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Assessing of Trucks Drivers' Behavior on Roads Safety in Egypt

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***Abstract*— As progress is being made to tackle health concerns, the number one killer of people aged 15–29 years is no longer a deadly virus or disease, but a man-made hazard: road traffic crashes [1]. Many studies have found that large trucks are over-represented both in terms of the number of fatal accidents with passenger vehicles and in the number of fatal accidents with each other [2].**

This research aims at assessing trucking characteristics on safety of roads in Egypt by analysing the collected data from a questionnaire (field survey) with the truck drivers at Egyptian roads network by regression model of SPSS software program. It studies the impact of truck drivers' bahaviour on truck accidents from an interview (questionnaire) with a randomly sample of 300 truck drivers. Analysis of collected data from a questionnaire with trucks' drivers proves that their bahaviours such as:

- **Not having valid license**
- **height of loaded trucks and exceeding the legal truck load**
- **Not having training**
- **Having problems in their lives**
- **Taking kinds of Analgesics and drugs to help them to continue driving and overcome tiredness and fatigue**
- **driving more than 10 hours per day**

have a significant effect on rate of accidents and thus increase the percent of accidents.

Keywords*— *Road safety, Truck related accidents, Truck drivers' behaviors, Analysis by SPSS Software Program.

I. INTRODUCTION

A. Intoduction

There are about 20 to 50 million victims as a result of accidents per year and that more than 90% of road traffic deaths occur in low income and middle-income countries [3]. According to the Global status report on road safety, published by the World Health Organization (WHO) in 2020, more than 93% of fatalities occur in low-income and middle-income countries [4]. Studies of the Ministry of Transport (MOT) carried out in cooperation with the Ministry of Interior, showed that heavy vehicles cause 60% of road accidents in Egypt of them about 13% are due to trailers [5].

B. Objectives

This research aims at assessing trucking characteristics on safety of roads in Egypt by studying the impact of truck drivers' bahaviour on truck accidents from a field questionnaire with them.

II. LITERATURE REVIEW

Road traffic injury death rates are the highest in the African region. Even within high-income countries, people from lower socioeconomic backgrounds are more likely to be involved in road traffic crashes **[4]**. In Egypt, about 156 persons die per 100000 vehicles in 2006. This rate is the highest in the world compared to other countries where the rate is 73 in Turkey 29 in Greece, 13 in Italy and 9 in Switzerland **[6].** All researches show road deaths continuing to increase in developing regions of the world but falling in the developed regions.

Based on the 2007 Commodity Flow Survey, among all the modes, trucks moved 70.7% of all freight by value, 68.8% by weight and 39.8% by ton-miles **[7].** In 2005, over 5000 people died and an additional 114,000 were injured in the 442,000 large-truck (gross vehicle weight rating greater than 10,000 pounds) crashes in the United States. Approximately 12% of all traffic fatalities involved a large truck crash **[8].** Large trucks have many operating characteristics such as high gross weight, long vehicle length and poor acceleration /deceleration performance, which have an impact on accident severity **[9].**

Classification and Regression Tree (The CART) model was proposed to establish the empirical relationship between injury severity levels and driver/vehicle characteristics, highway geometric variables, environmental factors and accident variables for the truck accidents. The results show that drinking-driving is the most important determinant for the injury severity of truck accidents on freeways. Seatbelt use, vehicle type, collision type, contributing circumstance and driver/vehicle action, number of vehicles involved in the accident and accident location are also identified to have effects on the injury severity of accidents. These findings can eventually be employed to promote the safe operation of trucks on the freeways in Taiwan **[10].**

When the current load exceeds the maximum permitted limit of a truck, several adverse consequences may occur such as truck instability because of an overloaded vehicle is less stable and braking default because of the braking system of any truck is designed for the maximum allowable weight **[11].**

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III. METHODOLOGY AND DATA COLLECTION

In order to achieve the main objective of this thesis the steps of the research methodology are summarized in a flow chart as shown in Figure (1):

