International Journal of Social Sciences and Management Review

Volume: 06, Issue: 03 May - June 2023

ISSN 2582-0176

LEVEL AND REASON OF PHYSICAL, COGNITIVE, AND ENVIRONMENTAL STRESS ENCOUNTERED BY THE MOTORCYCLE TAXI DRIVER: SOME PROPOSALS

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https://doi.org/10.37602/IJSSMR.2023.6315

ABSTRACT

Every year, stress and driving can cause fatal accidents. The main objective of this research was to determine the level and reasons for physical, cognitive, and environmental stress experienced. Specifically, it sought information regarding the profile of the driver by age, length of time driving in a day and frequency of driving in a week, other activities other than driving, blood pressure and heart rate, level and rate of stress in terms of cognitive, physical, and environmental stress, and the significant difference in driving before and after moving. This descriptive and experimental study collects data using a survey questionnaire and guide questions. 30 respondents are being asked questions for data collection, and the results were analyzed using Percentage Frequency Distribution, T-test, and Pearson Product Moment Coefficient of Correlation. Most respondents were middle-aged adults aged 41-60 who worked an average of eight (8) hours a day a week. The researcher observed an increase in Mean Arterial Pressure after driving. After a long drive, it was typical for them to experience muscle pain and general exhaustion. There was no correlation between drivers' heart rate, stress levels, and blood pressure, but there was a correlation between driver age and blood pressure. In conclusion, most of the problems and stressors faced by motorcycle taxi drivers are physical factors such as fatigue and trauma can significantly affect the motorcycle taxi driver's well-being and can trigger high blood pressure and heart rate.

Keywords: Blood Pressure, Heart Rate, Fatal Accidents

1.0 INTRODUCTION

1.1. Rationale of the Study

The traditional modes of public transportation in the Philippines have been deemed inconvenient by daily commuters and public utility operators. Traffic jams, a lack of commuter vehicles leading to longer travel times and challenging rides, and environmental issues brought on by the continued use of polluting gas are the main reasons why Filipinos continue to call for a better transportation system that causes stress for most of the commuters (Malasique, et al., 2021). The drivers of public transportation, particularly motorcycle taxi drivers, must transport people to certain areas throughout their assigned routes and borders, which means they must endure extended periods in the heat, rain, traffic, and other stressful conditions every time they

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leave to work and earn money. They are incredibly prone to high-stress levels since they spend long hours in the sun and the rain on public transportation, deal with personal issues, traffic, and pressure, and are exposed to various diseases. Stress can cause blood pressure to spike momentarily. Under stress, the body releases a surge of hormones. These hormones accelerate the heartbeat and constrict blood vessels. These actions temporarily increase blood pressure. According to Mayo Clinic (2022), no evidence links these conditions directly to hypertension. Stress can cause a significant increase in blood pressure. However, when the stress subsides, blood pressure returns to pre-stress levels. However, brief spikes in blood pressure can cause heart attacks or strokes and long-term damage to the blood vessels, heart, and kidneys. Similar to the damage caused by chronic high blood pressure.

This study aimed to determine the level and reasons for physical, cognitive, and environmental stress experienced and recommend ways to mitigate the pressure of the drivers. This study was conducted at Eskina Yati, Liloan, Cebu, because the place was surrounded by a population of approximately 37,000, according to the 2020 census, with many possible customers. The area had three (3) schools: Yati Elementary School, Arcelo Memorial National High School and Divine Life Institute of Cebu, San Vicente Ferrer Parish, public markets, and private establishments.

1.2. Theoretical and Conceptual Background

Demography seeks a statistical description of human populations concerning their demographic structure, the number of people: its composition by sex, age, marital status, and statistics of families (Pressat, 2017). Numerous studies and surveys have identified employment as a significant source of stress. There are findings regarding the primary causes of stress: a heavy workload, an imbalance between work and personal life, time pressure, unrealistic deadlines, and job insecurity (Reif et al., 2018). According to Lazarus (2016), "It is not the stressor itself that causes stress, but rather the individual's perception of the stressor." Numerous studies have discovered that drivers' physiological responses connect with driving stress". However, research restricts identifying the effects of stressors on motorcycle taxi drivers and finding ways to mitigate the impact.

Stress can lead to potentially deadly conditions like high blood pressure and heart disease, as well as minor problems like lack of sleep, irritability, headaches, and back pain. Vital signs such as heart rate and blood pressure provide essential information because they often reveal the first clue of either positive or negative reactions in the body (Adler et al., 2023). The study also stated that measurement around the normal range of the vital signs while doing an activity could mean the effect is beneficial. In contrast, the increase or decrease from its normal range may indicate a harmful effect on the body. Stress is a psychological and physiological response to a condition threatening an individual's ability to adapt to inner and outer demands (Lazarus, 2016). There are three types of stressors: Cognitive, Physical, and Environmental Stressors. Cognitive stress processes such as assessing and controlling coping mechanisms affect driving performance (as indicated by distraction from the driving task) and subjective emotional symptoms such as anxiety. Numerous life events, such as the death of a life partner, can trigger psychological and physical health difficulties. However, everyday annoyances and minor stressors typically have comparable effects on physical health (Information Resources Management Association, 2019). Physical and technological stressors include exposure to

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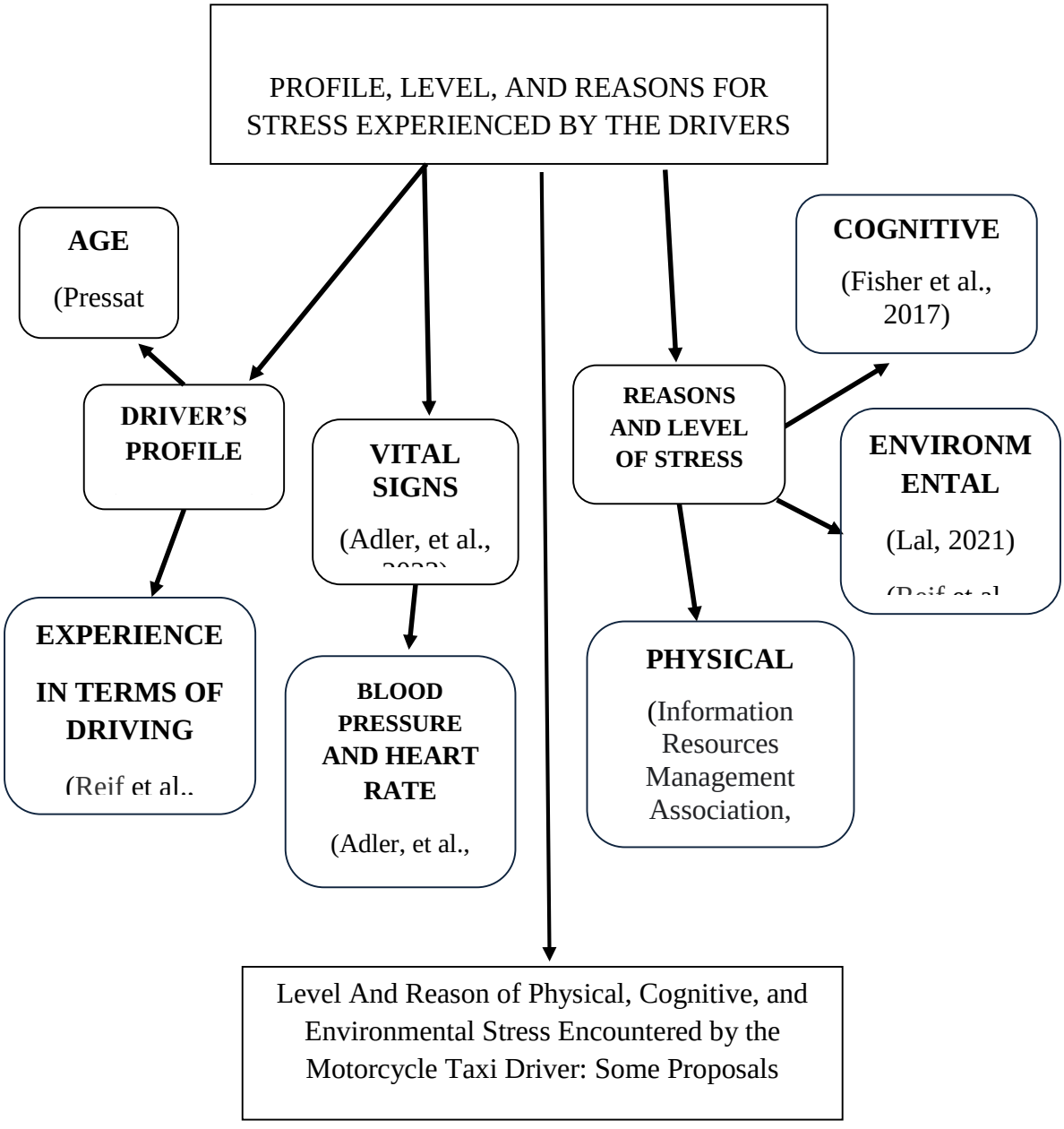
hazardous chemicals or toxic substances, a lack of workplace safety, and factors related to working hours, such as night work, shift work, and generally long work hours (Reif et al., 2018).

Figure 1: Theoretical/Conceptual Framework of the Study



The stressful work environment of public transport operators and their high mileage may increase the incidence of adverse safety outcomes such as traffic accidents, followed by risky road behaviors exacerbated by stress, anger, and difficult operating conditions (Lal, 2021). Moreover, Reif et al., (2018) state that extreme environmental conditions, such as noise, heat, or pollution, create stressors from the physical-technical environment.

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1.3. Review of Related Literature

Stress results from pressure or worry brought on by personal issues (Phyu Phyu et al., 2017). A personal issue is anything in life that can affect the ability to focus and complete the work correctly. Family, health, or financial challenges are personal concerns (Indeed, 2022). Riders owning a motorcycle will receive at least P370 each day; a few need to borrow money to buy and make monthly mortgage payments that could lower their daily income (Asian Development Bank, 2020). Despite the safety protocols and strict regulations regarding motorcycle registration and license, motorcycle taxi drivers are sought after, especially in rural areas. Motorcycle taxis are slowly gaining popularity as a cost-effective way to fill gaps in last-mile coverage from an affordability perspective (Sanka, 2021).

