

## EXTENDED ABSTRACT

# COVID-19 Malaysia Overview: Evaluate Driving Awkward Posture and Muscle Fatigue Through RULA and Electromyography (EMG) Analysis on Health Problem Among Older Taxi Drivers

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## SUMMARY

Driving taxis is one of the alternative jobs older people took up during the COVID-19 pandemic. This study evaluated driving posture and muscle fatigue among older taxis drivers in Malaysia during COVID-19 using Rapid Limb Assessment and Electromyography. The Rapid Upper Limb Assessment questions were used to assess awkward driving posture and Electromyography to measure muscular fatigue. RULA analysis body score at value score 7 (23.5%)- required change immediately and value score 5/6 (61.9%) - required investigation and change soon. There is a significant decrease in energy ( $p < 0.05$ ) on EMG analysis. Ergonomic education on driving posture may improve the lifestyle and well-being of older Malaysian taxis driver.

**Keywords:** Older Taxi Drivers; Rapid Upper Limb, Assessment (RULA), Electromyography (EMG), COVID-19

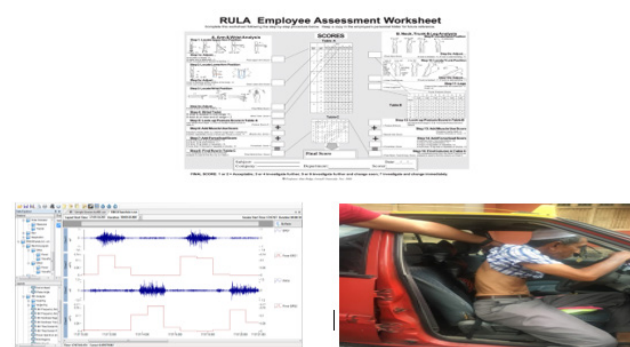
## INTRODUCTION

Older people find jobs that fit their skills and strengths in order to lessen the economic impact of epidemics. COVID-19 These populations want to be taxi drivers, and demand may grow because it's a reasonable, economical, energy-efficient employment with few regulations (standard licensed). Long driving hours and inappropriate seating can fatigue older cab drivers. In past studies, many taxi drivers have complained of musculoskeletal disorders (MSDs), especially low back pain (1,2). Previous study (3) has found that older taxi drivers work more than eight hours a day. Driving for long distances to problems with tiredness (4). In other words, driving is the main cause of physical tiredness. Ergonomic principles can help taxi drivers keep a safe and comfortable position, which can improve their health, quality of life, and safety.

## METHODOLOGY

This study involved among older taxi drivers in Malaysia. Face to face interviews with older taxi drivers were conducted in order to obtain fully completed questionnaires and minimize misinterpreted responses. The survey was conducted in four regions of Peninsular

Malaysia in both rural and urban areas. The RULA method was used to analyse the risk postures of whole segments of the upper limb. EMG can be used to measure muscle activity under specific loads or to quantify the degree of muscle fatigue. Investigative investigations using this technique are frequently used to lower injuries from occupational exposure. Postural studies using EMG instrument are typically tied to tasks related to driving activities that can increase muscle fatigue over time. The application of the RULA assessment and EMG tool is shown in Figure 1.



**Fig. 1:** RULA body maps and Electromyography (EMG) process

## RESULTS AND DISCUSSION

Table I showed that 23.5% at a score 7 and the action level was 4 which is indicating investigation and change are required immediately. For the total score of 5 or 6 RULA, 61.9% were classified under action 3, which described the need to investigate further and change soon. However, only 14.7% of older taxi drivers in the posture in which the score was 3 or 4 at level of action 2, which described the need for further investigation that may be required. The result showed similar result (Rapid Entire Body Assessment) technique and RULA of 46.0% of high-risk bus drivers at action level 3 who experience MSDs, which are caused by inappropriate driving posture (1).

**Table I: RULA posture analysis**

Value Score	Level of action	N	Percentage (%)
1/2	1	0	0
3/4	2	65.0	14.7
5/6	3	274	61.9
7	4	104	23.5

N=443

Table II compares the energy produced of the body's back muscles. In the trapezius lower fibres on the right, the thoracolumbar fascia on the left, and the thoracolumbar fascia on the right, there is a significant decrease in energy ( $p < 0.05$ ) in response to the recommended seat. Past studies (4,5) discovered that the use of EMG led to an increase in amplitude and a drop in average frequency in the completion of an even task with a low level of activity while driving.

## CONCLUSION

The results of this study could be used by Malaysia's

Ministry of Transport to take the appropriate actions and address older taxi drivers' concerns that COVID-19 could affect their working conditions and lead to health issues. Medical institutions should pay attention to this group's health problems and long-term implications, especially on family institutions and the high cost of treatment for low-income communities.

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## REFERENCES

1. Yusoff IS, Tamrin SB, Majid AZ. Elderly Taxi Drivers: Evaluation of Driving Posture in Malaysia Using Rapid Upper Limb Assessment (RULA) Approach. In Joint Conference of the Asian Council on Ergonomics and Design and the Southeast Asian Network of Ergonomics Societies 2020 Dec 2 (pp. 308-316). Springer, Cham.
2. Yusoff IS, Sabri MF, Wijekoon R, Majid AZ. The impact of an economic challenge on health through driving posture among elderly taxi drivers in Malaysia. *Journal of Critical Reviews*. 2020;7(12):4177-84.
3. González-Izal M, Malanda A, Gorostiaga E, Izquierdo M. Electromyographic models to assess muscle fatigue. *Journal of Electromyography and Kinesiology*. 2012 Aug 1;22(4):501-12.
4. Hostens I, Ramon H. Assessment of muscle fatigue in low level monotonous task performance during car driving. *Journal of electromyography and kinesiology*. 2005 Jun 1;15(3):266-74.

**Table II: Average energy consumption older taxi drivers**

Muscle parts	Average $\pm$ S. D (voltage*)		Compared – conventional & recommended	t value	P value
	conventional seating	recommended seat			
<i>Trapezius lower fibers</i> - left	15.61 $\pm$ 3.02v	15.44 $\pm$ 6.42v	5	0.92	0.93
<i>Trapezius lower fibers</i> - right	12.68 $\pm$ 5.60v	10.56 $\pm$ 5.95v	5	5.04	<b>0.00**</b>
<i>Latissimus Dorsi</i> - left	15.84 $\pm$ 6.70v	15.07 $\pm$ 1.99v	5	0.33	0.75
<i>Latissimus Dorsi</i> - right	34.50 $\pm$ 20.70v	28.93 $\pm$ 9.55v	5	1.01	0.36
<i>Thoracolumbar Fascia</i> - left	24.50 $\pm$ 7.74v	11.06 $\pm$ 5.44v	5	3.86	<b>0.01**</b>
<i>Thoracolumbar Fascia</i> - right	14.67 $\pm$ 7.01v	9.60 $\pm$ 5.26v	5	2.49	<b>0.05**</b>

\*\* P value: significant  $p < 0.05$

\* Voltage (v)