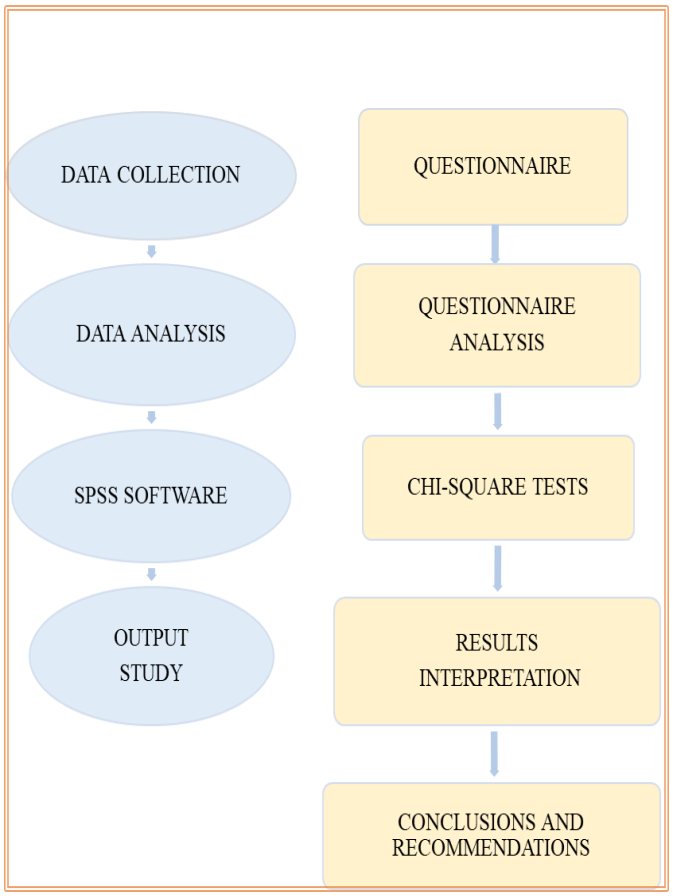

Figure (1) steps of the research methodology

The inputs, analysis and outputs summary are shown in Table (1):

Table (1) Inputs, Sources, Analysis and Outputs summary

INPUTS	SOURCES	ANALYSIS	OUTPUTS
- The results of the field questionnaire with truck drivers.	Field survey (questionnaire)	-Analyze the results and assess the truck drivers' behavior. -Regression analysis model.	-Truck drivers' behavior effects on the percent of truck share in traffic accidents. - The reasons of accidents and Suggestions for accident reduction.

The field questionnaire with 300 truck drivers who were chosen as a randomly sample of all types of truck drivers and the questionnaire form is shown in Figure (2):

Questionnaire Form

1- Education

2- The driver type:

☐ Professional ☐ governmental company
☐ Private company ☐ Contracting company
☐ Transportation Company

3- Type of your vehicle

☐ Truck with trailer ☐ Truck
☐ Half Truck

4- If driver

☐ Truck owner ☐ Truck ownership sharing
☐ Just driver

5 - The license of the driver

☐ Ended ☐ Valid
☐ Has no license

6- Can you identify and understand any of these signs (and gives 10 standard Signs to get to know them (if he understands 7 signs or more \ less)

☐ Understand ☐ Does not under stand

7-Can you understand any of these landed signs (if he exceeded 70%)

☐ Understand ☐ Does not under stand

8- How do you use the U-Turns?

9 - Did you know that you must committed to right lane for road?

☐ Yes ☐ No

10 - What is the height of your loaded truck (accurate)?

11- What has priority for you (to fix the truck or treatment of one of your children), in the case of lack of enough money for both cases?

12 - Do you have any financial indebtedness or premiums for others?

☐ Yes ☐ No

13- Do you drive the truck when you are sick?

☐ Yes What type of disease?
☐ No

14- What are you know and understand about manners and rules of traffic, and the right bahaviour of driving?

15- Have you had any special training of driving and its rules?

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16 - What is your social status and do you have any problems in your life?

☐ Have problems ☐ No problems

17 - Do you prefer that your sons' work in this career or not?

☐ Yes ☐ No

18 - Do you accept with what you earn and gain from this career?

