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Research Article

"TO STUDY SIMPLE AND FOUR-CHOICE REACTION TIME IN LIGHT VEHICLE DRIVERS AND NON-DRIVERS IN URBAN AREA" - A PILOT STUDY

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ABSTRACT

Reaction time were compared in drivers and non drivers, age with SRT, age with CRT, with Alcoholic history within 3 groups each of 30 using deary-liawald reaction time task shows a significant difference. The data was entered and analyzed using MS-EXCEL and IBM SPSS version 20. The outcome measures used were simple and choice reaction time.

INTRODUCTION

Reaction is defined as interval of time between presentation of stimulus and appearance of appropriate voluntary response in subject.[1] Reaction time is one of the important parameters which give information how fast and quickly person responds. The measurement of visual reaction time has been used to evaluate the processing speed of central nervous system and the co-ordination between sensory and motor system. [2]

Types of Reaction Time

1. Simple reactions (and simple reaction time): Is the time required for a subject to initiate a prearranged response to a defined stimulus. For example in driving because the stimulus is reasonably expected and the driver has already decided (and practiced) what he will do when the stimulus appears[3]. Simple reaction time is often a matter of habit. Such reaction times normally take about a quarter of a second to initiate action. The changing of a green traffic light to yellow in a driver's visual field and the typical driver's reaction to it would be an example of a simple reaction.
2. Choice reactions (and accompanying complex reaction time): Choice reaction time refers to the time taken to give one of the several responses to one of the several stimuli. Here, the decision related to the most appropriate response has not been made in advance[3]. Even situations involving little ultimate choice can fall into this category. Complex reactions are slower than simple reaction[3,1]. How long a complex reaction takes depends on how complex the stimulus is, how many choices there are for reaction, and how often the individual has been in a similar situation. Normally, such reactions can take from one-half to two seconds or more.

Incidence and prevalence

Estimates by the World Health Organisation have indicated that globally, road traffic accidents have led to as high as 1.27 million deaths in 2004, which have been found to be equivalent to all the deaths caused by communicable diseases. The most affected are the young population and it has been found that road accidents are one of the top three reasons for deaths among the population from the age group of 5 to 44 years, globally. The World Health Organisation (2009) estimates that road traffic accidents will be the fifth leading cause of deaths worldwide by 2030, leading to an estimated 2.4 million fatalities per year, if proper steps are not taken to prevent deaths and injuries on the road. Low income and middle-income countries have higher road traffic fatality rates1 (21.5 and 19.5 per 100, 000 population, respectively) than high-income countries (10.3 per 100, 000 population). Over 90% of the world's fatalities on the roads occur in low-income and middle-income countries, which have 48% of the world's registered vehicles (World Health Organisation, 2009)[4]. The human factor is the single cause of road traffic injuries in 57%, and together with other factors in more than 90% of all road traffic accidents[5].Within the driving task, reaction time in response to a particular potential traffic hazard is the time

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required from the point of initial detection of the hazard in one's field of view, through various stages of evaluation and decision making, to the time that vehicle control components are actuated, which includes the time necessary to2move hands and feet to the appropriate vehicle controls (such as movement of one's foot to the brake pedal). Perception involves the process of not only detecting an object in a general sense but also comprehension of its significance. Perception must occur before reaction can take place

Factors Affecting Reaction Time-[6]

Type of Stimulus

Many researchers have confirmed that reaction to sound is faster than a reaction to light, with mean auditory reaction times being 140-160 msec and visual reaction times being 180-200 msec [8]. Perhaps this is because an auditory stimulus only takes 8-10 msec to reach the brain, but a visual stimulus takes 20-40msec [7].

Stimulus Intensity

1. Froeberg (1907) found that visual stimuli that are longer in duration elicit faster reaction times[9].
2. Luce (1986) reported that the weaker the stimulus (such as a very faint light) is, the longer the reaction time is. However, after the stimulus gets to a certain strength, reaction time becomes constant[10].

