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# Application of Self-reported Drivers' Behavior Questionnaire in Private Vehicles (Motorcar) in Peshawar

Wajidullah[1], Safiullah[2], Muhmmad Adil Khan[3]
[1,2,3] National Institute of Urban Infrastructure Planning, University of Engineering & Technology Peshawar
wajidullah.momand@gmail.com[1]
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***Abstract*—** Transportation plays an essential role in our everyday lives. Transportation planners often looking for systems that are efficient, reliable, and safe. One of the most significant factors in road accidents and public safety is the behavior of drivers. The Driver Behavior Questionnaire (DBQ) has not been used in Peshawar to find driver behavior. The dream of a secure and effective transportation network seems to exacerbate these conditions. The complete DBQ method is essential to find the effectiveness of the DBQ. The Driver Behavior Questionnaire (DBQ) was split into four separate sections. There were three major categories of driver behavior: mistakes, slips and lapses, violations, and unintentional violations. The respondents had to rate themselves on a scale of 1 to 3, how good they think they are, how healthy they think they are. The report concludes with a list of recommendations on how drivers can improve their behavior. Survey was performed at colleges and public buildings in parking lots. Drivers were questioned directly in the parking lot. 250 questionnaires were filled out in total. Statistical Package for Social Sciences (SPSS) was mainly used for the analysis of the data. Almost 64% of people do not have a driving license. 62% consider the process of getting a license difficult while 29% consider it of no use, and they believe they do not need it. Drivers with no driving license do more speeding than those who have a license. Most of the respondents were of the opinion to have strict enforcement of traffic rules, mandatory training before issuing a driving license.

***Keywords*—** Accident, Driver, Behavior, DBQ, Traffic

## I. INTRODUCTION

### A. Background

Safety, in its entirety, is of great importance to us. Safety is part and parcel of the project, whether we are planning or designing. By moving goods and people from one location to another, transportation plays an essential role in our everyday lives. Transportation planners are often looking for systems that are efficient, reliable, and safe. Due to new technology, our daily lives have acquired more momentum. In addition, our road networks have also been affected by rapid urbanization, resulting in densely packed volumes of traffic. The dream of a secure and effective transportation network seems to exacerbate these conditions. Traditionally, road safety is accounted for by considering variables that may potentially affect driver behavior, such as weather, road conditions, and traffic conditions see Fig.1. The Driver Behavior Questionnaire (DBQ) is used to capture the behavior of drivers as a method originally formulated by the ref [4]. DBQ covers four major aspects of driver's behavior: Mistakes, lapses, violations, and Unintentional violations.

Drivers should be qualified and expected to drive according to the road conditions. Similarly, it is often part of the driver's actions to observe the gears and brakes of other traffic. One of the most significant factors in road accidents and public safety is the behavior of drivers.


Figure 1 Relation between road accidents, drivers behviour and other factors

When addressing behavior as an accident agent, we have to bear in mind that in the case of drivers, this is the most flexible aspect and even very complex. Does it, therefore, take extensive and laborious analysis to determine how the conduct of a driver results in different types of accidents? So observing the behavior of the driver in congested traffic such as Peshawar would lead us to formulate and quantify the involvement of the behavior of the driver in traffic accidents.

### B. *Problem Statement*

The complete DBQ has not been used in Peshawar to find driver behavior, to 1) find the behavior of drivers through the behavior technique of self-reporting drivers and 2) the relationship of such driver behavior with the frequency of involvement in accidents. Given the enormous amount of ownership of private motor vehicles in Peshawar, it is clear that in evaluating driving conduct, it is essential to find the effectiveness of the DBQ method, in addition to finding the relationship between the DBQ and the traffic accident.

### C. *Objectives*

In order to find the self-reported driving behavior in private cars, this research study suggests using the DBQ method. The research is more precisely targeted at:

- Compile a database of self-reported driver behavior factors and socio-economic data.