☐ Yes ☐ No

19 - Do you take any type of Analgesics and drugs to help you to continue driving and overcome tiredness and fatigue?

☐ Yes ☐ No

20 - Do you have a chronic disease that may affects your business?

☐ Yes ☐ No

21- How much is the whole driving hours and continuous driving hours you spend at the day?

22 - Are you satisfied with fees and fines have taken from you?

☐ Yes ☐ No

23 - What do you think about fees that taken from you go to the state or not?

☐ I think so ☐ I do not think so

24- What Your opinion on the proposal of making a financial fund for drivers, which will be financed by taking percentage of revenue collection of fees and fines, including overloaded weight fines and using this fund for the drivers care and training?

☐ Agree ☐ Not agree

25 - What do you think that if the trailers were converted to semi-Trailers, will it reduce road accidents?

☐ Yes ☐ No

☐ Increase accidents

26 - What is your opinion on constructing separate roads for trucks such as (Qatameya / Ain Sokhna road) as a solution to the problem of truck accidents?

☐ The only solution ☐ One of the solutions

☐ Not a solution

Figure (2) Questionnaire Form

IV. RESULTS & DISCUSSION

From the questionnaire results, main items have been concluded:

- The bahaviour of truck drivers on Egyptian roads.
- Most of bad bahaviour , which cause increasing in percent of accidents rate.

➢ Drivers who have valid license are (53%) more than who have ended license and have not license, which is (47%) as shown in Figure (3). By using SPSS Statically analysis program for analyzing the relation between validity of license and accidents rate of the data collected of the field survey it have been concluded that validity of license has a significant effect on rate of accidents (Pearson's R 0.047<0.05) as shown in Table (2). It means that drivers may be not committed to the laws and rules of traffic and legal loads, which cause more accidents and road damage.

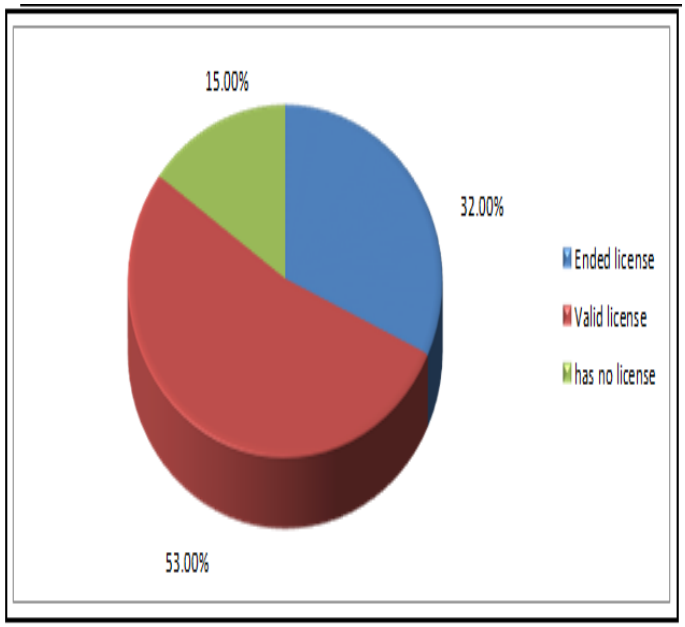

Figure (3) Percent of drivers who have valid license or not

Table(2) Chi-Square Tests of license question's responses

	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Significant.
Interval by Interval Pearson's R	.639	.151	2.352	.047[c]
Ordinal by Ordinal Spearman Correlation	.664	.174	2.514	.036[c]
N of Valid Cases	300			

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➢ Figure (4) shows that 65% of drivers do not know accurately the height of their loaded trucks and exceed the legal truckload. By using SPSS analysis program for analyzing the relation between height of loaded trucks and rate of accidents of the data collected from the field survey it have been deduced that height of loaded trucks has a significant effect on rate of accidents (Pearson's R 0.003<0.05) as shown in Table (3). It reflects negatively on their commitment to the legal allowable loads, which cause less control on their trucks stability that increase the rate accidents and pavement damage.