According to Sagar (2020), the driver's socioeconomic and demographic characteristics and surroundings may influence their driving behavior and eventual crash involvement. A demographic profile describes a specific type of person, including gender and age. The interconnected phenomena that influence health demographic profiles are the size, composition by age and gender, and geographical distribution of a population, and all directly impact overall health status. Because of the strong relationship between age, mortality, and morbidity, age significantly affects the pattern and extent of ill health in populations (Lopez et al., 2021). In addition, according to Hu L.'s (2020) study, drivers with 6–10 years of driving experience account for the highest number of accidents, followed by drivers with 3 years of driving experience, and drivers with 20 years or more of driving experience account for the lowest number of accidents. The cognitive, perceptual, and motor changes that typically follow aging have been linked to age-related changes in the spontaneous structure of the brain and the ability of the brain to control hormone levels can gradually deteriorate (Gonzalez-Roldan, et al. 2020).

Several factors could make it difficult for older people to drive safely. Pain perception and brain function are both impacted by aging. Older adults who experience worry or anxiety consequently tend to create more stress hormones (Woolston, 2022). Age-related increased reaction time and abnormalities in the eyes, brain, and muscles were some of these causes (Barco, 2022). Frickey (2019) state that those middle-aged adult drivers are the safest drivers. Drivers between 40 and 50 are statistically the safest on the road. These drivers had more experience than younger demographics (Hawkins, 2022). Acute psychological stress commonly occurs in young and older adults' lives (Amy Smith, et al. 2018). The stress reactions of older persons are influenced by environmental and psychological factors. (Commodari, E. & Di Nuovo, S. 2019).

Due to the nature of their occupation, drivers have a higher incidence of hypertension than the overall population (National Library of Medicine, 2020). The study of Tziomalos (2022), found that hypertension was associated with older age, driving without rest, longer driving, short sleep duration, smoking, alcohol intake, and inactivity. High blood pressure is one of the ailments connected to chronic (long-term) stress (Samaan, 2022). As the Centers for Disease Control and Prevention (2021) stated, blood pressure higher than usual was referred to as high blood pressure or hypertension. Daily activities affect how blood pressure changes. High blood pressure may be diagnosed if blood pressure readings are frequently above average (or hypertension). World Health Organization (2021) stated that two numbers represent blood pressure. The first number (systolic) represents the blood vessel pressure created when the heart

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contracts or beats. The pressure in the arteries between heartbeats is shown by the second number (diastolic).

According to Oklahoma Heart Hospital (2017), in certain conditions, such as severe stress or danger, blood pressure, and heart rate may rise simultaneously. However, blood pressure and heart rate do not usually vary simultaneously. Even if they both grow, it will not be at the same rate (ACLS Training Center, 2020). Some studies stated that individual's resting heart rate varies according to their age, body size, heart issues, use of medications, and the temperature of the environment. One's heart rate can also be influenced by emotions; for instance, becoming anxious or terrified might quicken it (Gholipour, B. and Lanese, N., 2022).

In most cases, the way we perceive or process events causes cognitive stress, not how things actually are. Poor concentration could distract the driver from performing their work and prioritizing the well-being of their passengers and it affects the proper functioning of the brain (Brain Training Australia, 2022). Cognitive stress affects the functioning of the brain. Physical stress is often the most obvious sign of stress. They may increase the heart rate, headache, or other pain as a symptom (Telus Health Care Centers, 2020).

Driving performance is also affected by fatigue and distraction (Barco, 2022). Environmental stress results from a person's response to an external event (Gaterlesben, 2016). Reif et al. (2018) state that extreme environmental conditions, such as noise, heat, or pollution, create stressors from the environment. Those who work in the public transportation industry are particularly vulnerable because of the high levels of stress they are exposed to from things like road traffic and unpleasant interactions with passengers (Santos & Lu, 2016). Mc Millen (2016) stated that heavy traffic could cause stress and chronic stress can elevate blood pressure. In addition, prolonged exposure to traffic congestion increased both systolic and diastolic blood pressure (Samra, et al., 2017).

Individuals who are stressed are more likely to be aggressive, and aggressive drivers are more likely to take risks while driving and have car accidents (Eagle, 2020). A driver encounters stressful scenarios due to shifting road conditions, the geometric design of the roads, the weather, land use, a strict schedule, drivers' heavy workloads, and traffic conditions (Phyu Phyu et al., 2017). Some studies have shed light on how drowsiness and fatigue constitute key risk factors related to professional drivers' risky behaviors and traffic (Useche et al., 2017). Fatigue can be caused by heavy workload, an imbalance between work and personal life, time pressure, unrealistic deadlines, or job insecurity (Reif, et al. 2018). Difficulty driving can be compounded by stress, particularly when driving through unfamiliar territory or during rush hour.

Driver stress is facing a situation where the perceived demand, primarily defined based on previous experiences, internal body sensation, and external stimuli, is higher than available resources (Francis, 2018). Therefore, it could lead to potentially deadly conditions like high blood pressure and heart disease, as well as minor problems like lack of sleep, irritability, headaches, and back pain (Heathfield, 2022). As the relationship between transportation behavior and health is multifaceted and complex, there has been a recent call for a more comprehensive examination of the association between transportation and multiple health outcomes (Van Wee, Ettema, 2016). According to Texas Health Resources (2023), the average resting heart rate is between 60 and 100 beats per minute. If the blood pressure was high even

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when resting, it means that your heart is working too hard and that the walls of your arteries are under additional stress (Better Health, 2021). Uncontrollable stress may cause blood pressure to increase (Samaan, 2022).

Physical and emotional health are impacted by stress that is out of control. Health and well-being may be in danger if this type of stress continues for weeks, months, or even years. When the stress subsides, blood pressure returns to pre-stress levels. The brief spikes in blood pressure can cause heart attacks or strokes and long-term damage to the blood vessels, heart, and kidneys, similar to the damage caused by chronic high blood pressure (Mayo Clinic, 2022). The initial level of stress and fatigue of the driver can have a significant impact on stress, driving behavior, and fatigue caused by a week's worth of driving, which is one of the leading causes of death worldwide (Magana, 2020).

According to the American Heart Association (2016), physical activity can cause an increase in heart rate. However, physical activity such as basketball can reduce stress. According to Mario Webb (2021), the hormones cortisol and adrenaline, which are stressful conditions, can be channeled through basketball. You're mental and physical health can benefit from playing basketball. Stress and driving are a dangerous combination and can lead to life-threatening situations, evidenced by the many road traffic crashes that occur yearly due to driver stress (Mohammad, 2018).

2.0 THE PROBLEM

2.1 Statement of the Problem

The main objective of this research was to determine the level and reasons of physical, cognitive, environmental stress experienced. Specifically, it sought answers to the following questions.

1. What is the profile of the driver in terms of:

    1.1 age,
    1.2 frequency of driving in a week,
    2.2 length of time driving per day, and
    2.3 other activities aside from driving?

3. What is the blood pressure and heart rate of the driver?

    3.1 Before driving, and
    3.2 After driving?

4. What is the level of stress encountered while driving in terms of:

    4.1 cognitive stress,
    4.2 physical stress, and
    4.3 environmental stress?

5. What are the reason you feel stress in driving:

    5.1 cognitive stress,

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5.2 physical stress, and
5.3 environmental stress?

6. Is there a significant difference between the blood pressure and heart rate before and after driving?

7. Is there a significant relationship between the following:

7.1 before driving;

7.1.1 age and blood pressure,
7.1.2 age and heart rate,
7.1.3 age and cognitive level of stress,
7.1.4 age and physical level of stress,
7.1.5 age and environmental level of stress,
7.1.6 frequency of driving in a week and blood pressure,
7.1.7 frequency of driving in a week and heart rate,
7.1.8 frequency of driving in a week and cognitive level of stress,
7.1.9 frequency of driving in a week and physical level of stress,
7.1.10 frequency of driving in a week and environmental level of stress,
7.1.11 length of time driving per week and blood pressure,
7.1.12 length of time driving per week and heart rate,
7.1.13 length of time driving per week and cognitive level of stress,
7.1.14 length of time driving per week and physical level of stress,
7.1.15 length of time driving per week and environmental level of stress,

7.2 after driving;

7.2.1 age and blood pressure,
7.2.2 age and heart rate,
7.2.3 frequency of driving in a week and cognitive reason of stress,
7.2.4 frequency of driving in a week and physical reason of stress,
7.2.5 frequency of driving in a week and environmental reason of stress,
7.2.6 length of time driving per week and blood pressure,
7.2.7 length of time driving per week and heart rate,
7.2.8 length of time driving per week and cognitive reason of stress,
7.2.9 length of time driving per week and physical reason of stress, and
7.2.10 length of time driving per week and environmental reason of stress.

8. What are the means to mitigate drivers' stress?

2.2 Null Hypothesis

H0: There is no significant difference between blood pressure and heart rate before driving.

H0.2: There is no significant difference between blood pressure and heart rate after driving.

H0.3: There is no significant relationship between the age and blood pressure, before and after driving.

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H0.4: There is no significant relationship between age and heart rate, before and after driving.

H0.5: There is no significant relationship between age and cognitive level of stress.

H0.6: There is no significant relationship between age and physical level of stress.

H0.7: There is no significant relationship between age and environmental level of stress.

H0.8: There is no significant relationship between frequency of driving in a week and blood pressure.

H0.9: There is no significant relationship between frequency of driving in a week and heart rate.

H0.10: There is no significant relationship between frequency of driving in a week and cognitive level of stress.

H0.11: There is no significant relationship between frequency of driving in a week and physical level of stress.

H0.12: There is no significant difference between frequency of driving in a week and environmental level of stress.

H0.13: There is no significant relationship between length of time driving per day and blood pressure.

H0.14: There is no significant relationship between length of time driving per day and heart rate.

H0.15: There is no significant relationship between length of time driving per day and cognitive level of stress.

H0.16: There is no significant relationship between length of time driving per day and physical level of stress.

H0.17: There is no significant relationship between length of time driving per day and environmental level of stress.

H0.18: There is no significant relationship between the frequency of driving in a week and blood pressure after driving.

H0.19: There is no significant relationship between the frequency of driving in a week and heart rate after driving.

H0.20: There is no significant relationship between length of time driving per day and blood pressure after driving.

H0.21: There is no significant relationship between length of time driving per day and heart rate after driving

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H0.22: There is no significant relationship between length of time driving per day and cognitive reasons of stress after driving.

H0.23: There is no significant relationship between length of time driving per day and cognitive reasons of stress after driving.

H0.24: There is no significant relationship between length of time driving per day and physical reasons of stress after driving.

H0.25: There is no significant relationship between length of time driving per day and environmental reasons of stress after driving.

2.3 Significance of the Study

This study was focused on determining the level of stress of the drivers. The outcome of this study is relevant to the following:

To the Motorcyclist. This study will help drivers to determine which factors contribute to their level of stress and this will aid them in mitigating stress to improve their performance.

To the Public Transportation Operators - This study provides insight about the type of stress encountered by the driver that will serve as reference to prevent road accidents.