Age

1. Simple reaction time shortens from infancy into the late 20s, then increases slowly until the 50s and 60s, and then lengthens faster as the person gets into his 70s and beyond[11] (Der and Deary, 2006).
2. Luchies *et al*.(2002) also reported that this age effect was more marked for complex reaction time tasks [12]
3. Reaction time also becomes more variable with age (Hultsch *et al*., 2002)[13].
4. Welford (1980) speculates on the reason for slowing reaction time with age. It is not just simple mechanical factors like the speed of nervous conduction. It may be the tendency of older people to be more careful and monitor their responses more thoroughly[8].
5. Redfern *et al*., (2002) found that older adults were as adept as younger people at assimilating information, but they did take longer to react[14].

Practice and Errors

Sanders (1998, p. 21) cited studies showing that when subjects are new to a reaction time task, their reaction times are less consistent than when they've had an adequate amount of practice[15].

Fatigue

1. Welford (1980) found that reaction time gets slower when the subject is fatigued [8].
2. Singleton (1953) observed that this deterioration due to fatigue is more marked when the reaction time task is complicated than when it is simple[16].
3. Mental fatigue, especially sleepiness, has the greatest effect.
4. Philip *et al*. (2004) found that 24 hours of sleep deprivation lengthened the reaction times of 20-25-year-old subjects, but had no effect on the reaction times of 52-63-year-old subjects[17].

Distraction

1. Welford (1980) reviewed studies showing that distractions increase reaction time[8,]
2. Trimmel and Poelzl (2006) found that background noise lengthened reaction time by inhibiting parts of the cerebral cortex.[18]

Warnings of Impending Stimuli

Brebner and Welford (1980) report that reaction times are faster when the subject has been warned that a stimulus will arrive soon[19].
Alcohol

Hernandez *et al*. (2007) found that the slowing of reaction time by alcohol was due to a slowing of muscle activation, not muscle action[20].

Exercise

Exercise can affect reaction time. Welford (1980) found that physically fit subjects had faster reaction times [8]

Intelligence

Among people of normal intelligence, there is a slight tendency for more intelligent people to have faster reaction times, but there is much variation between people of similar intelligence[21] (Nettelbeck, 1980).

The speed advantage of more intelligent people is greatest on tests requiring complex responses[22] (Schweitzer, 2001).

Physiology of Reaction Time-[23]

Nervous system

-the communication network of neurons that allows the organism to interact with the environment (external, internal)

Main function: regulation of body functions
Purpose: adaptation to changes - maintenance of homeostasis and survival

Components of Reaction Time- [2]

When a person responds to something he/she hears sees or feels. The total reaction time can be decomposed into a sequence of components.

Mental Processing Time

It is the time required for the responder to perceive the stimulus, identifying and analyzing of stimulus and decide the proper motor response .it is composed of following stages.

1. ***Sensation***- the time takes to detect sensory inputs from the object.
2. ***Perception-/Recognition***-the time needed to recognize the meaning of sensation.
3. ***Response and Programming***- The time necessary to decide which if any response to make and to mentally programme the movement.
4. ***Movement Time***-it is time required to perform movement after selection of response

Neurophysiology of conductivity impulses and response

1. Monosynaptic reflex
2. Polysyanatic Reflex
3. Role of Cortex And Associate Areas In Execution

The role of neurotransmitters

Neurotransmitters are endogenous chemicals that transmit signals across a synapse from one neuron (brain cell) to another 'target' neuron[24].

Aim of Study

To study the simple and four-choice reaction time of the rickshaw drivers, Taxi drivers, and non-driving individuals in the urban area.

Objectives

- To compare the simple and four-choice reaction time on rickshaw driver, Taxi drivers and non-driving individual using computerized reaction time test. (Deary –Liewald reaction time test)
- To check whether reaction time differs in history of alcoholic and non-alcoholic persons
- To find the correlation between age and SRT & age and CRT.

Need of Study

The human factor is the single cause of road traffic injuries in 57%, and together with other factors in more than 90% of all road traffic accidents. Human factor includes many aspects, where reaction time is very important. People break faster when there is great urgency, we have to find out whether the driver has the option of steering in order to avoid the obstacle. The driver then must consider alternative responses, braking vs. steering, weigh the dangers of each response, check the left lane for traffic, etc. In an emergency situation like accident a driver has to react according to his visual perception, depth perception, movement time and reaction time some time drivers get choice reaction time to tackle the emergency accident situation. In this study, we are focusing on the reaction time of rickshaw drivers & taxi drivers or who are responsible not only for themselves but for their passenger as well to avoid accidents.