## II. LITERATURE REVIEW

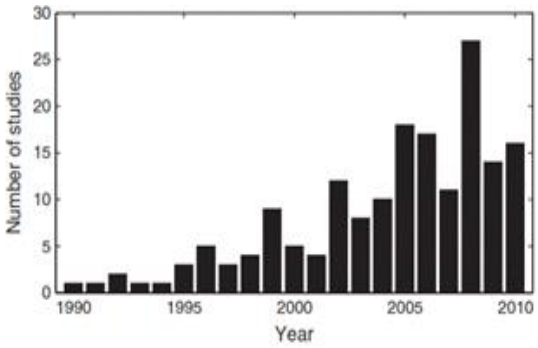
The death rate due to road traffic in South East Asia is 18.5 per 1 Lakh population, and this death rate is by far much higher than the death rate in the 1st Global Road Safety Report [6]. According to this report, the death rate is 16.6 per 1 lakh population due to road traffic [3]. Another National Highway Traffic Safety Administration (USA) study estimated that car accident happens every ten (10) seconds. Much of the deaths of older and younger individuals (35 years and below) in America were attributed to road accidents due to careless driving. According to the [3], approximately 98 percent of car accidents in 2013 is attributable to lower driver concentration.

[4] conducted a case study (DBQ, Driver Behavior Questionnaire) on driver behavior while driving. In the checklist, they listed fifty (50) different things concerning the most common mistakes during driving. Fifty (50) respondents/drivers were asked to state their actions with errors that they normally experienced when driving over the last year. The study results indicate that all the violations (attention, perception, etc.) were due to psychological reasons. Errors/violations simply explain the behaviors of drivers created by the same reluctant driving for years [7].

According to the findings of several studies, four causes are the fundamental reasons for violations while driving, i.e., violations, aggressive violations, errors, and lapses [1]. Almost all experiments used Linear / logistic regressions, using the factor scores, to find the best accident predictor [1], [7], [4]. 174 case studies were analyzed by the ref [7], and the findings revealed that individual/person difference us the basic application of the Driver Behavior Questionnaire, BDQ.

A study based on the Chernobyl and Zeebrugge study was conducted by the ref [4], their findings clearly showed that there is a difference between each and every violation of drivers during accidents. Errors can be identified based on each person's cognitive/mental state, according to the authors, while errors/violations cannot be represented in isolation from society. Violations can only be specified based on the social/environmental context, since this process would be administered in this way under codes of conduct, culture, norms, regulations, laws, and procedures, etc. Violations are those deviations from existing practices that involve safeguarding the minimum harmless activity from dangerous vulnerability.

The aim of the [4] analysis was to find out how far the distinction of mistakes and violations would lie through the research in the questionnaire on car drivers, in which drivers describe the number of occasions while driving on the road they perform bad or silly behavior.




Number of English-written studies per year using the original DBQ or a modified version of it.

Figure 2 Number of English-written studies per year using DBQ

Due to the important findings of this method in different cognitive failure questionnaires, a self-reported questionnaire was used, answers to those questionnaire questions were usually positively associated. The Driver Behavior Questionnaire (DBQ) was based on fifty items used in this analysis. Slips, lapses, accidental violations, and intended violations were focused on objects. In the DBQ, Section 1 of the report, three sections were defined: information on personal data concerning age, occupation, marital status, driving experience, and mileage, etc. Section 2: 50 violation items in which they have to respond on a category scale of 05 points. In addition, these items were grouped into three categories of risk. Section 3 consisted of five questions in which drivers were questioned about their driving performance on a three-scale option. Results indicate that there is a lower violation rate for old age drivers. People with high annual mileage, who consider themselves to be better drivers, and more violations have been reported by those influenced by mood. More crimes are confessed by men than women do. The mood was directly related to risky mistakes, while the use of motorways was inversely related. For researchers and traffic safety experts, this instrument turned out to be a landmark.

The questionnaire on driver conduct primarily used in Arab countries (Qatar and the United Arab Emirates) was based on the DBQ [1]. The main objective of the research was to establish the relationship between incidents in the UAE and Qatar and then to compare the findings between the two countries. Based on twenty (21) Primary Health Case Divisions in the province, Qatar was divided. Using nurses and health educators, 847 men and 263 women were approached to complete the questionnaire. 80.5% of drivers acknowledge that they have been involved in at least one traffic accident. A different sampling method was used for the UAE; instead,

during their renewal of car registration, random drivers, 992 males, and 294 females approached clinics. 55.8 percent of drivers admit that at least one traffic accident has involved them. A report on 'Aberrant driving behavior: mistakes and violations' by the ref [2], was also based on the analysis by the ref [4]. The study explains the violence and mistakes of drivers in Western Australia. As was the case in the overall sample of 135 (61 male and 74 female), the same number of items and methodology was used. Data reveals that most of the risky violations/errors are committed by young drivers relative to old drivers. Path visibility and speeding while driving is the most extreme offenses.