To the Commuters: This will ensure their safety to travel via public transportation, especially on motorcycle taxis.

To the Community. This study will help people understand the big problems that affect communities and look for ways to solve them through policy and social change.

To the Future Researcher. This study will be a useful reference for the future researcher who would plan to make any related study specifically in gaining deeper understanding of the spatial and temporal aspects of driver's stress.

2.4 Scope and Limitations

This study focused on determining drivers' stress in Eskina Yati, Liloan, and Cebu. The scope of the study is to determine the demographic profile and health status, causes and effects of exposure to stress, and the level of stress experienced by the target respondents. This study is limited only to motorcycle drivers working in Eskina Yati, Liloan, and Cebu, and there are 70 overall population and 30 respondents who participated using simple random sampling.

The source of data was based on our self-made survey questionnaire. After doing so, the researchers will gather and interpret the data. Furthermore, the study sought to determine whether the driver's demographic profile would affect the type of stress: cognitive, environmental, and physical stress, and to identify the most frequent kind of stress experienced.

3.0 RESEARCH METHODOLOGY

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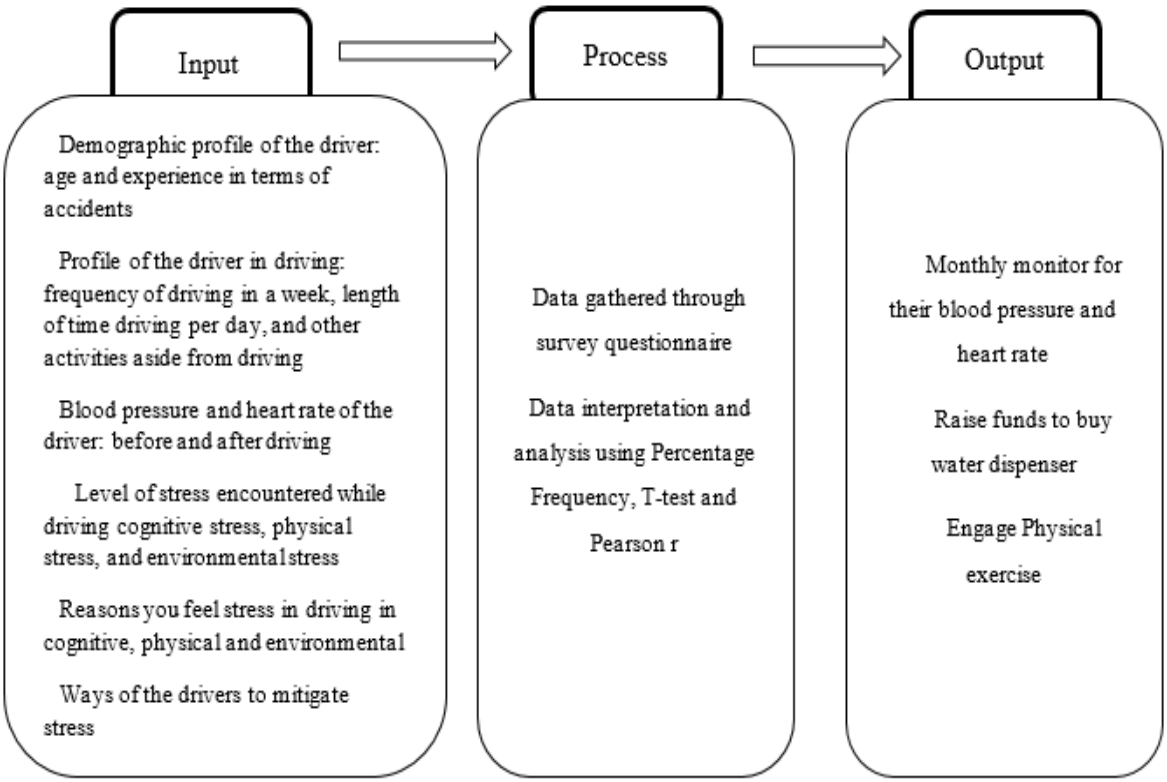
This descriptive and experimental research utilizes a survey questionnaire and guides questions to gather data. This research aimed to recognize the cognitive, physical, and environmental stress levels to mitigate motorcycle driver stress. The researchers sought to collect detailed data and information by surveying the motorcycle driver before and after driving.

3.1 Research Process Flow

The following steps are included in the research process flow: define the research problem, aim and objectives, literature review, self-made questionnaire, and data collection through surveys. Researchers used descriptive statistics in data analysis and interpretation to show and summarize a study's most critical essential dataset

Figure 2: Research Process Flow



3.2 Research Environment

The study was conducted in Eskina Yati, Liloan. Approximately 37,000 surrounded the place, according to the 2020 census, and many possible customers. The first thing you will notice in the area is populated. It has three (3) schools: Yati Elementary School, Arcelo Memorial National High School and Divine Life Institute of Cebu, San Vicente Ferrer Parish, public markets, and private establishments.

Figure 3: Map of Eskina Yati, Liloan

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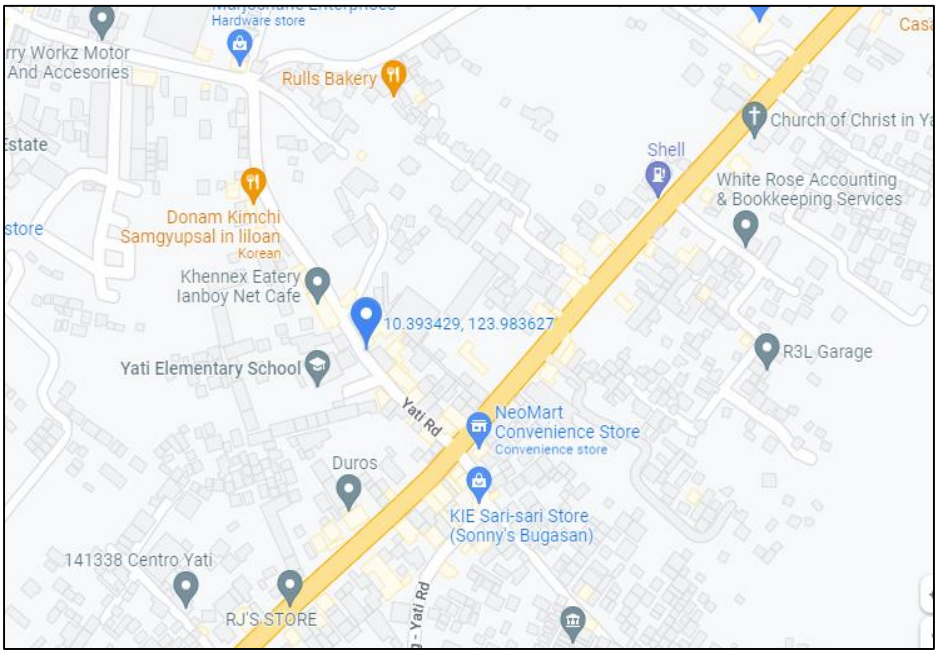

3.3 Research Respondents

The researchers considered Eskina Yati and Liloan as the study's respondents because it is a center of activities. The total population was 70, and the sample size of respondents was 30 motorcycle drivers—responses were given by respondents regarding roadblocks they faced while driving. Coping mechanisms were the participants' techniques for dealing with difficult situations.

3.4 Research Instrument

The researcher measured the drivers' stressors using a sphygmomanometer and a survey questionnaire. The researcher had a specific type of respondents and used a simple random sampling technique to choose a valid subject for this study. The instrument used was survey questions to gather the needed data for the analysis. The statistical tool used simple random sampling, and the data were analyzed using the T-test, Pearson r, and Percentage Frequency Distribution.

3.5 Procedures of Data Gathering

On November 8, 2022, the researcher conducted a survey interview in Eskina Yati, Liloan. The survey questionnaire used was pre-made. The researcher's surveys begin at six a.m. and involve using a sphygmomanometer to measure respondents' blood pressure and heart rate. The next step will be to conduct another study at 5 p.m. to see if their blood pressure and heart rate have changed. Beforehand, the researcher asked the respondents for approval to participate in the study. After the researchers explained the purpose of this study, the respondents were assured that the gathered information would be kept confidential and used for research purposes. The researchers interviewed each of them was one who checked on the survey questionnaire during the interview. The drivers interviewed in the morning were also the same person interviewed in the afternoon. The data collected were the basis for the result of this study.

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3.6 Treatment of Data

The statistical tool used was simple random sampling, and the data were analyzed using the T-test and percentage frequency distribution. The researcher used t – a test to compare the averages of two groups: blood pressure and heart rate before and after driving. Simultaneously, the researcher used the percentage frequency distribution to show the percentage of observations for each data point of survey responses and displayed it using the bar graph. It provided researchers with the ability to clearly and concisely summarize data. Before testing hypotheses and research questions, researchers frequently briefly described their data sample.

3.7 Scoring Procedure

Table 1: Blood Pressure and its Description

Classification	Mean Arterial Pressure (MAP)
Low	<70 mmHg
Normal	70 - 100 mmHg
High	>100 mmHg

Blood pressure readings are an essential health indicator, so many doctors recommend keeping track of them at home as you age. Readings vary throughout the day and can be affected by factors such as hydration and stress. Furthermore, the ranges of numbers that indicate high, low, and normal blood pressure differ depending on your age (Rogers, 2018). The typical MAP range is between 70 and 100 mmHg (EMTprep, 2017). It was also stated that it could be calculated by using the systolic blood pressure (SBP) and diastolic blood pressure (DBP): Mean Arterial Pressure (MAP) = ((2 × DBP) + SBP) ÷ 3

Table 2: Heart Rate and its Description

Classification	Heart Rate
Bradycardia (slow)	>60 bpm
Normal	60 to 100
Tachycardia (Fast)	<100

Most people have an average resting heart rate of 60 to 100 beats per minute (bpm). A heartbeat that is excessively fast (beating more than 100 beats per minute) or too slow (beating less than 60), a fluttering sensation in the chest, or a heartbeat that skips can all be signs of abnormal cardiac rhythms (Memorial Care, 2023).

Table 1: Age Intervals and Description of Respondents

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Age Interval	Description
18 – 24	Young Adults
25 – 40	Adults
41 – 60	Middle-age Adults
61 and above	Old Adults

According to Hazirbas et al. (2022), these age groupings are defined differently in different datasets. They suggest acquiring data from those older than the age of maturity, which varies by nation between (18 and 22). However, the researcher used five age groups as follows: "Adolescents; (12–17)," "Young Adults (18–25)," "Adults (26–40)," "Middle Age (41–60)," and "Older Adults (60+)" to classify the age of motorcycle taxi drivers (Grubbs et al., 2019).