METHODOLOGY

- **Study design**-Observational cross-sectional
- **Sample size**-90
- **Type of study**-comparative study
- **Sample source**-office of taxi and rickshaw drivers
- **Type of sampling**: Convenience, simple random allocation
- **Duration of study**-12 months
- **Place of study**: Tertiary care centre, taxi and rickshaw drivers' office or gas station.
- **Material used**- desk, chair, windows 7 compatible laptop, Deary – Liewald reaction time test. (Reaction time software)

Inclusion criteria

90 Normal healthy, asymptomatic males comprising of:
30 Taxi drivers.
30 Rickshaw drivers.
30 Non drivers. Age 30 – 60 years.

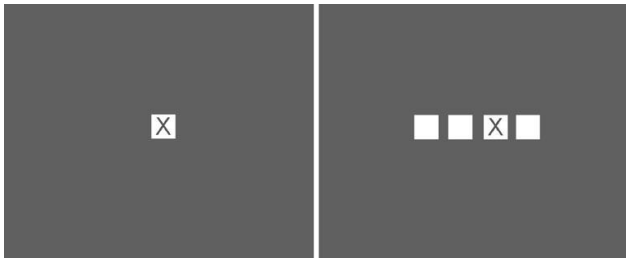
Exclusion criteria

Musculoskeletal conditions
Neurological conditions.
Trauma or injury to upper limb
Vision or hearing impairment
Alcoholism and drug addiction.

Study procedure

Ethical approval was taken from the ethics committee of the institution before commencing the study.99 subjects were screened according to inclusion and exclusion criteria. All the subjects who fulfilled the criteria and were willing to participate in the study (n=99) were asked to sign the informed consent form after explaining the procedure and benefits in language best understood. Then each subject's simple and choice reaction time was screened by Deary – Liewald reaction time test. (Reaction time software)

The participants were tested for simple reaction time in room or back seat of their own vehicle with no distraction. In the Simple Reaction Time, participants have to press a key in response to a stimulus. In the Choice Reaction Time, there will be four stimuli and participants have to press the key according to their choice. Eight practice trials for both Simple Reaction & Choice Reaction Time are given. The simple reaction involves twenty test trials and choice reaction time involves forty test trials.



Screenshots of the Deary-Liewald task for the simple reaction time task (left) and the choice reaction time Task (right)

Deary-Liewald reaction time task

This was designed by Ian J. Deary and programmed by David Liewald, with several iterations between the initial design and the final programme that was used here. The programme runs on a screen with a vertical refresh rate of 60 Hz. For the SRT, one white square is positioned approximately in the centre of a computer screen, set against a blue background. The participants have to respond to the appearance of a diagonal cross within the square. Each time a cross appears, participants have to respond by pressing a key as quickly as possible. Each cross remains on the screen until the key is pressed, after which it disappears and another cross appears shortly. The inter-stimulus interval (the time interval between each response and when the next cross appears) ranges between 1 and 3 s and were randomised within these boundaries. The computer programme records the response time and the inter-stimuli interval for each trial. For the CRT, four white squares appear in a horizontal line across approximately the middle of the computer screen, set against blue background (see Fig.). Four keys on a standard computer keyboard correspond to the

different squares. The position of the keys corresponds in alignment to the position of the squares on the screen: the 'z' key corresponds to the square on the far left, the 'x' key to the square second from the left, the 'comma' key to the square second from the right and the 'full-stop' key to the square on the far right. The stimuli to respond appear in diagonal cross within one of the squares. Participants are instructed to gently rest the index and middle fingers of their left hand on the 'z' and the 'x' keys, and the index and middle fingers of their right hand on the 'comma' and 'full stop' keys. A cross appearing randomly in one of the squares and participants are asked to respond as quickly as possible by pressing the corresponding key on the keyboard. Each cross remains on the screen until one of the four keys are pressed, after which it disappears and another cross appears shortly after. The inter-stimulus intervals ranging between 1 and 3 seconds and are randomised within these boundaries. The computer programme records the response times for each cross, the inter-stimulus interval for each trial, which key was pressed and, in the case of four-choice reaction time, whether the response was correct or wrong. It also calculates the mean, median, variance, standard deviation, skewness, and kurtosis of the response times.