Many other experiments were conducted with minor modifications based on the research [4]. In ref [7] performed 174 studies to determine the correlation between errors and violations using DBQ. The relationship with self-reported injuries was found to have violations in 42 samples and errors in 32 samples. The findings indicate that age negatively correlates with mistakes and breaches, while the experience is positively linked. The authors affirm the validity of the DBQ tool and conclude that DBQ is a useful tool for predicting the actions of drivers in road accidents.

Lahore's city traffic police statistics indicate that 76,070 accidents occurred in Lahore between 2004-2010, while in 2010 alone, there were 31,717 accidents in Lahore. Approximately 86% of accidents in 2010 were due to careless driving, as seen in Figure 2. Of the 31717 accidents in 2010, 7950 occurred only because of the over-speed, While 12487 accidents occurred due to the driver's carelessness, 4658 occurred due to incorrect turnings, and 1950 U-turn accidents. 46 percent were motorbikes in these 31717 deaths, and 29 percent were motorcars. About 73 percent of the victims of accidents were under 40 years of age, and 31 percent were 20 years or younger. On the top, motorcycles are involved in traffic accidents, and on the second, cars are the same as in the rising vehicle rate, see [5].

In ref [8] quoted the data from Rescue 1122 concerning Peshawar city in a newspaper article that Rescue 1122 was busier in 2012 than in 2011. 4,639 people were rescued and hospitalized, and 1,014 have been involved in road accidents among those individuals [8].

All these figures highlight how important it is to observe the actions of the driver. The conduct of drivers is an essential factor influencing road safety, but other factors are primarily accounted for. There is a need to measure the impact of the actions of drivers on safety in a more transparent way. This will allow us to recognize the root causes of injuries and can also be used to enhance the traffic rules.

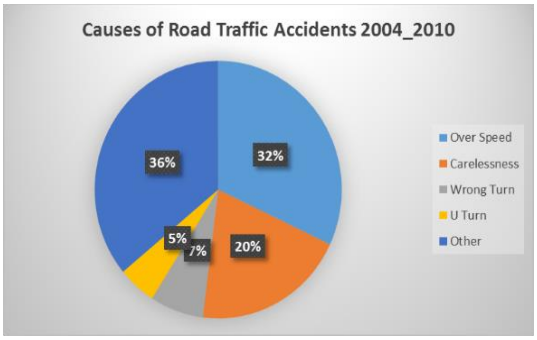



Figure 3 Causes of road traffic accidents 2004 to 2010

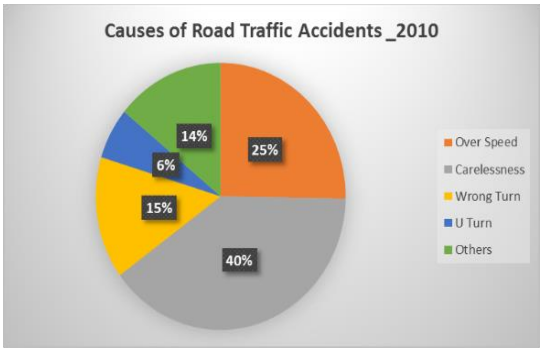



Figure 4 Causes of road traffic accidents 2010

## III. METHODOLOGY

### A. *Driver Behavior Questionnaire (DBQ) Construction*

The essential tool for the study of dissimilarity between aberrant driver behavior errors and violations was the driver behavior questionnaire. In terms of behavior, the Driver Behavior Questionnaire (DBQ) was split into four separate sections. The first part of the questionnaire included the socio-economic conditions of the driver and other information, i.e., age, gender, driving experience, level of education, respondents' monthly income, driving license, average mileage age of the car, frequency of motorway use, regular driving hours and past records of road accidents.