Table 2: Likert Scale of the Level of Stress of Motorcycle Taxi Driver

Weighted Mean Scale	Interpretation	Description
4.20 – 5	Extremely	The respondent had felt a severe level of stress
3.40 - 4.19	Very	The respondent had felt an intense level of stress
2.60 - 3.39	Moderately	The respondent had felt an average level of stress
1.80 - 2.59	Slightly	The respondent had felt a mild level of stress
1 - 1.79	Not at all	The respondent had felt no stress

The Likert Scale used to measure the stress level of the drivers experienced consists of: extremely, very, moderately, slightly, and not at all. A score of 1 depicts the lowest stress level, while five is the highest.

3.8 Definition of Terms

The following terms were defined according to their usage in this study for better comprehension:

Demographic Profile – used to determine the motorcycle taxi driver's age and experience in terms of accidents.

Heart Rate – used to determine the number of heartbeats of motorcycle taxi drivers using a sphygmomanometer.

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Mean Arterial Pressure – calculated to determine the classification of the blood pressure of the motorcycle taxi driver.

Motorcycle Taxi Driver (Habal-habal)- a means of transportation usually prevalent in rural areas.

Sphygmomanometer - an instrument measuring the respondents' blood pressure and heart rate.

Stressors - factors that cause stress, whether cognitive, physical, or environmental.

4.0 PRESENTATION, INTERPRETATION OF DATA, ANALYSIS, AND CONCLUSION

The following figures and tables in this chapter show the findings for each of the questions mentioned in the statement of the problem. Presentation and interpretation are based on data gathered through questionnaires and analyzed using percentage frequency distribution, Pearson r, and T-test.

4.1 Results and Discussion

Figure 4: Percentage Frequency of Motorcycle Taxi Driver's Age:

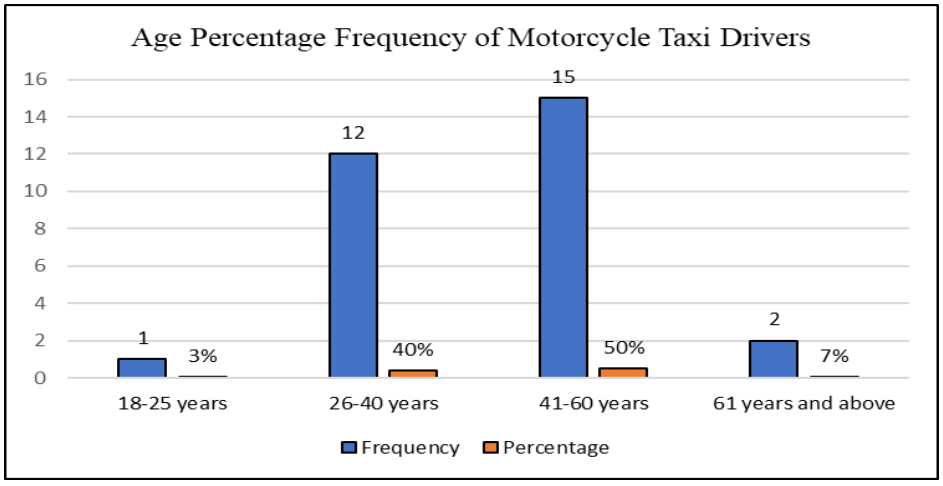

Figure 4 shows the percentage frequency of respondents in each group as follows: 18-25 years old (3%); 26-40 years old (40%); 41-60 years old (50%); 61-66 years old (7%). It clearly shows that out of 30 respondents, the majority of them were 41-60 years old (middle-aged adults), and few were 18-25 years old (young adults), ages ranging from 18-25 (Grubbs et al., 2019). Thus, statistics that those middle-aged adult drivers are the safest drivers (Frickey, 2019). Drivers between the ages of 40-50 are statistically the safest on the road because these drivers have more experience than young demographics (Haklaw, 2023).

Figure 5: Frequency of Driving in a Week

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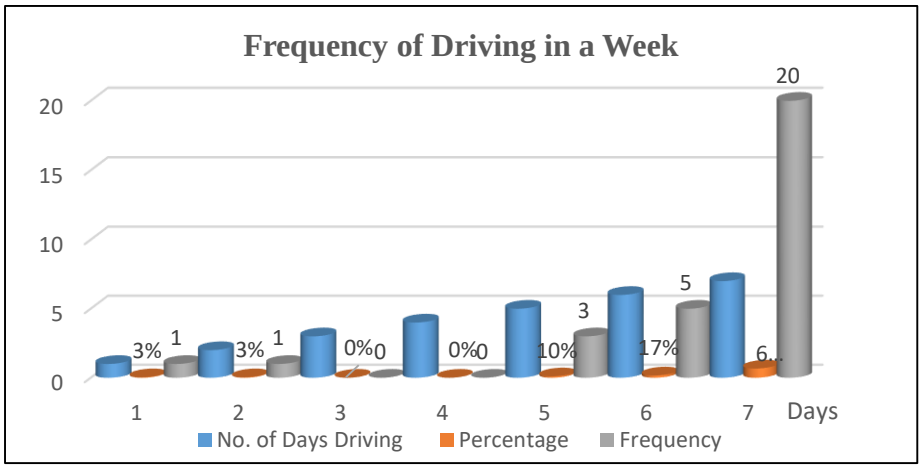

As shown in Figure 5, 20 out of 30 respondents worked as motorcycle taxi drivers every day of a week (67%), five respondents worked six days a week (17%), three respondents worked 5 days a week, no respondent worked 3 and 4 days a week, and 1 respondent both worked 1 to 2 days a week based on the findings, most motorcycle taxi drivers were worked in a week. Despite the safety protocols and strict regulations regarding motorcycle registration and license, motorcycle taxi drivers are sought after, especially in rural areas (Sanka, 2021). These modes of transport can access narrow roads. Riders owning a motorcycle will receive at least P370 each day; a few need to borrow money to buy and make monthly mortgage payments that could lower their daily income, according to Asian Development Bank (2020). They chose to drive every day in order to have more to save and spend.

Figure 6: Percentage Frequency of Length of Time in Driving per Day

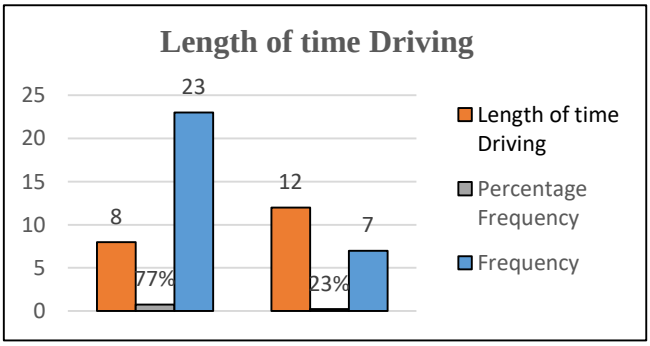

Figure 6 presents the distribution of length of time in driving. The figure revealed that most of the respondents work at least 8 hours a day, with total respondents of 23 (77%), and 7 respondents (23%) answered that they work for 8 hours/day. Motorcycle taxis are slowly gaining popularity as a cost-effective way to fill gaps in last-mile coverage from an affordability perspective (Sanka, 2021). Depending on the demand, they might receive at least P370 daily (Asian Development Bank, 2020). Therefore, they used their vacant hours as motorcycle taxi drivers for income.

Figure 7: Percentage Frequency Distribution of Activities Aside from Driving

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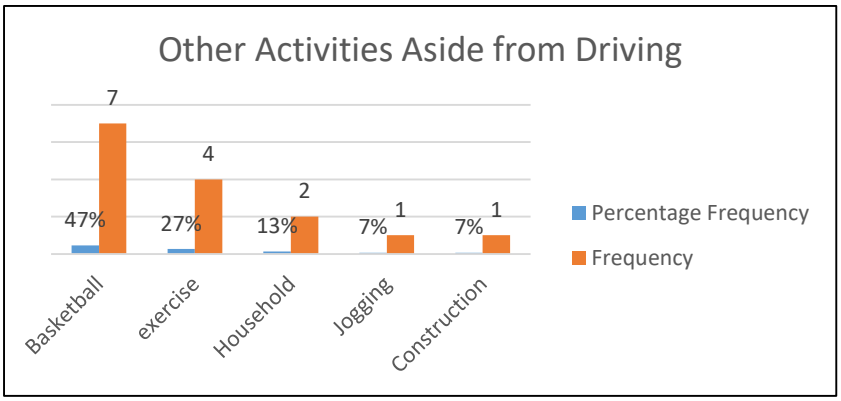

Figure 7 presents the activities aside from driving. The figure shows that 47% of respondents answered basketball, 27% of respondents answered exercise, 13% of respondents answered household, and 7% of respondents both answered jogging and construction. Based on the findings, the drivers played basketball aside from driving (47%). Thus, the most crucial benefit of basketball is that it reduces tension. It facilitates better sleep patterns and stress reduction (Widjaja, 2020). According to Mario Webb (2021), the hormones cortisol and adrenaline, which are stressful conditions, can be channeled through basketball to reduce stress. Your mental and physical health can benefit from playing basketball.

Table 5: Percentage Frequency of Blood Pressure and Heart Rate Before Driving

Blood Pressure (Before Driving)	Frequency	Percentage	Heart Rate (Before Driving)	Frequency	Percentage Frequency
Low	1	3%	Bradycardia (slow)	0	0%
Normal	4	13%	Normal	30	100%
High	25	83%	Tachycardia (Fast)	0	0%

Table 5 shows the percentage frequency of blood pressure and heart rate before driving. The blood pressure and heart rate were measured the morning before the respondents worked. Dissecting the number of respondents, 1 respondent (3%) had low blood pressure, 4 of them (13%) wave thermal, while the remaining 25 (83%) out of 30 respondents had high blood pressure. Based on the findings, most of the driver's blood pressure was high even when resting rest. This signifies that your heart is working too hard and that the walls of your arteries are under additional stress (Better Health, 2021). A possible factor is that as the human body ages, medical conditions and disorders will be more common, as Barco & Carr (2022) stated. However, all of the respondent's heart rates were normal. According to Texas Health Resources (2023), the average resting heart rate is between 60 and 100 beats per minute. Therefore, our

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data collected from the respondents' heart rates were average. Since the environment was not affecting their body and they had not started their work, their heart rates were average.