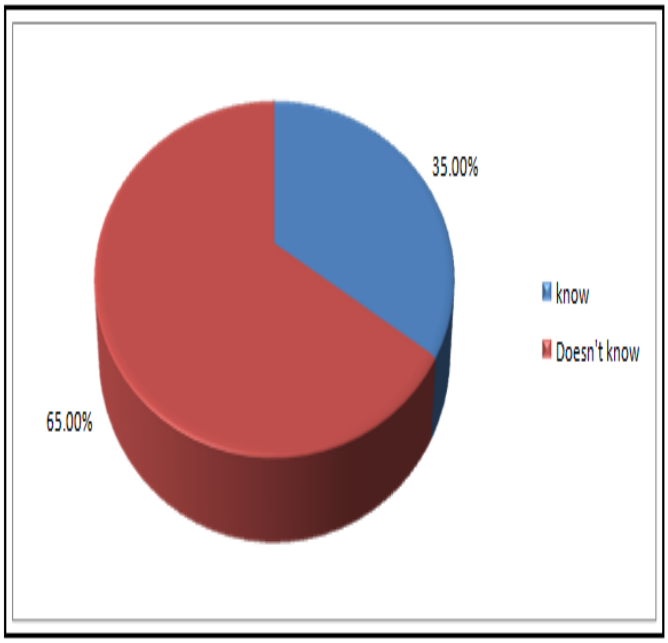

Figure (4) Responses of question of the height of loaded truck (accurate)

Table (3) Chi-square tests of the height of loaded truck question's responses

	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Significant.
Interval by Interval Pearson's R	.836	.085	4.315	.003[c]
Ordinal by Ordinal Spearman Correlation	.849	.099	4.538	.002[c]
N of Valid Cases	300			

➢ Figure (5) illustrates that 41 % of drivers have a training (most of them working in governmental companies and some working in private companies) and 59% of drivers have not any training. It have been concluded that training has a significant effect on rate of accidents (Pearson's R 0.003<0.05) from analyzing the relation between training and rate of accidents of the data collected from the field survey by using SPSS analysis program as shown in Table (4). It reflects on their awareness and their ability to understand the laws and the traffic rules to follow it and understand of traffic guidance on the road, thus increase the percent of accidents.

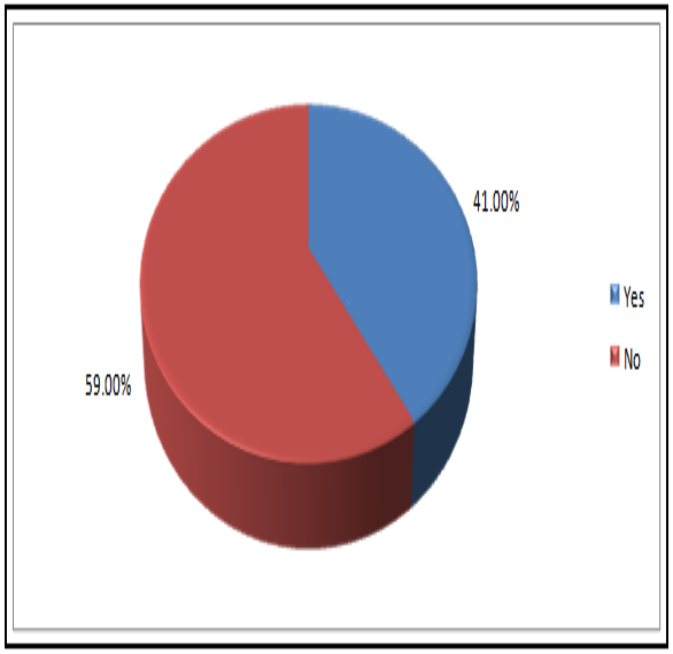

Figure (5) Responses of question of having any special training of driving and its rules

Table (4) Chi-Square Tests of having any special training of driving and its rules Question's responses

	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Significant.
Interval by Interval Pearson's R	.836	.085	4.315	.003[c]
Ordinal by Ordinal Spearman Correlation	.849	.099	4.538	.002[c]
N of Valid Cases	300			

➢ Figure (6) indicates that 62% of truck drivers have problems in their lives. By using SPSS analysis program for analyzing the relation between having problems and rate of accidents of the data collected from the field survey it have been concluded that having problems has a significant effect on rate of accidents (Pearson's R 0.003<0.05) as shown in Table (5). Problems affect driver bahaviour in terms of mood and therefore his bahaviour, concentration on work, driving and making him takes drugs to continue his work and thus

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influenced negatively on consciousness and bahaviour on the road, which may increase the accidents rates.