TABLES AND RESULTS

Statistical Analysis

The data was entered using MS-Excel-2007 and analyzed using IBM SPSS version 20.

Table 2 Simple Reaction Time Discriptive Statistics

Simple reaction time Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Srt non drivers	30	242.20	1106.90	520.7	233.7
Srt rikshaw drivers	34	244.75	982.05	442.5	185.4
Srt taxi drivers	35	270.65	980.50	515.6	185.8

Table 3 Choice Reaction Time Discriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Crt non drivers	30	473.37	1248.50	784.1181	240.62236
Crt rikshaw drivers	34	466.03	1058.25	677.0224	186.48162
Crt taxi drivers	35	402.63	1235.10	765.7707	268.70146

Table 4 Simple Reaction Time in All Groups Vs Choice Reaction Time in All Groups

GROUPS	N	MEAN	STD DEV	P VALUE	Significance
Srt all groups	3	492.9	43.75		
Crt all groups	3	742.3	57.28	P = 0.004	Singnificant

This table shows the mean of SRT all groups is 492.9 and CRT 742.3 respectively.

Where p-value is (p=0.004) which is statically significant

Table 5 Simple Reaction Time in All Group

NO	Group	N	MEAN	STD DEV	P VALUE	Singnificance
1	Non drivers	30	520.7	233.7		
2	Rikshaw drivers	34	442.6	185.4		
					P=0.213	Non Singnificant
3	Taxi drivers	35	515.7	185.8		

This table shows the mean of non-drivers, rickshaw drivers, taxi drivers is 520.7, 442.6, and 515.7 respectively. Where p-value is (p=0.213) which is statically not significant.

Table 6 Choice Reaction Time in All Group

NO	Group	N	MEAN	STD DEV	P VALUE	Significance
1	Non drivers	30	784.1	240.6		
2	Rikshaw drivers	34	677	186.5	0.145	NON
3	Taxi drivers	35	765.8	268.7		Singnificant

This table shows mean CRT of non-drivers, rickshaw drivers, taxi drivers are 784.1, 677, and 765.8 respectively. Where p-value is (p=0.183) which is statically not significant.

Table 7 History of Accident In Alcoholic And Non Alcoholic In Rikshaw Drivers

History of alcoholism	History of accident		Total	P value
	YES	NO		
YES	9(75%)	3(25 %)	12	P=0.020
NO	6(27.27%)	16(72.73%)	22	

By calculating with chi-square there is significant difference (P=0.020) in history of accident and history of alcoholism in rickshaw drivers

Table 8 History of Accident in Alcoholic and Non Alcoholic In Taxi Drivers

History of alcoholism	History of accidents		Total	P value
	YES	NO		
YES	11(78.57%)	3(21.42%)	14	0.005
NO	5(23.81%)	16(76.19%)	21	

By calculating with chi-square there is a significant difference (P=0.005) in the history of accident and history of alcoholism in taxi drivers.

Table 9

Sr .no	Correlation Between	Pearson correlation	r2	P value
1	Age vs SRT	0.604	0.365	0.000
		Pearson correlation		
2	Age vs CRT	0.451	0.204	0.012

Age and SRT are positively correlated. The correlation is statistically significant.

(P=>0.005) which shows as age increases SRT in Non-drivers increases.

Table 10 Rickshaw Drivers (AGE VS SRT)

Sr .no	Correlation Between	Pearson correlation	r2	P value
1	Age vs SRT	0.238	0.0.057	0.175
		Pearson correlation		
2	Age vs CRT	0.196	0.038	0.266

Age and SRT are positively correlated by Pearson correlation coefficient. The correlation is statistically not significant. (P=0.175) which shows as age increases SRT in Rickshaw drivers increases

Age and SRT are positively correlated. The correlation is statistically not significant. (P=0.327) which shows as age increases SRT in Taxi drivers increases