As in the [4] driver behavior questionnaire, the 2nd part of the questionnaire consisted of 50 different kinds of behavioral questions. Overall, in section 2, there were three major categories of driver behavior: mistakes, slips and lapses, violations, and unintentional violations. A total of twenty-one items of Slips and Lapses (When in 3rd gear and driving away from the traffic signal, switching windscreen wipers instead of headlights, etc.), 9 items of error (hitting a car in a car park when reversing, misjudging the entry), 3 Unintended violations (look at the speed meter when driving and find out that you are going faster than the speed limits permitted unwillingly.) and 17 intentional violations (overtake on the inner/left hand (wrong side) due to slow driving on the outer/fast lane of other cars (overtaking lane). Driving too close to the car and flashing the car to warn the front car to go fast or get off the front lane.). With five, most general self-assessment questions, section three contained the DBQ. The respondents had to rate themselves on a scale of 1 to 3, how good drivers they think they are, how healthy they think they are, how many mistakes

they think they are prone to drivers, how much compliant with the law they think they are as drivers, and to what degree their mood influenced their driving.Particular attention was paid to the direct opinion of people in the questionnaire analysis on why the Driver Conduct is bad and how it could be changed. Two logical categories were split into section four of the report. In the view of the respondent, the first focuses on the causes/reasons behind the bad conduct of the driver. Moreover, the second part comes from a detailed recommendations section, which covers some of the potential steps to change the conduct of the driver. The respondent was asked in section four to comment on the reasons for the aberrant conduct of the driver in general. The respondent has to give their opinion on the options provided for poor behavior, i.e., Lack of knowledge of traffic rules and regulations, lack of driving instruction, lack of enforcement of traffic regulations, low literacy rate, the weak signal system for traffic, and weak road signs. The respondent was also asked about the impact of the weather on the actions of the driver. Section four contained several questions concerning their views about strengthening the conduct of the driver, i.e., advertising campaigns via cable, national television, print media, the inclusion of some courses in academia, training, and seminars in educational institutions, etc.

After completing the questionnaire in English, it was translated to Urdu for keeping in mind the illiterate and even the lessor knowledge of traffic. The questionnaire was formatted in such a way that both English and Urdu were back-to-back lines, so if a person finds it difficult in one language, he may understand it from the other language.

### *B. Instructions*

Every responded were given the following set of instructions:

There is no one flawless. At some point, the best drivers often make mistakes or commit violations in some situations. It is possible to consider most of them as inconsequential, but some are potentially very dangerous. The research is about analyzing the observations of drivers into their own aberrant behavior. This thesis is part of a Master of Science in Urban Infrastructure Planning research program at the National Institute for Urban Infrastructure Planning and Management. It is quite easy with the questionnaire in hand. Below is a range of things relating to violations and mistakes that you have encountered while driving. For each question, the respondent was to answer how much, if at all, the kind of thing listed in that question happened to you in the last year or so. The respondent was required to write the number range from 0-5 in the box on the right side of each question. The numbers with its meanings are; never=0, Hardly ever=1, Occasionally=2, Quite Often=4, Frequently=4, and Nearly all the time=5.

We recognize that it is impossible to provide specific answers, so we are only interested in your general opinion and interpretation of each item. So, spending too much time on each object is not appropriate. Easily write the number you think your best guess is most suitable as easily as possible. It is optional to include your name and contact numbers. Your answers to the items provided are anonymous and will be taken into account in the strictest confidence. However, we want to know a few information about your socio-economic profile and your driving experience. If you could fill in the things in section one before the central part and the rest of the pages, we will be obliged. It is a request to work as fast as possible through all the behavioral questions and write one number against each question. Please re-check it after completing all the questions to ensure that you do not miss the answer to any question. Please make sure that the questions are answered honestly. Your replies are anonymous. Thank you, and help in completing it for all your cooperation.

### *C. Survey*

The survey was performed at colleges and public buildings in the parking lots. Drivers were questioned directly in the parking lot. After a brief introduction, they were given the option of filling it at home and then delivering it to the watchman in the parking lot or filling it on the spot either by himself or by the interviewer by verbally answering him. Three hundred and fifteen questionnaires were given to individuals who told the interviewer that after filling it in at home, they would send it back to the watchman. A total of 45 questionnaires, 4 of which were incomplete, were returned. Via an interview, an additional 110 questionnaires were completed by describing each object and then writing their responses. 250 questionnaires were filled out in total. In the study field, the number of female drivers was very small, and it was also difficult to approach females to fill out the questionnaire because of cultural restrictions, so only two questionnaires were filled out by female drivers, which is not appropriate for research, so they were removed from the research.