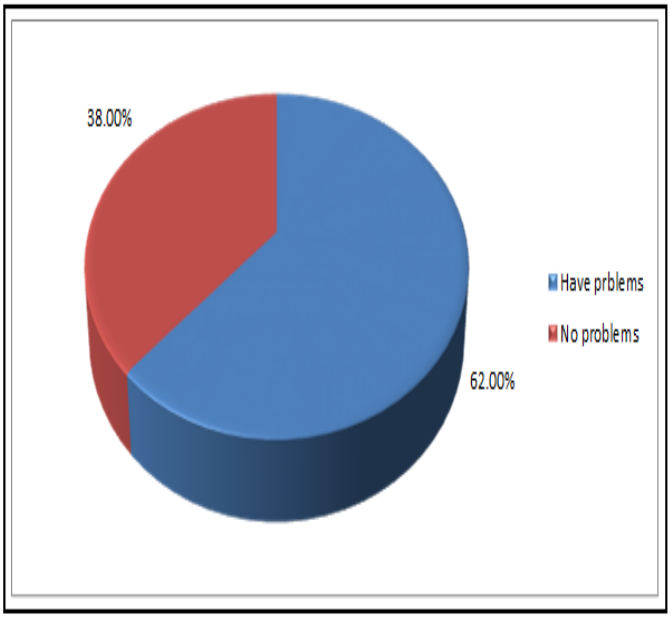

Figure (6) Responses of question of social status and life's problems

Table (5) Chi-Square Tests of social status and life's problems question's responses

	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Significant.
Interval by Interval Pearson's R	.836	.085	4.315	.003[c]
Ordinal by Ordinal Spearman Correlation	.849	.099	4.538	.002[c]
N of Valid Cases	300			

➢ Figure (7) clarifies that 46% of drivers take types of Analgesics and drugs to help them to continue driving and overcome tiredness and fatigue. For analyzing the relation between having drugs and rate of accidents of the collected data from the field survey, SPSS analysis program was used. It have been deduced from the analysis that having drugs has the most significant effect on rate of accidents (Pearson's R 0.00<0.05) as shown in Table (6), which reduce significantly their awareness and concentration when driving as this factor is one of the major and serious reasons which cause accidents related trucks.

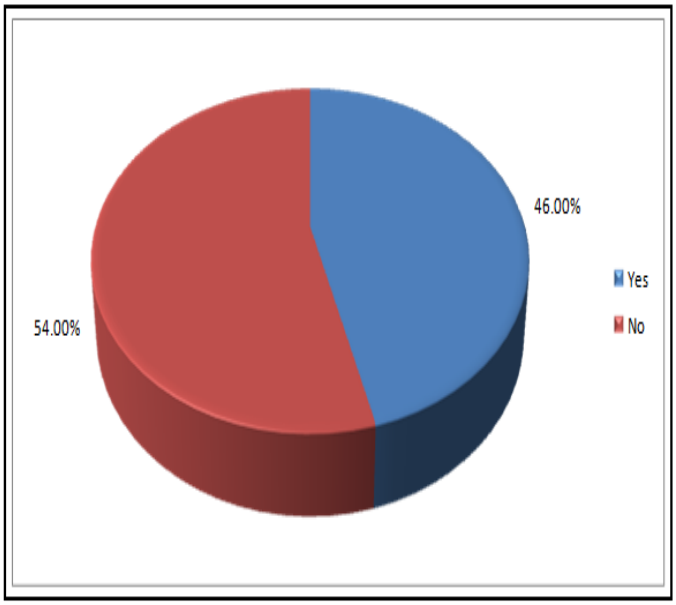

Figure (7) Responses of question of having any kind of drugs

Table (6) Chi-Square Tests of having any kind of drugs question's responses

	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Significant.
Interval by Interval Pearson's R	.896	.030	5.715	.000[c]
Ordinal by Ordinal Spearman Correlation	.945	.049	8.165	.000[c]
N of Valid Cases	300			

➢ Figure (8) shows that:

- 51% of drivers drive more than 10 hours per day and drive more than 6-10 hours continuously.
- 25% of drivers drive more than 12 hrs/day.
- 24% of drivers drive less than 10 hrs/day.