DISCUSSION

Estimates by the World Health Organisation have indicated that

globally, road traffic accidents have led to as high as 1.27 million deaths in 2004, which have been found to be equivalent to all the deaths caused by communicable diseases. The most affected are the young population and it has been found that road accidents are one of the top three reasons for deaths among the population from the age group of 5 to 44 years, globally. The World Health Organisation (2009) estimates that road traffic accidents will be the fifth leading cause of deaths worldwide by 2030, leading to an estimated 2.4 million fatalities per year, if proper steps are not taken to prevent deaths and injuries on the road. The human factor is the single cause of road traffic injuries in 57%, and together with other factors in more than 90% of all road traffic accidents[5]. Within the driving task, reaction time in response to a particular potential traffic hazard is the time required from the point of initial detection of the hazard in one's field of view, through various stages of evaluation and decision making, to the time that vehicle control components are actuated, which includes the time necessary to move hands and feet to the appropriate vehicle controls (such as movement of one's foot to the brake pedal).so we calculate two types of reaction time i.e. simple reaction time and choice reaction time in 3 groups which includes rickshaw drivers ,taxi drivers, and control group (each N=34 , 35 and 30 respectively) with Deary and liewald reaction time task(2010),which has Internal consistency for the Deary-Liewald task was measured using

Cronbach's alpha and was very high for both the SRT (a = .94) and for correct responses on the CRT (a = .97). Reliability of the SD of response times was measured using a split-half analysis. A correlation was conducted between the SD of the first half of responses and the SD of the second half of responses, which revealed a high significant correlation for correct responses on the CRT (r[148] = .64, p < 0.01). The correlation was not significant for the SRT (r[148] =.15, p = 0.07).

We choose this group because of different driving patterns in driving in this group such has in rickshaw driving the vehicle is three-wheeler handle, accelator and gear are in hands and breaks are in leg. But in taxi driving it differently such as taxi is four wheeler and its accelerator break and clutch are in leg and steering wheel is operated by hands to change the direction.

So as (table 2,3) shows the descriptive analysis of all three groups simple reaction time and choice reaction time and (table1) shows descriptive analysis of age in all groups which shows mean, max. value, min. value and standard deviation respectively.

Now in (table 4) comparison between simple reaction time in all groups vs choice reaction time in all groups by one way ANOVA test we found p=0.004 which shows statistically significant. Which shows there is the difference in SRT in all groups vs CRT in all groups.SRT in lesser than CRT in all groups i.e. SRT is faster or quicker than CRT as many previous studies by Brebner and Welford (1980), Karia Ritesh M. And Ghuntla Tejas P (2012)

In (table 5) comparison between simple reaction time in all groups by one way ANOVA test we found p=0.213 which shows statistically not a significant difference in all group in simple reaction time. As mean simple reaction time in all groups are 520.7, 442.6 and 515.7 m.sec respectively.

Now in (table 6) comparison between choice reaction time in all groups by one-way ANOVA test we found p=0.145 which shows statistically not a significant difference in all group in choice reaction time. As mean choice reaction, time in all groups is 784.1, 677 and 765.8 m.sec respectively.

In (table 7) show a comparison between histories of alcoholism vs. history of an accident in rickshaw drivers. By calculating with chi-square test we found statistically significant in this groups as value is (p=0.020). this results shows that out of 30 subjects 9 (75%) subject having history of alcoholism and history of accident, 6(27.27%) having no history of alcoholism but having history of accidents, 3(25%) subjects were alcoholic but no history of accidents and 16(72.73%) subjects having no history of alcoholism and no history of accidents.

In (table 8) shows a comparison between histories of alcoholism vs. history of accidents in taxi drivers. By calculating with chi-square test we found that statistically significant in this group as p-value is (p=0.005) as this result shows that out of 30 subjects 11(78.5%) subjects having history of alcoholisms and history of accidents,5(23.8%) having no history of alcoholism but having history of accidents ,only 3(21.42%) subjects were found having history of alcoholism but no history of accidents,16(76.19%) subjects were found that no history of alcoholism or accidents.

In (table 9) we correlate between age and SRT in non-drivers population with Pearson correlation and get (r=0.604), (r^2=0.365) and p=<0.005 (p=0.000) which tells that Age and SRT are positively correlated. The correlation is statistically significant. Which shows as age increases SRT in Non-drivers increases. (graph 6) we correlate between age and CRT in non-drivers population with Pearsons correlation and get (r=0.451), (r^2=0.204) and (p=0.012) which tells that Age and CRT are positively correlated. The correlation is statistically significant. Which shows as age increases CRT in Non-drivers increases.

