limb Assessment (RULA) method. **Results:** Quantitative data was presented in the form of numbers and percentage. Out of the total population 94.62% and 97.84% participants were having low level risk of MSD's on right and left side respectively. Also 5.37% and 2.15% participants were having moderate level of MSD's risk on the right and left side respectively. **Conclusion:** The auto rickshaw drivers are at low to medium risk of developing musculoskeletal disorders and thus further investigation with change would be required.

KEYWORDS

Auto rickshaw drivers, RULA method, MSD risk, Posture.

INTRODUCTION

In India public transport play important role in Indian economy. Globally occupational health sector is demanding more attention from the health care authorities by each passing day, since disorders that follow due to work environment have gradually increased in types and magnitude and have led to aggravated diseases affecting many workers.^[14]

People working in transport sector spend more than 8-10 hours in a day in traffic. In our country, auto rickshaw drivers like other professional driver are at higher risk of developing work related musculoskeletal disorders specially due to poor road condition, extended hours of work in bad posture, traffic congestion, poor ergonomic design of auto rickshaw and poor maintenance of the vehicle and so on. Driving, a task that involves prolonged sitting, a fixed posture and vibration, any of which could directly lead to musculoskeletal trouble. Musculoskeletal disorders as a disorder affects a part of the body's musculoskeletal system, which includes bones, nerves, tendons, ligaments, joints, cartilage, and spinal discs.^[2]

Ergonomic Assessments can also be referred to as workplace assessments which safeguards that a worker's workplace is ergonomically so designed that it minimizes the musculoskeletal disorders related to that particular with the help of ergonomic analysis tool such as Rapid Upper Limb Assessment (RULA).

The drivers work long durations in strenuous postures. Staying in same posture for many hours causes musculoskeletal pain in the shoulder, knees, and low back. But the very few studies have been done on musculoskeletal disorders risk assessment. The possible risk factors and extent of risk in the working posture of auto rickshaw drivers has been scarcely assessed. Hence this study tried to find out the extend of musculoskeletal disorders risk in auto rickshaw drivers.

METHODOLOGY

This observational study was conducted after approval was obtained from institutional ethics committee. Anonymity and confidentiality were assured, and all procedures were performed in compliance with relevant laws and institutional guidelines. Written informed consent has taken prior conducting the study and consent was taken to publish methodology details.

This observational study with population of auto rickshaw drivers studied in urban areas on sample size of 93 in the duration of 6 months.

Sample Criteria

INCLUSION CRITERIA:

- 1) Driving for at least 3 hours a day.
- 2) Driving autos from more than 2 years.
- 3) Age group-30-50 years

EXCLUSION CRITERIA:

- 1) Trauma of upper limb, lower limb, spine.
- 2) Any musculoskeletal disorders before starting the driving job.
- 3) Any deformities of upper limb, lower limb, spine.
- 4) Previous surgery of upper limb, lower limb, spine in last 5 years.
- 5) Regular gym or exercise.
- 6) Current physiotherapy treatment.
- 7) Electric rickshaw driver.^[7]

Outcome Measures

Rapid Upper Limb Assessment (RULA)

The RULA ergonomic assessment tool considers biomechanical and postural load requirements of job tasks/demands on the neck, trunk and upper extremities. A single page RULA worksheet is used to evaluate required body posture, force and repetition. Based on the evaluations, scores are entered for each body region in section. A -for the arm and wrist, and section B -for the neck and trunk. Using the RULA worksheet, the evaluator will assign a score for each of the following body regions: upper arm, lower arm, wrist, neck, trunk, and legs. Data collection was started by clicking pictures of the static posture of auto rickshaw drivers. Drivers were asked to drive auto rickshaw and stop after taking 2 rounds. Once he stops photos were clicked from the lateral sides. Auto rickshaw drivers were in his regular working position. The camera used for taking photographs was placed 1.5 meters away from the auto rickshaw drivers and the distance was kept constant. After the data for each region is collected and scored, tables on the form are then used to compile the risk factor variables, generating a single score that represents the level of musculoskeletal disorders risk as outlined below^[15]

SCORE	LEVEL OF MSD RISK
1-2	Negligible risk, no action required
3-4	Low risk, changes may be needed
5-6	Medium risk, further investigation, change soon
7	Very high risk, implement change soon



Data Analysis

Data was calculated using percentage formula.