### *D. Data Analysis*

Statistical Package for Social Sciences (SPSS) was mainly used for the analysis of the data. The collected data through 250 questionnaires were entered into SPSS for analysis.

### *E. Descriptive Statistics*

The socio-economic characteristics of the surveyed drivers were determined. Descriptive Statistics analyses were determined for the DBQ items to know the mean, standard deviation, and frequencies of the data.

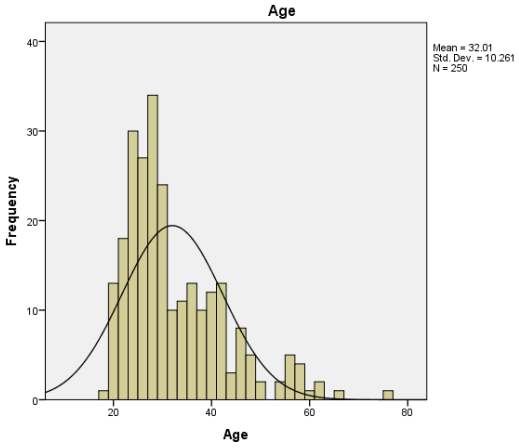



Figure 3 Age of respondents

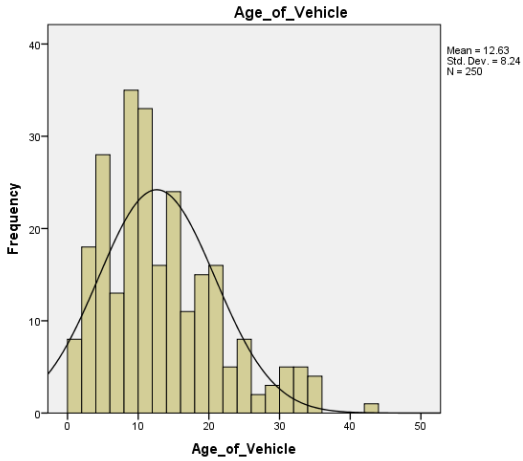



Figure 4 Age of vehicle

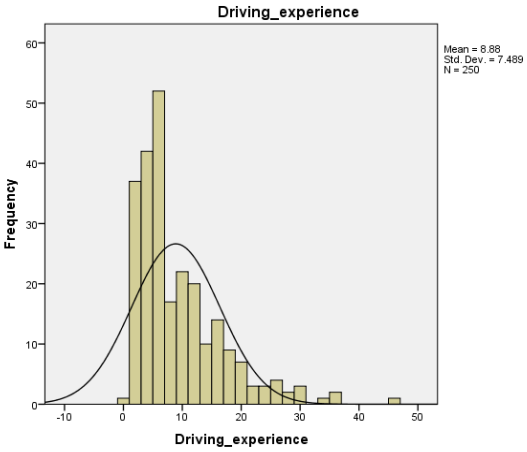



Figure 5 Driving experience of respondents

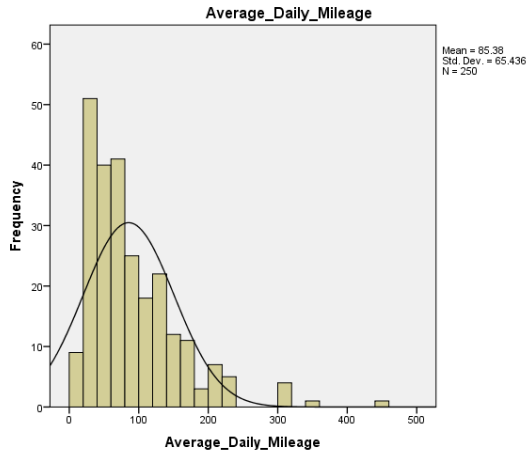



Figure 6 Average daily milage

## F. *Education Level*

The level of education indicates that the sample size includes 51 percent of graduate or undergraduate students, 31 percent of intermediate and below, while 17 percent were illiterate, showing that the sample size includes all literacy sections. First of all, there were two reasons for most of the graduates this, as the study aims to find the difference in violations & errors in private car owners; thus, it was evident that educated people are mostly private car owners in the city; secondly, the study was conducted in the University of Peshawar car parking lot and some public offices, which also caters to educated people.