In (table 10) we correlate between age and SRT in rickshaw drivers population with Pearson's correlation and get (r=0.238), (r^2=0.057) and (p=0.175) which tells that age and SRT are positively correlated. The correlation is statistically nonsignificant. (P=0.175) which shows as age increases SRT in rickshaw drivers increases. (graph 8) we correlate between age and CRT in rickshaw drivers population with Pearson correlation and get (r=0.196), (r^2=0.038) and (p=0.266) which tells that Age and CRT are positively correlated. The correlation is statistically nonsignificant. (P=0.266) which shows as age increases CRT in Nondrivers increases.

In (table 11) we correlate between age and SRT in taxi drivers population with Pearson correlation and get (r=0.171), (r^2=0.029) and (p=0.327) which tells that age and SRT are positively correlated. The correlation is statistically non-significant. (P=0.327) which shows as age increases SRT in taxi drivers increases.(graph 10) we correlate between age and CRT in taxi drivers population with pearson correlation and get (r=0.276), (r^2=0.76) and (p=0.108) which tells that Age and CRT are positively correlated. The correlation is statistically not significant. (P=0.108) which shows as age increases CRT in taxi drivers increases.

CONCLUSION

The following results were found a comparison between simple

reaction time in all groups vs choice reaction time in all groups by one-way ANOVA test we found p=0.004 which is statistically significant. Which shows there is the difference in SRT in all groups vs CRT in all groups.SRT in lesser than CRT in all groups i.e. SRT is faster or quicker than CRT

In comparison between simple reaction time in all groups by one-way ANOVA test we found p=0.213 which is statistically not significant. There was no significant difference in all groups in simple reaction time.

In comparison between choice reaction time in all groups by one-way ANOVA test we found p=0.145 which shows statistically no significant difference in all group in choice reaction time. In comparison between histories of alcoholisms vs. history of accident in rickshaw drivers. By calculating with chi-square test we found statistically significant in this groups as value is (p=0.020).

In comparison between histories of alcoholism vs. history of accidents in taxi drivers. By calculating with chi-square test we found that statistically significant in this group as p-value is (p=0.005)

In correlation between age and SRT in non drivers population with Pearson correlation and get (r=0.604), (r^2=0.365) and p=<0.005 (p=0.000) which tells that Age and SRT are positively correlated. The correlation is statistically significant. Which shows as age increases SRT in Non drivers increases.
The correlation between age and CRT in non drivers population with Pearsons correlation and get (r=0.451), (r^2=0.204) and (p=0.012) which tells that Age and CRT are positively correlated. The correlation is statistically significant. Which shows as age increases CRT in Non drivers increases.

In correlation between age and SRT in rickshaw drivers population with Pearson's correlation and get (r=0.238), (r^2=0.057) and (p=0.175) which tells that age and SRT are positively correlated. The correlation is statistically non-significant. (P=0.175) which shows as age increases SRT in rickshaw drivers increases.

In correlation between age and CRT in rickshaw drivers population with pearson correlation and get (r=0.196), (r^2=0.038) and (p=0.266) which tells that Age and CRT are positively correlated. The correlation is statistically non-significant. (P=0.266) which shows as age increases CRT in Non-drivers increases.

In correlation between age and SRT in taxi drivers population with Pearson correlation and get (r=0.171), (r^2=0.029) and (p=0.327) which tells that age and SRT are positively correlated. The correlation is statistically non-significant. (P=0.327) which shows as age increases SRT in taxi drivers increases.

In correlation between age and CRT in taxi drivers population with Pearson correlation and get (r=0.276), (r^2=0.76) and (p=0.108) which tells that age and CRT are positively correlated. The correlation is statistically not significant. (P=0.108) which shows as age increases CRT in taxi drivers increases.

Clinical Implication

This type of study the reaction time of drivers and non drivers. In future we can implicate this study on a large scale and calculate drivers' reaction time on driving simulator and calculate reaction time of the drivers.