Table 6: Percentage Frequency of Blood Pressure and Heart Rate After Driving

Blood Pressure (Before Driving)	Frequency	Percentage	Heart Rate (Before Driving)	Frequency	Percentage Frequency
Low	1	3%	Bradycardia (slow)	0	0%
Normal	4	13%	Normal	30	100%
High	25	83%	Tachycardia (Fast)	0	0%

Table 6 shows the percentage frequency of blood pressure and heart rate after driving. After driving, the respondents were asked to rest for 5 minutes before their blood pressure and heart rate were measured. After all of them worked around 8-12 hours a day, 1 respondent (3%), whose blood pressure was low before driving, remained low even after driving. While the number of respondents who had high blood pressure increased to 97%. Having to face heavy traffic has been shown to cause stress, and chronic stress can elevate blood pressure, as to McMillen (2016), which is why more respondents had high blood pressure after driving than before driving. Even after driving, their heart rates were average, with a percentage of 100%. The study shows that when you cycle frequently, your body becomes accustomed to pumping blood faster when sitting or hiking. (Anatomica, 2021). However, their heart rates could still decrease from high to normal since they were given a few minutes to rest after work.

Table 7: Level of Stress Felt by the Drivers

Type of Stress	Weighted Mean	Interpretation	Description
Cognitive	1.53	Not at all	The respondent had felt no stress
Physical	2.80	Moderately	The respondent had felt an average level of stress
Environmental	3.37	Moderately	The respondent had felt an average level of stress

Table 7 shows the level of stress felt by the drivers. The respondents had no cognitive stress, with a weighted mean of 1.53. They had felt moderate physical stress, with a weighted mean

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of 2.80, while the highest level was environmental stress, with a weighted mean of 3.37, which was describe as moderate. Cognitive stress affects the brain's functioning (BrainTraining Australia, 2022), which could negatively distract and affect the driver's performance. Regarding the respondent's cognitive stress, most of them had no problems in terms of cognitive aspects. They may have their personal, like family, health, or financial challenges (Indeed, 2022), however, the respondents' mental/cognitive state was stable since they had no trouble composing themselves.

Physical Stress is often the most obvious sign of stress. The respondents may have experienced physical stressors like headache, dizziness, fatigue, etc. (Telus Health Care Centers, 2020), which could affect driving performance (Barco, 2022). This could be from exhaustion from driving for around 8 - 12 hours every day.

Reif et al. (2018) state that extreme environmental conditions, such as noise, heat, or pollution, create stressors from the environment. It was mentioned by Bantos & Lu (2016) that those who work in the public transportation industry tend to be vulnerable to stress since they are exposed to the environment that changes every time, like traffic, weather, the behavior of passengers, etc.

Table 8: Reasons for Feeling Stress (Cognitive) of the Drivers

Reason to feel stress (Cognitive)	Frequency	Percentage
Poor concentration	10	31%
None	8	25%
Difficulty with memory	6	19%
Anxious thoughts	5	16%
Fearful anticipation	3	9%

Table 8 shows the drivers' reasons for feeling stress (cognitive). Cognitive stress may not affect them much, but a minority of the respondents answered that they still had reasons/stressors on their mental state. 31% of the minority had voted that they experienced poor concentration while driving, 25% had no problems, 19% experienced difficulty with memory, 16% had anxious thoughts while driving, and 9% feared something while driving. As Barco (2022) said, driving performance is also affected by fatigue and distraction. Poor concentration could distract the driver from performing their work and prioritizing the well-being of their passengers and it affects the proper functioning of the brain (Brain Training Australia, 2022), since they should compose themselves and focus on their work but they still got distracted and had poor concentration.

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Table 9: Reasons of Feeling Stress (Physical) of the Drivers

Reason to feel stress (Physical)	Frequency	Percentage
Fatigue	30	86%
Trauma	4	11%
None	1	3%
Dietary Stress	0	0%
Dental Challenges	0	0%

Table 9 shows the reasons of feeling stress (physical) of the drivers. Having the greatest percentage of votes against Cognitive and Environmental Stress, 86% of the respondents had experienced fatigue. Fatigue refers to a state of low energy and motivation (Davis, 2022). Low energy and motivation could reduce their performance. Also, fatigue can be caused by heavy workload, an imbalance between work and personal life, time pressure, unrealistic deadlines, or job insecurity (Reif, et al. 2018).

Table 10: Reasons of Feeling Stress (Environmental) of the Drivers

Reason to feel stress (Environmental)	Frequency	Percentage
Traffic	27	33%
Environment Issues	22	28%
Personal Problem	14	3%
Rude/Disrespectful passengers	5	4%
Past Negative Experience	5	4%
Losing control of the vehicle	5	4%
Fear of dying in an accident	2	5%
Driving alone in unfamiliar places	1	6%
Being trapped and having a panic attack	1	6%
Existing anxiety disorder	0	7%

Table 10 shows the reasons for feeling stress (environmental) of the drivers. Most of the respondents had voted that their Environmental Stressor was traffic, with a percentage of 33%. It was mentioned by Mc Millen (2016) that heavy traffic could cause stress. In the target

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population's location, it was known to have traffic jams especially during the start of the class and dismissal time of the schools, since the location was surrounded by it. Stress and driving are a dangerous combination and can lead to life-threatening situations (Mohammad, 2018).

Table 11: Significant Difference between Blood Pressure and Heart Rate (Before Driving)

T-test: Paired Two Sample for Means		
	Blood Pressure	**Heart Rate**
Mean	105.8	77.5333333
Observations	30	30
Hypothesized Mean Difference	0	
df	29	
t Stat	8.59676024	
t Critical two-tail	2.045229642	
Interpretation	Reject null hypothesis	

Table 11 shown above illustrates the significant difference between blood pressure and heart rate before driving. Since the computed t value of 8.60 at 0.05 level of significance with 29 degrees of freedom is greater than the tabular t value of 2.045, the null hypothesis is rejected which means that there is a significant difference in the blood pressure and heart rate before driving. According to Oklahoma Heart Hospital (2017), in certain conditions, such as severe stress or danger, blood pressure, and heart rate may rise simultaneously. However, this is not always the case. Even if your blood pressure does not change, your heart rate may since it reflects a number of cardiovascular health signs. Blood pressure and heart rate do not always correspond. Surprisingly, blood pressure and heart rate do not usually vary simultaneously. Even if they both grow, it will not be at the same rate (ACLS Training Center, 2020).

Table 12: Significant Difference between Blood Pressure and Heart Rate (After Driving)

T-Test: Paired Two Sample for Means		
	Blood Pressure	**Heart Rate**
Mean	110.1333333	79.6
Observations	30	30
Hypothesized Mean Difference	0	
df	29	
t Stat	11.17279461	

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t Critical two-tail	2.045229642	
Interpretation	Reject the Null hypothesis	

Table 12 shown above illustrates the significant difference between blood pressure and heart rate after driving. Since the computed t value of 11.17 at a significance level of 0.05 with 29 degrees of freedom is greater than the tabular t value of 2.045, the null hypothesis is rejected, indicating that there is a significant difference between the blood pressure and heart rate of motorcycle taxi drivers. According to the American Heart Association (2016), physical activity can cause an increase in heart rate. In addition, it was said that a person may be able to increase his heart rate by two times while having only a minor rise in blood pressure.

Table 13: Significant Relationship between Age and Blood Pressure, Heart Rate, Cognitive level of Stress, Physical level of Stress, and Environmental level of Stress

	Age & Blood Pressure (Before)	**Age & Heart Rate (Before)**	**Age & Cognitive level of Stress**	**Age & Physical level of Stress**	**Age & Environmental level of Stress**
Correlation r	0.47620	-0.047878364	0.01001742	-0.31078107	-0.24368221
N	30	30	30	30	30
df	28	28	28	28	28
Tabular r value	0.349	0.349	0.349	0.349	0.349
Interpretation	Reject null Hypothesis	Accept Null Hypothesis	Accept Null Hypothesis	Accept Null Hypothesis	Accept Null Hypothesis

Table No. 13 shown above illustrates the significant relationship between age and blood pressure; age and heart rate; age and cognitive level of stress; age and physical level of stress, and; age and environmental level of stress. Since the computed r value of 0.48 at 0.05 level of significance with 28 degrees of freedom is greater than the tabular r value of 0.349, the null hypothesis is rejected which means that there is a significant relationship between the age and blood pressure of motorcycle taxi drivers before driving.

The computed r value of -0.048 at 0.05 level of significance with 28 degrees of freedom is less than the tabular r value of 0.349, the null hypothesis is accepted which means that there is no significant relationship between the age and heart rate of motorcycle taxi drivers before driving. This finding contradicts the study of Dr. Konstantinos Tziomalos (2022), researchers have discovered numerous potential factors associated with high heart rates among drivers,

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including demographic factors such as age, income, marital status, and a family history of high blood pressure. Therefore, medications exist to treat both high and low heart rates with their associated age. Drivers with high heart rates who take medication for their condition should be incredibly cautious of their medication's potential risks (Netsted, 2022). Some studies stated that individual's resting heart rate varies according to their age, body size, heart issues, use of medications, and the temperature of the environment. One's heart rate can also be influenced by emotions; for instance, becoming anxious or terrified might quicken it (Gholipour, B. and Lanese, N., 2022)

The computed r value of 0.01 at 0.05 level of significance with 28 degrees of freedom is less than the tabular r value of 0.349, the null hypothesis is accepted which means that there is no significant relationship between the age and cognitive level of stress of motorcycle taxi drivers before driving. This finding contradicts the study of Amy Smith, et al. (2018) that acute psychological stress commonly occurs in young and older adults' lives. The ability of the brain to control hormone levels can gradually deteriorate. Older adults who experience worry or anxiety consequently tend to create more stress hormones (Woolston, 2022). The cognitive, perceptual, and motor changes that typically follow aging have been linked to age-related changes in the spontaneous structure of the brain (Gonzalez-Roldan, et al. 2020). Pain perception and brain function are both impacted by aging.

The computed r value of -0.31 at 0.05 level of significance with 28 degrees of freedom is less than the tabular r value of 0.349, the null hypothesis is accepted which means that there is no significant relationship between the age and physical level of stress of motorcycle taxi drivers before driving. This finding contradicts the study of Gonzalez-Roldan, et al. (2020) that pain perception and brain function are both impacted by aging. According to Torbjörn Åkerstedt, et al. (2018), people frequently experience fatigue, which was often correlated with sleep issues and both are influenced by aging.

The computed r value of -0.24 at 0.05 level of significance with 28 degrees of freedom is less than the tabular r value of 0.349, the null hypothesis is accepted which means that there is no significant relationship between the age and environmental level of stress of motorcycle taxi drivers before driving. This finding contradicts the study Commodari, E. & Di Nuovo, S. (2019) that in terms of a person's well-being, as they age, psychological stress is crucial. The stress reactions of older persons are influenced by environmental and psychological factors. Help Guide (2022) stated that since everyone ages differently, there is no set age at which one should no longer drive. However, older persons are more likely than younger drivers to obtain traffic tickets and be involved in accidents. Age-related issues might arise from things like declining vision, deteriorating hearing, weaker motor responses, and deteriorating health problems.