RESULTS

Table 1: Demographic Data

DATA	MEAN
Working hours per day	10.41
Working hours per week	72.86
Daily kilometres travelled	115.81
Daily trips	11.12

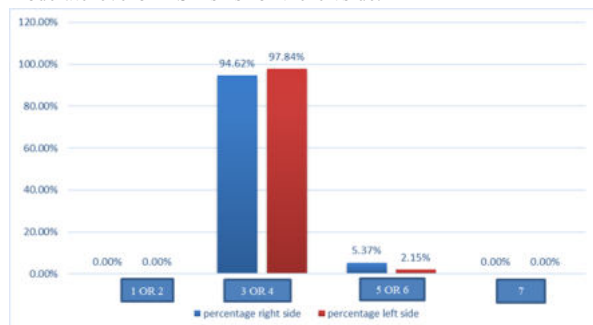
Table 2: RULA scale score distribution

SR NO	SCORING (MSD RISK)	LEVEL OF RISK	PERCENTAGE OF PARTICIPANT WITH SCORE OF RIGHT SIDE	PERCENTAGE OF PARTICIPANT WITH SCORE OF LEFT SIDE
1	1-2	Acceptable Posture	0	0
2	3-4	Further investigation, change may be needed	94.62%	97.84%
3	5-6	Further investigation, change soon	5.37%	2.15%
4	7	Investigation and implement change.	0	0

INTERPRETATION:

Out of the total population 94.62% participants were having low level risk of MSD's on right side and 5.37% participants were having moderate level of MSD's risk on the right side.

Out of total population 97.84% participants were having low level of risk of MSD's on left side and 2.15% of participants were having moderate level of MSD's risk on the left side.



Graph 1: Shows RULA scale score of left side and right side in percentage.

DISCUSSION

- In this study static working posture of auto rickshaw drivers is assessed using RULA method. No participant had acceptable RULA score. Most auto rickshaw drivers had low level of ergonomic risk i.e. score 3 or 4, which requires investigation and changes. Some auto rickshaw drivers had score 5, which require investigation and change soon.
- We now consider the possible reasons why auto rickshaw drivers had ergonomic risk while driving auto rickshaw. There are three components of RULA assessment, which relate to these risk levels i.e. posture, muscle use and force score.
- Regarding the posture score of Upper Limb:
- While driving auto rickshaw, most participant held their upper arms in flexed posture -20 to +20 degrees, but some participant also raised their shoulder or shoulder are abducted.
- Lower arms are in flexion and extension position of more than 100 degrees while their wrist postures in both flexion and extension position between -15 to +15 degrees with their wrist bent away from the midline.

Regarding the spine posture:

Participant held their neck in flexion (10 -20 degrees) together with neck bent /twisted Sole flexion of the neck was present in most of the participants.

Forward head posture: It must be increasing the load on the supporting structures.

Trunk flexion /awkward trunk posture were also observed. A trunk flexion posture of participants is between 0-20 degrees were demonstrated while some had trunk twisted or side bent .It could also be a strong risk factor.

Regarding the muscle use score:

- With respect to the muscle use score, the auto rickshaw drivers posture are mainly static, participants held their posture for longer than 1 minute.
- Regarding forces score:**
- Auto rickshaw drivers does not carry any weight in their hands. Thus, the upper arm forces score were considered zero
- From the reason stated above, it is clear that the low – moderate levels of ergonomic risk in auto rickshaw drivers in this study were mainly affected by their posture and muscle use.
- According to demographic data, an autorickshaw drivers spends, almost average 10 hours a day or around 115 kilometers plying their auto rickshaw. Drivers take average 11 trips. So drivers sit in this awkward posture for longer duration, this could be the reason that they had adapted this unnatural working posture. Besides longer duration of working, working environment can also play role in developing certain working posture which need to be assessed.
- Some factors which may possibly influence the occurrence of musculoskeletal troubles like frequent servicing of vehicle and condition of the roads are not included and assessed in the study. That is environmental assessment is not performed.

SOME LIMITATIONS IN RULA SCALE ARE ALSO OBSERVED DURING STUDY:

- Forward flexion of neck can be assessed but anterior translation cannot be assessed.
- We can only assess that if legs are supported or not but we cannot comment on the hip –knee angle. (This can be a contributing factor for ergonomic assessment)
- Component of wrist twist: This component is mandatory to add in scoring, but it is observed that wrist twist factor is not present in auto rickshaw drivers. Hence the result could have been in the risk criteria.

CONCLUSION

The final score of these method suggest that the drivers are at low to medium risk of developing musculoskeletal disorders and thus further investigation with change would be needed soon.

Clinical implication

- As auto rickshaw drivers have their posture in low to moderate risk, frequent change of position is suggested.
- Also the environment could be a contributing factor for MSDs, so an adequate consideration of that may also be needed.

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