Summary

The objective of the study was to compare the simple and four choice reaction time on rickshaw driver, taxi drivers and non-driving individual using computerised reaction time test. (Deary –Liewald reaction time test). It was an observational study done in non drivers (n=30), rickshaw drivers (n=34) and taxi drivers (n=35) respectively. Subjects were asked to sign the informed consent form after explaining the procedure and benefits in language best understood.

Then each subject's simple and choice reaction time was screened by Deary – Liewald reaction time test. (Reaction time software)

The participants were tested for simple reaction time in room or back seat of their own vehicle with no distraction. In the Simple Reaction Time, participants have to press a key in response to a stimulus. In the Choice Reaction Time, there are four stimuli and participants have to press the key according to their choice. Eight practice trials for both Simple Reaction & Choice Reaction Time were given. The simple reaction involves twenty test trials and choice reaction time involves forty test trials.

So the following results were found a comparison between simple reaction time in all groups vs choice reaction time in all groups by one-way ANOVA test we found p=0.004 which is statistically significant. Which shows there is difference in SRT in all groups vs CRT in all groups.SRT in lesser than CRT in all groups i.e. SRT is faster or quicker than CRT

In comparison between simple reaction time in all groups by one way ANOVA test we found p=0.213 which is statistically not significant. There was no significant difference in all groups in simple reaction time.

The correlation between age and CRT in non-drivers population with Pearsons correlation and get (r=0.451), (r^2=0.204) and (p=0.012) which tells that Age and CRT are positively correlated. The correlation is statistically significant. Which shows as age increases CRT in Non-drivers increases.

In correlation between age and SRT in rickshaw drivers population with Pearson's correlation and get (r=0.238), (r^2=0.057) and (p=0.175) which tells that age and SRT are positively correlated. The correlation is statistically non significant. (P=0.175) which shows as age increases SRT in rickshaw drivers increases.

In correlation between age and CRT in rickshaw drivers population with pearson correlation and get (r=0.196), (r^2=0.038) and (p=0.266) which tells that Age and CRT are positively correlated. The correlation is statistically non significant. (P=0.266) which shows as age increases CRT in Non-drivers increases.

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(p=0.327) which tells that age and SRT are positively correlated. The correlation is statistically non-significant. (P=0.327) which shows as age increases SRT in taxi drivers increases.

In correlation between age and CRT in taxi drivers population with Pearson correlation and get (r=0.276), (r^2=0.76) and (p=0.108) which tells that age and CRT are positively correlated. The correlation is statistically not significant. (P=0.108) which shows as age increases CRT in taxi drivers increases.

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The objective of the study was to compare the simple and four-choice reaction time on rickshaw driver, taxi drivers and non-driving individual using computerised reaction time test. (Deary –Liewald reaction time test). It was an observational study done in non-drivers (n=30), rickshaw drivers (n=34) and taxi drivers (n=35) respectively. Subjects were asked to sign the informed consent form after explaining the procedure and benefits in language best understood.

Then each subject's simple and choice reaction time was screened by Deary – Liewald reaction time test. (Reaction time software)

The participants were tested for simple reaction time in room or back seat of their own vehicle with no distraction. In the Simple Reaction Time, participants have to press a key in response to a stimulus. In the Choice Reaction Time, there are four stimuli and participants have to press the key according to their choice. Eight practice trials for both Simple Reaction & Choice Reaction Time were given. The simple reaction involves twenty test trials and choice reaction time involves forty test trials.

So the following results were found a comparison between simple reaction time in all groups vs choice reaction time in all groups by one-way ANOVA test we found p=0.004 which are statistically significant. Which shows there is the difference in SRT in all groups vs CRT in all groups.SRT in lesser than CRT in all groups i.e. SRT is faster or quicker than CRT

In comparison between simple reaction time in all groups by one-way ANOVA test we found p=0.213 which is statistically not significant. There was no significant difference in all groups in simple reaction time.

Limitation of Study

- Small sample size
- Drivers' reaction time test should be done in the close room where no sound can distract subjects' attention.
- The Proper visual investigation should be done before test performance.
- Subjects educational qualification should be included as intelligence can effect on reaction time
- The reaction time of subjects can be checked on the direct driving simulator.

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