Table 14: Significant Relationship between Frequency of driving in a Week and Blood Pressure, Heart Rate, Cognitive level of Stress, Physical level of Stress, and Environmental level of Stress

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	Frequency of Driving in a week & BP (Before)	Frequency of Driving in a week & Heart Rate (Before)	Frequency of Driving in a week & Cognitive Level of Stress (Before)	Frequency of Driving in a week & Physical Level of Stress (Before)	Frequency of Driving in a week & Environmental Level of Stress (Before)
Correlation r	0.15593037	-0.15700400	-0.1110568	-0.2382481	0.054826824
N	30	30	30	30	30
df	28	28	28	28	28
Tabular r value	0.349	0.349	0.349	0.349	0.349
Interpretation	Accept Null Hypothesis	Accept Null Hypothesis	Accept Null Hypothesis	Accept Null Hypothesis	Accept Null Hypothesis

Table 14 illustrate the relationship between the frequency of driving in a week and blood pressure, frequency of driving in a week and heart rate, frequency of driving in a week and cognitive level of stress, frequency of driving in a week and physical level of stress, as well frequency of driving in a week and environmental level of stress. Frequency of driving in a week and blood pressure before driving resulted in a correlation r of 0.15 is lesser than the tabular r-value of 0.41, indicating that it accepted the null hypothesis and there was no significant relationship from one other. This result contradicts the findings of Tziomalos (2022), which found that hypertension was associated with older age, driving without rest, longer driving, short sleep duration, smoking, alcohol intake, and inactivity. To avoid hypertension and its accompanying repercussions, health education should include changes in lifestyle, sleep patterns, and driving breaks. Due to the nature of their occupation, drivers have a higher incidence of hypertension than the overall population (National Library of Medicine, 2020). In addition, prolonged exposure to traffic congestion increased both systolic and diastolic blood pressure (Samra, et al.,2017).

The frequency of driving in a week and heart rate correlation r is - 0.157 is lesser than the tabular r-value of 0.349 leading to the acceptance of the null hypothesis. Contrary to Jo's (2019) study, this experimental analysis discovered for the first time that HR increased during long periods of driving. Monitoring was conducted for 24 hours on healthy participants who were planning to travel considerable distances. Continuous driving causes your heart rate to rise (Livesey and Demony, 2017). Therefore, according to Shakouri (2018), heart rate measurements were mostly unaffected by an increase in driving frequency in simulated work environments and under greater traffic congestion.

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The frequency of driving in a week and cognitive level of stress correlation r is 0.011 is lesser than the tabular r-value 0.349 that result in accepting the null hypothesis. This study contradicts the study of Magana (2020), the initial level of stress and fatigue of the driver can have a significant impact on stress, driving behavior, and fatigue caused by a week's worth of driving, which is one of the leading causes of death worldwide. In accordance with the findings of Xiang's (2021) study, cognitive bias was observed among all age groups of drivers. It appeared that drivers with less than one year of experience were consistently overconfident about their driving skills. And drivers with more than three years of driving experience typically gave the most conservative evaluations of themselves and others. In addition, according to Hu L.'s (2020) study, drivers with 6–10 years of driving experience account for the highest number of accidents, followed by drivers with 3 years of driving experience, and drivers with 20 years or more of driving experience account for the lowest number of accidents.

Furthermore, the frequency of driving in a week and physical level of stress has a correlation r of 0.23 is lesser than the tabular r-value of 0.349 which means that it also accepted the null hypothesis. Contrary to the findings of Phyu Phyu et al. (2017), stress originates from pressure or anxiety caused by personal circumstances, such as family, health, and financial troubles (Indeed, 2022). Consequently, fatigue and distraction can have an impact on driving performance (Barco, 2022).

The frequency of driving in a week and environmental level of stress have the value of 0.05 to its correlation r is lesser than the tabulated r value 0.349 to its p-value resulting to accept the null hypothesis, thus all accept the null hypothesis. This result is in line with Phyu Phyu THWE's (2017) study, which found that the stress of driving varies based on the type of road. The highways with the most traffic, poor pavement, and nasty passengers are the most challenging to navigate. In addition, traffic congestion, a dearth of commuter vehicles, resulting in longer travel times and less comfortable rides, and environmental issues stemming from the continued usage of toxic gases all contribute to the aforementioned issues (Malasique, 2020). Consequently, according to Reif et al. (2018), physical-technical environment stressors include noise, heat, and pollution.

Table 15: Significant Relationship between Length of Time Driving in a Day and Blood Pressure, Heart Rate, Cognitive level of Stress, Physical level of Stress, and Environmental level of Stress

	Length of Time Driving & BP	Length of Time Driving & Heart Rate	Length of Time Driving & Cognitive Level of Stress	Length of Time Driving & Physical Level of Stress	Length of Time Driving & Environmental Level of Stress
Correlation r	-0.0351905	-0.2874519	0.0762161	-0.1244492	-0.231189538
N	30	30	30	30	30
df	28	28	28	28	28

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Tabular r value	0.349	0.349	0.349	0.349	0.349
Interpretation	Accept Null Hypothesis	Accept Null Hypothesis	Accept Null Hypothesis	Accept Null Hypothesis	Accept Null Hypothesis

Table 15 depicts the relationship between hours of driving and blood pressure, hours of driving and heart rate, and hours of driving and cognitive, physical, and environmental level of stress before driving. The hours of driving in a week and blood pressure resulted in 0.035 in correlation r is lesser than the tabular r value 0.349 indicating that the null hypothesis was accepted, that means there was no significant relationship between them. This finding contradicts the study of Schad (2022) they found that the longer a person commutes or drives constantly, the more likely they are to have elevated blood pressure while operating a motor vehicle. Additionally, because of long durations spent seated in the same position with little or no opportunities for physical movement, driving is not the healthiest occupation (Road Safety Authority, 2016). The hours spent driving and eating on the road, as stated by Truenorth (2022), can lead to high blood pressure, a condition that affects the health and ability to drive of many drivers.

The hours of driving and heart rate resulted in a correlation r of 0.28 is lesser than the tabulated r value 0.349 indicating that accepting the null hypothesis means there was no significant relationship between them. This study contradicts to the study of Livesey and Demony, (2017), this result indicates that continuous driving causes an increase in heart rate According to SurreyLive (2017), being a driver, a passenger in a car, a passenger in a car with a poor driver, getting lost, driving too fast, and attempting to squeeze through a narrow gap are all common causes of an elevated heart rate while driving. According to Shakouri (2018), an increase in driving frequency in simulated work environments and during periods of increased traffic congestion had little effect on heart rate measurements.

Hours of driving and Cognitive level of stress resulted to correlation r of 0.076 is lesser than the tabulated r value 0.349 that leads to accepting the null hypothesis meaning that there was no significant relationship from each other. This finding contradicts the study of Road Safety Authority, (2016) anxiety, fear, and agitation can all play a role in the negative condition known as stress it results from longer period of driving. Based on the Brooks Law Group study, 2020) When a person drives for too long, they can get stressed out. When a driver is stressed, it can be dangerous for them and the other drivers around them. They are more likely to get angry on the road. When you're driving under a lot of stress, anxiety can quickly turn into anger, which could make you drive more aggressively. In addition, to Magana (2020), one of the top causes of death around the world is driving, and the stress, driving behavior, and fatigue generated by a week of driving can be greatly impacted by the driver's starting stress and fatigue levels.

Hours of driving and Physical level of stress resulted to correlation r of 0.124 is lesser than thee tabulated r value 0.349 that leads to accepting the null hypothesis meaning that there was no significant relationship from each other. This finding contradicts the study of Road Safety Authority, (2016) driver fatigue is a leading cause of car crashes and other dangerous occurrences that is an example of physical stress. An excessive number of accidents and

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incidents involving motor vehicles are brought about each year because of drivers who are too fatigued to keep their eyes open for long periods of time. Moreover, Magana (2020), a driver's initial level of stress and tiredness can have a big effect on the stress, driving behavior, and tiredness caused by a week of driving, which is one of the leading causes of death around the world. In Xiang's study from 2021, drivers of all ages were found to have cognitive bias. It seemed like drivers with less than a year of experience were always too sure of themselves when it came to driving. And drivers who had been driving for more than three years gave the most cautious assessments of themselves and others.

Hours of driving and Environmental level of stress resulted to correlation r of – 0.23 is lesser than the tabulated r value 0.349 that leads to accepting the null hypothesis meaning that there was no significant relationship from each other. This finding contradicts the study of Louis Montoro (2018) the environment in which the work of public transportation driver's takes place is potentially hazardous to their health and well-being. Environmental overstimulation (e.g., noise, smog, fluctuating light conditions) and challenging ergonomic situations. Moreover, according to Magaña (2020), temperature, humidity, and environmental conditions might also contribute to driver weariness. Temperature was a prominent cause of automobile accidents in the past. If CO2 levels are too high, the driver may experience dizziness and nausea. In addition, traffic congestion, a lack of commuter vehicles, resulting in longer journey times and less comfortable rides, and environmental problems caused by the ongoing use of hazardous gases all contribute to the aforementioned problems. (Malasique, 2020).

Table 16: Significant Relationship between Age and Blood Pressure; Age and Heart Rate (After)

	Age & Bp	**Age & Heart Rate**
Correlation r	0.476220174	-0.02969538
N	30	30
df	28	28
Tabular r value	0.007808434	0.876213374
Interpretation	Reject null Hypothesis	Accept null hypothesis

Table 16 depicts the relationship between age and blood pressure, as well as age and heart rate after driving. Age and blood pressure resulted after driving in a correlation r of 0.467 is greater than the tabular r-value of 0.0078, indicating that we must reject the null hypothesis and that there is a significant relationship between the two. Consequently, the age and heart rate were found to be non-significant from one another, the computed r is- 0.029 is lesser than the tabular r value leading to the acceptance of the null hypothesis. This finding agrees with the study of Frontiers (2020) they predicted that the driver's heart rate was impacted by age, sex, and performance as aging influences adrenoceptors. Researchers also discovered that men in the

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general population with a fast heart rate were more likely to have a shorter life expectancy or suffer a heart attack (Goorakani, 2020). Those whose heart rates increased between the ages of 50 and 60 had a worse outcome (Chen, 2019).