By using SPSS analysis program for analyzing the relation between driving hours and accidents rate of the data collected from the field survey it have been concluded that driving hours has a significant effect on rate of accidents (Pearson's R 0.004<0.05) as shown in Table (7). It indicates that most drivers drive more than 6-10 hrs/day continuously that cause tiredness and fatigue, which reflects negatively on their bahaviour on the road in terms of concentration, perception and reaction speed, especially for large distances and driving for a long time, thus increase accidents rates.

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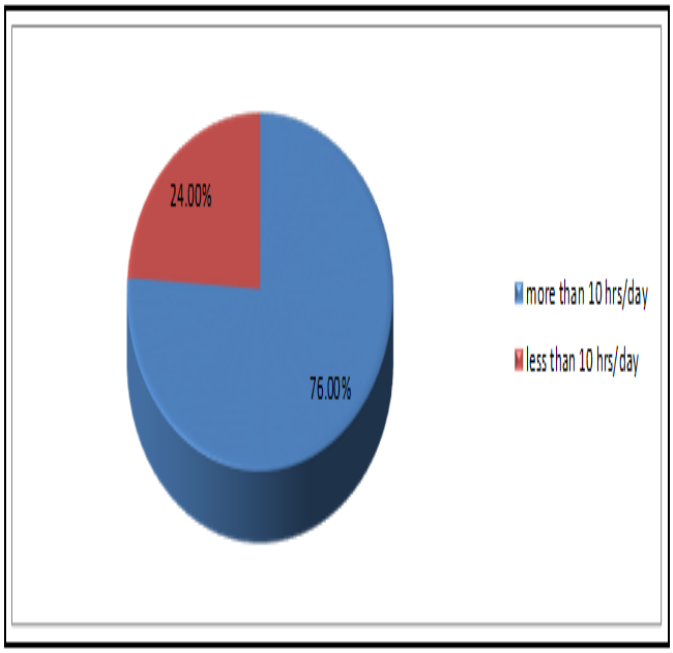

Figure (8) Responses of question of driving hours

Table (7) Chi-Square Tests of driving hours question's responses

	Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Significant.
Interval by Interval Pearson's R	.810	.107	3.910	.004[c]
Ordinal by Ordinal Spearman Correlation	.784	.125	3.567	.007[c]
N of Valid Cases	300			

- All drivers are agree with the proposal of making a financial fund for drivers, which will be financed by taking percentage of revenue collection of fees and fines, including overloaded weight fine and uses this fund in the drivers care and training. It means that suggestion is excellent and must be recommend to be implemented for improving their situation and try to increase their awareness and their traffic culture, which positively affects accidents reduction and road safety increasing.

- Results show that 93% of drivers see that the suggestion of converting the trailers to semi-trailers will not reduce road accidents as they have the experience and expertise on the road, which mean that it is not good solution for the accident problem and it must be tried to find other solutions to reduce road accidents.

- (88%) of drivers see that constructing separate roads for trucks such as road (Qatameya / Ain Sokhna) one of the important solutions for the problem of truck accidents, which mean that this solution must be studied and recommended to be implemented.

V. CONCLUSION

Based on the results of monitored field survey data, it have been concluded that behviours such as:

- Not having a valid license, height of loaded trucks and exceeding the legal truckload, not having a training, having problems in life, taking kinds of Analgesics and drugs to help them to continue driving and overcome tiredness and fatigue, driving more than 10 hours per day and driving more than 6-10 hrs/day continuously.

have a significant effect on rate of accidents and thus increase the percent of accidents.

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