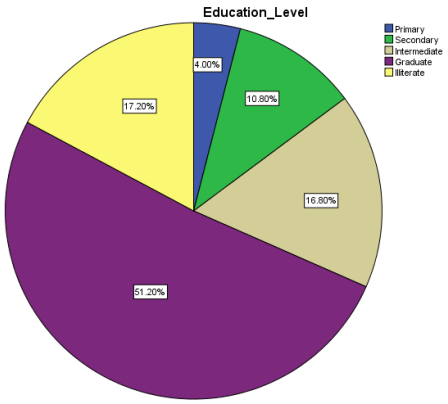



Figure 7 Educational level

## G. *Monthly Income*

40 percent of individuals had an income of less than 10,000, which was attributed to the fact that most of these groups were university students. 38 percent of individuals have revenues between 10000 and 30000, mainly drivers of private drivers or drivers of public/private agencies, who are likely to earn salaries in that range. Although 21% of individuals had an income of more than 20%.

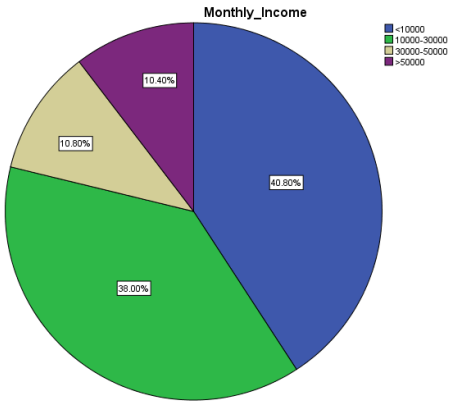



Figure 8 Monthly Income

## H. *Occupation of the respondent*

The sample size was distributed, which is evident from the table, among all the occupations. 26 percent were teachers, 38 percent were in their own private company, 16 percent were government employees, and 15 percent were private employees.

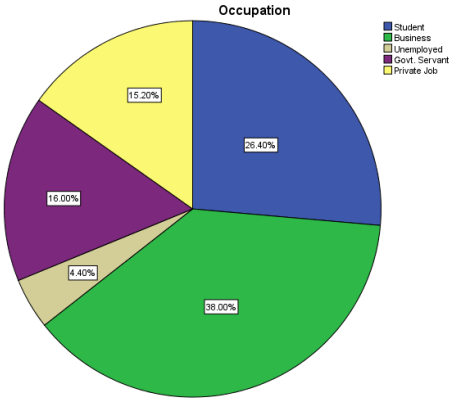



Figure 9 Occupation

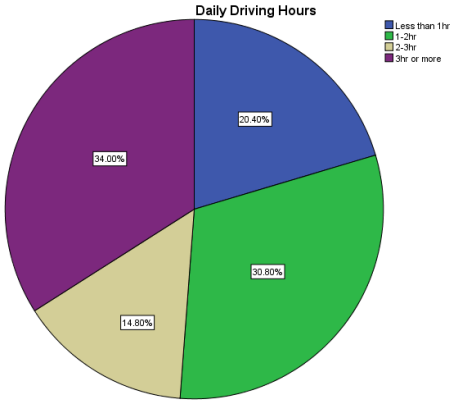



Figure 11 Daily driving hours

## *I. Frequency of Motorway use*

Around 50% of respondents were using the motorway monthly or more. While 17% of respondent use motorway fortnightly. 32% of respondent were using the motorway weekly are daily.

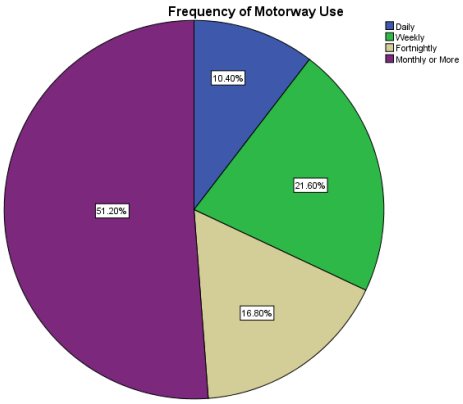



Figure 10 Frequency of motorway use

## *J. Daily Driving Hours*

Daily driving activity indicates that 20 % of respondents have less than one hour of daily driving hours. In comparison, 31% have 1-2 hours of daily driving hours, while 46% have 2 hours or more than 2 hours, mainly drivers who come for work from outside the city or drivers of public/private departments or private taxi drivers who ride all day long. So, the sample for the analysis is well distributed.