Table 17: Significant Relationship between Frequency of Driving in a Week and Blood Pressure; Heart Rate; Cognitive Reason of Stress; Physical Reason of Stress; Environmental Reason of Stress

	Frequency of Driving in a week & BP (After)	Frequency of Driving in a week & Heart Rate (After)	Frequency of Driving in a week & Reason to feel stress: Cognitive (After)	Frequency of Driving in a week & Reason to feel stress: Physical (After)	Frequency of Driving in a week & Reason to feel stress: Environmental (After)
Correlation r	0.164634151	0.15619091	0.421847917	-0.26989781	0.00197236
N	30	30	30	30	30
Df	28	28	28	28	28
Tabular r value	0.349	0.349	0.349	0.349	0.349
Interpretation	Accept null hypothesis	Accept null hypothesis	Reject null hypothesis	Accept null hypothesis	Accept null hypothesis

Table 17 depicts the relationship between frequency of driving in a week and blood pressure, frequency of driving in a week and heart rate, and frequency of driving in a week and reasons for stress in cognitive, physical, and environmental areas. The frequency of driving in a week and blood pressure after driving resulted in 0.164 in correlation r, 0.84 is lesser than the tabulated r value 0.349 indicating that the null hypothesis was accepted and that there was no significant relationship between them. This finding contradicts with the study of Tziomalos (2022) hypertension was connected to older age, driving without rest, longer driving, low sleep duration, smoking, alcohol consumption, and inactivity. To prevent hypertension and other consequences, health education on lifestyle changes, sleep habits, and driving breaks should be addressed. Due to the nature of their profession, drivers have an elevated risk of hypertension in comparison to the general population (National Library of Medicine, 2020). Moreover, longer exposure to driving congestion raised systolic and diastolic blood pressures (Samra, et al., 2017).

The frequency of driving and heart rate resulted in a correlation r of -0.157 is lesser than the tabulated r value 0.349, indicating that accepting the null hypothesis which means there was

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no significant relationship between them. This finding contradicts with the study of Jo (2019) this experimental analysis found for the first time that HR increased throughout extended periods of driving ng, and monitoring was conducted for 24 hours on healthy participants who expected to travel considerable distances. Constant driving causes an increase in your heart rate (Livesey and Demony, 2017). Hence, according to Shakouri (2018) states that heart rate measures were mostly unaffected if driving frequency increased in simulated work areas and under higher traffic congestion.

The frequency of driving in a week and the reasons you feel stressed cognitively led to a correlation r value of 0.42 is greater than the tabulated r value 0.349 causing the null hypothesis to be rejected. This means that there was a significant relationship between the two. According to Kenyon (2016), fatigue and stress from working long hours can impair cognitive function. Same with the findings of McKenzie (2016), a professor of economics at Keio University in Tokyo, about how the number of hours worked each week affects a person's cognitive ability, that work can boost brain activity, but long hours and stressful tasks can damage cognition.

The frequency of driving in a week and the causes of physical stress had a correlation r of -0.27 is lesser than the tabular r value of 0.349, accepting the null hypothesis that there was no significant relationship between them. This finding contradicts with the study of Phyu Phyu et al., (2017) stress results from pressure or worry brought on by personal issues as well as family, health or financial challenges are examples of personal concerns (Indeed, 2022). As a result, driving performance is also affected by fatigue and distraction (Barco, 2022).

The frequency of driving in a week and the reasons of environmental stress had a correlation coefficient of 0.002 is lesser than the tabulated r value of 0.49, accepting the null hypothesis that means that there was no significant relationship between them. This finding agrees with the study of Phyu Phyu Thwe (2017), the stress of driving changes depending on the type of road. The most difficult roads to drive on are those with considerable traffic and mixed roads; rough and bad, poor pavement, or rude passengers. Furthermore, traffic congestion, a lack of commuter vehicles, resulting in longer journey times and uncomfortable rides, and environmental difficulties caused by the ongoing use of harmful gas (Malasique, 2020). According to Reif et al. (2018), extreme environmental circumstances such as noise, heat, or pollution generate stressors from the physical-technical environment.

Table 18: Significant Relationship between Length of Time Driving per Day and Blood Pressure; Heart Rate; Cognitive Reason of Stress; Physical Reason of Stress; Environmental Reason of Stress

	Length of Time Driving & Blood Pressure	Length of Time Driving & Heart Rate	Length of Time Driving & Reason to feel stress: Cognitive (After)	Length of Time Driving & Reason to feel stress: Physical (After)	Length of Time Driving & Reason to feel stress: Environmental (After)

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Correlation r	0.0104902	-0.137870	0.16850509	-0.035245	-0.048730806
N	30	30	30	30	30
df	28	28	28	28	28
Tabular r value	0.349	0.349	0.349	0.349	0.349
Interpretation	Accept null hypothesis	Accept null hypothesis	Accept null hypothesis	Accept null hypothesis	Accept null hypothesis

Table 18 depicts the relationship between hours of driving and blood pressure, hours of driving and heart rate, and hours of driving and reasons for stress in cognitive, physical, and environmental areas. The hours of driving in a week and blood pressure after driving resulted in 0.01 in correlation r is lesser than the tabulated r value 0.349, indicating that the null hypothesis was accepted, indicating that there was no significant relationship between them. This finding contradicts with a study by Schad (2022) who found that the longer a person commutes or continuously drives (Tziomalos, 2022) also found out that older age, short sleep duration, smoking, alcohol consumption and inactivity, the more likely they are have high blood pressure while driving. Therefore, driving is not the healthiest career due to long periods spent in one posture with little to no opportunities for physical mobility (Road Safety Authority, 2016).

The hours of driving and heart rate after driving resulted in a correlation r of -0.13 is lesser than the tabulated r value 0.349, indicating that accepting the null hypothesis means there was no significant relationship between them. Strong values such as heart rate and blood pressure provide the first indications of positive or negative reactions in the body, according to Adler et al. (2023). However, this data contradicts Tziomalos' study in 2022 that elevated heart rates in drivers can be caused by various variables, including demographics such as age, income, marital status, and a family history of high blood pressure. Shakouri (2018) states that the heart rate measurements remained mostly unaffected when ding frequency increased in simulated work zones and worse traffic jams.

Hours of driving and reasons for stress cognitively resulted in a correlation r of 0.17 is lesser than the tabulated r value 0.349, leading to accepting the null hypothesis, meaning that there was no significant relationship between each other. Therefore, this finding contradicts the that distraction affects driving performance (Barco, 2022). The brain's ability to regulate hormone levels can gradually decrease, according to Smith, et al. (2018); it could be a possibility that some individuals tend to have a hard time hanging their cognitive stress. According to Xiang's 2021 study, cognitive biases have been observed in drivers of all ages.

Hours of driving and reasons for stress in physical resulted in a correlation r of - 0.04, less than the tabulated r value of 0. This led to accepting the null hypothesis that there was no significant relationship between each other. This result of the relationship of the independent and

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dependent variables refutes the idea that drivers were subjected to physical stresses that would have affected their ability to drive (Barco, 2022). Variables associated with working hours include night work, shift work and generally long hours, and physical and technical stresses, including to toxic or hazardous chemicals and unsafe workplaces factors (Reif, et al. 2018). According to specific research by Usechebyet al. (2017), drowsiness and fatigue are the main risk factors for dangerous actions and traffic of professional drivers.

Hours of driving and reasons for stress in the environment resulted in a correlation r of – 0.49 is lesser than the computed r value 0.349 which leads to accepting the null hypothesis meaning that there was no significant relationship between each other. This study contradicts on the connection between driving time and environmental stress (Reif, et al. 2018), which claims that extreme environmental conditions such as noise, heat or pollution induce stressors from the physical and technical environment. Driving under the influence of stress can lead to life-threatening situations (Mohammad, 2018). Those who work in public transport are particularly vulnerable due to the high levels of stress they experience from things like traffic and unpleasant encounters with passengers (Santos & Lu, 2016).

Table 19: Means to Mitigate Driver's Stress

Ways of Mitigating Stress	Frequency	Percentage
Enough Sleep	26	30%
Connect with Others	20	23%
Listen to music	19	22%
Be Active	9	10%
Stress Eating	7	8%
Seek for Counseling	4	5%
Others	2	2%

Before suggesting ways of mitigating the effect of stress on the respondents, the respondents had asked what the ways of the respondents were. Most of them tend to sleep (30%), connect with others (23%), and listen to music (22%). According to the Office of Disease Prevention and Health Promotion (2023), getting enough sleep reduced respondents' risk of major health problems like diabetes and heart disease, helped them maintain a healthy weight, improved their mood, and reduced stress. It was also said by Sack (2020) that distractions could also help lessen the negativity and stress, since it frees anyone from their negative, automatic, and habitual thought patterns, lowers the intensity of the uncomfortable emotion so it's easier to control.

5.0 SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.1 Findings

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The profile of the driver in terms of age, frequency of driving in a week, length of time in driving in a day and other activities all have an impact on the levels of cognitive, physical, and environmental stress they experience. The majority of drivers are between the ages of 41 and 60, and majority of them are dealing with high blood pressure. According to the data, most motorcycle taxi drivers work seven days a week, for at least eight hours a day. The highest percentage of physical activities was basketball because that's what the drivers do during their spare time. The blood pressure before and after driving were all in high level because mostly of the motorcycle taxi drivers' blood pressure were above 100 mm Hg. In heart rate the results in before and after are all in normal condition, since their heart rates were all within the normal range of 60 to 100 beats per minute. The level of stress in environment and physical were both moderate since the respondents were facing traffic, personal problems and environmental issues; heat, rain, noise etc. and were most likely to experienced fatigue and trauma before and after driving. The respondents had no stress felt at all on cognitive type of stress.

The blood pressure and heart rate before and after driving resulted to reject the null hypothesis this means that there was a significant difference between the age and blood pressure. The relationship between age and heart rate, age and cognitive level of stress, age and physical level of stress, and age and environmental level of stress resulted to accept the null hypothesis which means there is no significant relationship from each other. Frequency of driving and blood pressure, frequency of driving and heart rate, frequency of driving and cognitive level of stress, frequency of driving and physical level of stress, and frequency of driving and environmental level of stress are all resulted to accept the null hypothesis which means that there is no significant relationship from each other. Length of time driving and blood pressure after driving, length of time driving and heart rate, length of time driving and cognitive level of stress, length of time driving and physical level of stress, and length of time driving and environmental level of stress are all resulted to accept the null hypothesis which means that there is no significant relationship from each other.

The means of mitigating stress of the motorcycle taxi driver majority are enough sleep, connect with others and listen to music.

5.2 Conclusion

The motorcycle taxi drivers experienced moderate physical and environmental stress in driving. The common reason of physical stress was fatigue, while the common environmental stress was traffic. There was significant relationship between blood pressure and heart rate before and after driving and the frequency of driving in a week and cognitive reasons of stress.