## *K. Accidents*

The respondents were asked regarding their accident history. The accident history of the drivers shows that 89% have experienced accidents in the past one year.

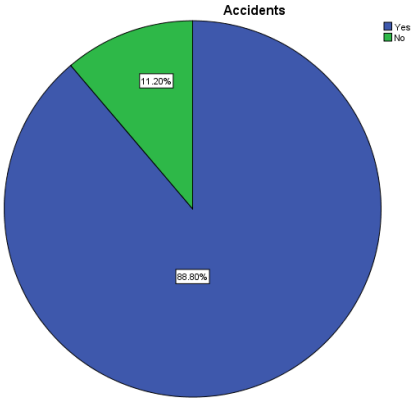



Figure 12 Accidents

## *L. Martial Status*

54% were married while the remaining 46% were unmarried.

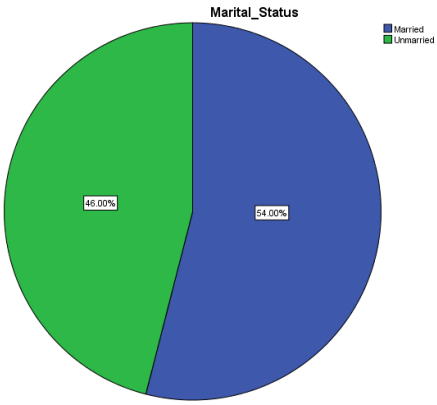



Figure 13 Marital status

*M. Driving License*

A license is an official identification document which states that a motorized vehicle and/or a motorbike may be driven by the recipient. The details relating to the possession of a license was reported in order to verify the legal driving status of the respondent. Twenty-seven percent of respondents do not have a driving license (27 percent).

To know the reasons why a person could not get the driving license, we have recorded the reasons. There are four main reasons for this problem.

- The person is underage and could not apply for the Driving License.
- Many people may find the licensing process difficult.
- The official has made it very expensive, or the person having the vehicle is very poor.
- Some careless people did not care to have a driving license due to the lake of enforcement.

Although the data from Figure 13 indicate that 50 percent of respondents consider the process complicated, it is evident that the licensing institutions that have established the process lack the power. 24 percent said they did not need a license. Whatever the legitimacy of the driving license process is, but the least that indicates the driver's legal status is that at least he is a driver and has been through a license obtaining process of written and realistic checks. It is worrying for both the top reporting reasons mentioned by the respondents.

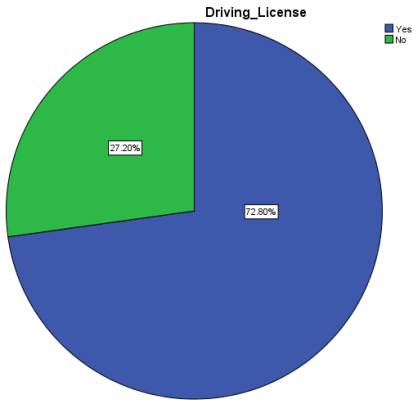



Figure 14 Driving license

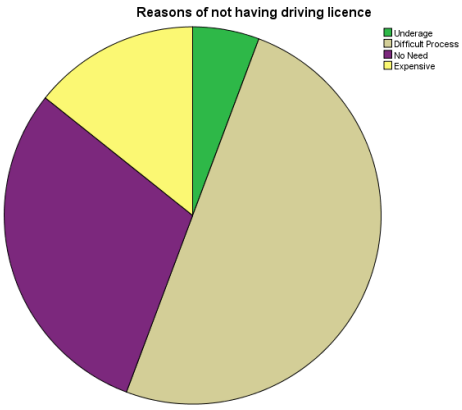



Figure 15 Resaons of not having driving license

## IV. RESULTS

Primary data is collected in the field by means of a driver survey. In the four major structural groups, the data is broken. In section one, demographic data and the respondent's driving experience/history are addressed. The second segment illustrates the interpersonal elements of the pilot. Section 3 contains self-assessment questions.