5.3 Recommendation

Concerning the driver's health, the researchers propose the following:

- Free monthly monitoring of blood pressure and heart rate.
- Engage physical exercises such as jogging and Zumba, and physical games, such as basketball in their free time.
- Raise funds to buy water dispensers primarily for the drivers.

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- The researchers encouraged the motorcycle taxi drivers to continue their means of mitigating stress, such as enough sleep for reducing physical stress and listening to music through phones to reduce environmental distraction and stress.

6.0 APENDIX

6.1 Appendix A:

Letter of Request

Dear Respondents,

This study entitled, "Level and Reason of Physical, Cognitive, And Environmental Stress Encountered by The Motorcycle Taxi Driver: Some Proposals". This research would be beneficial to the drivers for it can mitigate ways to minimize stress hence decrease the possibility of having health problems. Thus, there is a great need for the completion of this research. We sincerely invite you to participate in this study by being one of the survey respondents by answering the survey questionnaire below. This questionnaire composes of 14 questions and will not take more than 10 minutes of your time to be completed. The information that will be accumulated from this survey will be much of help for the researcher's study and will also benefit the safety of public transportation operators.

This research study is solely for academic purposes, and your assistance in completing the following questionnaire will be greatly appreciated. By the consent given by answering this survey, your participation and information will be kept and remain confidential and would only be used for the following research purposes.

Please check here to indicate your informed consent to participate in this study. ☐

6.2. Appendix B

Survey Questionnaire

Age:

Questions:

1. What is the blood pressure and heart rate of the driver before driving?

    1.1 Blood Pressure
    1.2 Heart Rate

2. How long are you driving in a day?

- ☐ 1 – 3 hours
- ☐ 4 to 6 hours
- ☐ 7 to 9 hours
- ☐ Half day (12 hours)
- ☐ 24 hours

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3. How frequent do you do to work as a public utility driver?

- ☐ Once a week
- ☐ Twice a week
- ☐ Thrice a week
- ☐ Four times in a week
- ☐ Five times in a week
- ☐ Six times in a week
- ☐ Everyday
- ☐ Others: _____

4. Please rate the level of stress felt during driving, 5 is the highest stressor and 0 is the lowest

Cognitive:

- Anxious thoughts
- fearful anticipation
- poor concentration
- difficulty with memory

Physical:

- trauma (injury, infection, surgery)
- fatigue
- dietary stress
- dental challenges

Environment:

- Traffic
- Environment issues (heat, rain, etc.)
- Personal Problems
- Rude/disrespectful passengers
- Past negative experiences
- Existing anxiety disorders
- Driving alone in an unfamiliar place
- Fear of dying in an accident
- Being trapped and having a panic attack
- Losing control of the vehicle

5. What are your ways to mitigate stress?

- ☐ Enough Sleep
- ☐ Stress Eating
- ☐ Be active
- ☐ Connect With Others
- ☐ Listen to Music

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- ☐ Seek for Counselling
- ☐ Others: _____

6. Other activity aside from Driving: _____

7. What is the blood pressure and heart rate of the driver after driving?

7.1 Blood Pressure
7.2 Heart Rate

8. What are the reasons you feel stressed after driving? Check as many

Cognitive:

- ☐ Anxious thoughts
- ☐ fearful anticipation
- ☐ poor concentration
- ☐ difficulty with memory

Physical:

- ☐ trauma (injury, infection, surgery)
- ☐ fatigue
- ☐ dietary stress
- ☐ dental challenges

Environment:

- ☐ Traffic
- ☐ Environment issues (heat, rain, etc.)
- ☐ Personal Problems
- ☐ Rude/disrespectful passengers
- ☐ Past negative experiences
- ☐ Existing anxiety disorders. …
- ☐ Driving alone in an unfamiliar place. …
- ☐ Fear of dying in an accident. …
- ☐ Being trapped and having a panic attack.
- ☐ Losing control of the vehicle.
- ☐ Other: _____

6.3 Appendix C

6.3.1 Tally and Computation

Before Driving

Respondents	Age	Blood Pressure		Mean Arterial Pressure (mm Hg)	Heart Rate
		Systolic	Diastolic		

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M	25	120	80	93	80
M	28	127	92	104	82
M	32	121	82	95	80
M	32	123	92	102	94
M	33	151	101	118	70
M	34	136	88	104	80
M	34	130	89	103	96
M	34	135	101	112	75
M	34	135	90	105	76
M	37	152	95	114	80
M	38	145	89	108	73
M	39	149	100	116	92
M	40	130	80	97	64
M	41	124	90	101	67
M	42	130	93	105	73
M	43	133	88	103	63
M	43	167	118	134	69
M	44	123	86	98	63
M	44	132	96	108	77
M	44	138	88	105	78
M	45	145	92	110	63
M	49	149	90	110	78
M	50	154	95	115	85
M	51	127	97	107	97
M	55	135	88	110	64
M	55	137	101	52	90
M	56	145	106	119	79
M	60	142	82	102	88
M	62	156	92	113	77
M	66	150	1	111	73

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Length of Time Driving in a Day	Frequency of Driving in a Week
12	7
8	7
8	7
8	1
12	7
12	7
8	6
8	6
8	6
8	7
8	5
8	7
8	2
8	7
12	7
12	7
8	5
8	7
8	7
8	6
8	7
8	7
8	6
8	5
12	7
8	7
8	7
8	7
12	7
8	7

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Level Of Stress		
Cognitive Level of stress	**Physical Level of stress**	**Environmental Level of stress**
2	3	3
1	3	5
2	4	4
4	4	4
2	3	3
2	2	3
0	2	3
4	4	3
0	3	3
3	4	5
1	2	4
2	3	4
0	3	2
2	3	3
1	3	3
1	3	3
0	3	3
0	0	4
0	1	5
0	4	4
0	4	2
3	3	4
4	4	3
3	3	4
2	2	3
0	2	1

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1	4	4
1	1	3
2	2	3
3	2	3

Ways of Mitigating Stress						
Enough Sleep '1'	**Stress Eating '2'**	**Be Active '3'**	**Connect with Others '4'**	**Listen to music '5'**	**Seek for Counselling '6'**	**Others '7'**
1	2	3	4	5	6	
				5		
1	2		4	5		
1	2	3				
1			4	5	6	7
			4			
1		3	4	5		
1		3	4	5	6	
1				5		
1			4	5		
1		3		5		
1			4	5		
1			4	5		
1	2		4	5		
1	2		4			
			4		6	
1		3	4	5		
			4			
1			4	5		7
1		3	4	5		
1						
1						

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1						
1			4	5		
1						
1		3	4	5		
1		3	4			
1	2					
1	2		4	5		
1						

After Driving

Reason to feel stress (Cognitive)				
None (1)	Anxious thoughts (2)	Fearful anticipation (3)	Poor concentration (4)	Difficulty with memory (5)
				5
				5
				5
	2	3		
	2			
			4	
1				
			4	
1				
			4	
				5
			4	
1				
			4	

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	2			
	2			
1				
1				
			4	
1				
1				
			4	
	2			
		3		
			4	
1				
				5
		3		
			4	5
			4	

Reason to feel stress (Physical)				
None (1)	Trauma (2)	Fatigue (3)	Dietary Stress (3)	Dental Challenges (5)
		3		
		3		
	2	3		
	2	3		
		3		
		3		
		3		
		3		

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		3		
		3		
	2	3		
		3		
		3		
		3		
		3		
		3		
		3		
1		3		
		3		
		3		
		3		
		3		
		3		
		3		
		3		
		3		
		3		
		3		
	2	3		
		3		

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Reason to feel stress (Environmental)									
Traffic (1)	Environment Issues '2'	Personal Problem '3'	Rude/Disrespectful passengers '4'	Past Negativer Experience '5'	Existing anxiety disorder '6'	Driving alone in unfamiliar places '7'	fear of dying in an accident '8'	being trapped and having a panic attack '9'	losing control of the vehicle '10'
1	2	3	4	5	0	7	0	0	10
1	2	3	0	0	0	0	0	0	0
1	0	0	4	0	0	0	0	0	0
1	2	0	4	5	0	0	0	0	0
1	2	3	0	0	0	0	0	0	0
1	0	3	0	0	0	0	0	0	0
1	0	0	4	0	0	0	0	0	0
1	2	3	0	5	0	0	0	0	0
1	2	0	0	0	0	0	0	0	10
1	2	0	0	0	0	0	0	0	0
1	2	3	0	0	0	0	0	0	0
1	2	0	0	0	0	0	0	0	10
0	2	0	0	0	0	0	0	0	0
1	2	0	0	0	0	0	0	0	0
1	2	3	0	0	0	0	0	0	0
1	2	0	0	0	0	0	0	0	0
1	2	0	0	5	0	0	0	0	10
1	2	3	0	0	0	0	0	0	0
1	2	3	4	5	0	0	8	9	10
1	2	0	0	0	0	0	0	0	0
1	2	0	0	0	0	0	0	0	0

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1	0	0	0	0	0	0	0	0	0
1	2	0	0	0	0	0	0	0	0
1	0	3	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
1	0	3	0	0	0	0	0	0	0
0	0	3	0	0	0	0	0	0	0
1	2	3	0	0	0	0	0	0	0
1	2	0	0	0	0	0	8	0	0
1	0	3	0	0	0	0	0	0	0

6.4. Appendix D

6.4.1 Survey, Blood Pressure, and Heart Rate Monitoring Before Driving:

Survey, Blood Pressure, and Heart Rate Monitoring After Driving

6.0 ACKNOWLEDGEMENT

This study was made successful through the aid of significant persons who guided and helped us throughout the completion of this study. Our utmost gratitude to those individuals who helped and broaden our perspectives as we went through this study.

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To our parents, who patiently supported us financially, morally and spiritually from the time we started conducting the study until it's completion. Those support boosted our morale and spirit in finishing what we started. We would like to commend them for their endless understanding and tireless motivation.

To our Professors, Engr. Delfa Castilla, through her guidance and encouragement helped us a lot in drawing out our ideas and skills in writing.

To our Research Adviser, Engr. Donald Lalican, for sharing his knowledge and expertise and for supervising us in writing this thesis

To our Panel of Examiners, Engr. Delfa Castilla, Engr. Donald Lalican and Engr. Gweneth, for their encouragement insightful comments and suggestions for the best outcome of this research paper.

To our Friends, who have been there to keep us determined and resolved in making our way through, for cheering us everytime we felt worn out, and for encouraging us to finish and submit our study within the submission date.And foremost, to our Almighty God, for the guidance and strength He bestowed on us all the way as we accomplished our research paper.

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