- Socio-economic Profile and driving history
- Drivers behavior during driving
- Self-assessment
- Remedial Measures

*A. Descriptive Statistics*

Participants ranged from 18 to 53 years of age, with an average of 26.66 years (S.D. 8.05) and from 1 to 25 years of driving experience with an average of 6.20 years (S.D. 5.03). With a mean of 48.92, the average daily mileage ranged from 2 to 350 (S.D. 65.88). The level of use of the highway was almost weekly or longer. As the average vehicle age is 9.65 (S.D. 7.59), the age of the vehicle was also important.

Drink (Alcohol) and drive, Ignoring motorway exit, misjudging car gap while parking, attempting to drive away without switching ignition, While in 3rd gear and driving away from the traffic signal, forgetting car in parking are the least reported things while flashing the car to signal the car in front to go quickly or get off the front lane. The highest recorded things were being frustrated with a car in front and overtaking on the wrong side, disregarding red lights late at night, overtaking vehicle inside, and disregarding speed limits late at night or early in the morning. Due to the cultural and religious sense, the use of alcohol is a bit evident. The data showed that the respondents to this study do not regularly use motorways, so one of the least mentioned items is the missed exit on the motorway. As the replied were mainly younger, so the least reported stupid errors such as driving without ignition and/or in third gear were reported. Mean and standard deviations for socio-economic products can be seen in detail in the see Table 1.

TABLE 1 SOCIO-ECONOMIC CHARACTERISTICS OF DRIVERS SURVEYED IN PESHAWAR

| | Age | Age_of_ Vehicle | Driving _ experience | Average_Daily_ Mileage |
|---|---|---|---|---|
| **N Valid** | 250 | 250 | 250 | 250 |
| **Missing** | 0 | 0 | 0 | 0 |
| **Mean** | 32.01 | 12.63 | 8.88 | 85.38 |
| **Median** | 29.00 | 11.00 | 6.00 | 70.00 |
| **Mode** | 24 | 8a | 5 | 50 |
| **Std. Deviation** | 10.26 | 8.24 | 7.48 | 65.43 |
| **Minimum** | 18 | 1 | 0 | 10 |
| **Maximum** | 76 | 42 | 45 | 450 |

### *B. Descriptive Statistics for The Behavior Items*

The answers reported for section 2 were from Never (0) to Frequently (4). Drink (alcohol) and drive, missing motorway exit, misjudging car gap. In contrast, parking, attempting to drive away without switching ignition, attempting to drive away from the third gear traffic signal, forgetting car in parking were the least reported things while flashing the car in front as a signal to drive faster, the highest recorded items were to become aggressive with a car in front and overtake on the wrong side, pay no attention to red lights at night, overtake the vehicle on the inside and ignore speed limits late at night or early in the morning. Due to the cultural and religious sense, the use of alcohol is a bit evident. As the replied were mainly younger, so the least reported stupid errors such as driving without ignition and/or in third gear were reported.

## CONCLUSION

The trend of people not having a driving license is very high, especially in young people. Almost 64% of people do not have a driving license. The reason for those not having the driving license is very alarming; as described by the respondents of these areas, 62% consider the process of getting a license difficult while 29% consider it of no use, and they believe they do not need it. This issue needs much importance because, on the one hand, getting a license is difficult. At the same time, on the other, a lot no of people think they do not need it, which shows poor enforcement and reliability of the public institutions. Drivers with no driving license do more pushing speeding than those who have a driving license.

Fifty percent of the respondent believes that the reason for the bad behavior of drivers is due to the lack of awareness about traffic guidelines and regulations and lack of regulations enforcement. The majority of the respondents believe that having awareness regarding safe driving behavior on national television will be effective. The respondents also believe in training and workshops on driver behavior at school and university level. Most of the respondents were of the opinion to have strict enforcement of traffic rules, mandatory training before issuing a driving license, improvement of traffic signal system, and improvement of road signs will help to improve the aberrant driving behavior.

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**Wajidullah:** M.Sc. in Urban Infrastructure Planning from University of Engineering & Technology Peshawar. B.Sc. in City & Regional Planning from University of Engineering & Technology Lahore.

**Safiullah**
B.Sc. Civil Engineering, from CECOS University Peshawar

**Muhammad Adil Khan**
B.Sc. Civil Engineering, from CECOS University Peshawar