Evaluation of Traffic Accidents No. through Variety of Weather Conditions According to Differences of Gender and Ages’ Categories of Drivers in Greece

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Abstract - The research includes studying of impacts the diversity of weather conditions on the characteristics of drivers in terms of gender and ages’ categories of them by assessing No. of traffic accidents which resulted through each type of weather condition during period (2012-2016). The data of research obtained from Hellenic Statistical Authority (ELSTAT), which included No. of traffic accidents in Greece that distributed to 13 types of weather conditions and classified according to gender and ages’ categories of drivers who involved in these traffic accidents during period of study. The research comprised of studying the statistical data that collected about traffic accidents and evaluation that differences in their No. if they are affecting by the diversity of weather conditions and differences in gender and age of drivers. In addition, the study included assessment the relationship between the dependent variable, which includes of traffic accidents No. and the other independent variables that consists of weather conditions and drivers’ characteristics through appropriate statistical tests. Depending on study of the statistical data and the results which obtained through the analysis, it was found that there is a relationship between the diversity of weather conditions and the differences in No. of traffic accidents during period of study. Also, it got that there is effects on No. differences of traffic accidents which resulted according to different characteristics of drivers during some weather conditions more than the other. In Greece, the study found that most of the traffic accidents happened during the clear sky of weather condition and the male drivers who have age category (18-35) have the bigger No. of accidents during the clear sky of weather condition and the male drivers who have age category (18-35) have the bigger No. of accidents during clear sky weather. Thus, the study recommended to increase the traffic awareness for the most of weather conditions especially in clear sky weather.

Keywords - Drivers’ characteristics, Drivers’ Gender, Drivers’ Age, Adverse Weather Conditions, Road weather safety, Weather effects, Driver behaviour, Road conditions, Traffic Accidents, Roads in Greece.

I. INTRODUCTION

The study evaluates the impact of various weather conditions on the different No. of traffic accidents depending on the variety of drivers’ characteristics who involved in those accidents. There are many researches which related to assessment the effects of diversity weather conditions in terms of increasing or decreasing of accidents No. according to increase of bad weather condition through driving of vehicles on roads in several areas of the world. Some of researches have concluded that bad weather conditions may increase No. of traffic accidents and some others have concluded which No. of traffic accidents is bigger during good weather conditions.

Adverse weather conditions, such as strong wind, heavy rain or snow, heavy fog and so on, have obvious impacts on roadway traffic operations, especially traffic safety. Also, Among adverse weather conditions, rainy weather may be one of the conditions which cause significant negative impacts on traffic safety. The combined impacts from roadway, vehicle, traffic control, and driver behavior under rainy weather conditions could increase the potential for safety problems and traffic crashes [1].

Driving largely is a visual task, poor visibility conditions such as rain, fog, or snow create several additional demands on the driver and their ability to collect necessary visual information is drastically reduced. The driving task becomes more complex when weather-related conditions of reduced visibility are accompanied by wet surfaces [2]. Bad weather can raise the number of accidents significantly by 20% or more over the base rate [3].

Adverse weather and road conditions, following e.g. rain, snowfall and temperature fluctuations, are a considerable cause of an elevated risk of traffic accidents and compromised traffic flow in northern Europe and northern America [4].

Heavy rain weakens the visibility and wets the road surface, which causes drivers to pay more attention while driving, thus with the decrease of traffic flow the probability of severe accident decreases [5].

Shifting weather patterns due to climate change, such as warmer temperatures, more rain, and less snow, will exacerbate road safety issues. For example, snowfall and rainfall are widely known to reduce visibility and make braking more difficult, and temperatures may influence the mode, frequency, and types of trips [6].

An increase in maximum wind gust causes an increase in the number of crashes, Global radiation and sunshine duration both had a significant negative impact on road safety [7].

Weather related crashes refer to crashes that occur during adverse weather conditions. Rainfall represents one of the most critical weather condition variables in traffic safety. Similarly, rain related crashes are those that occur during rainy conditions [8].

Weather related crashes are those that occur in the presence of rain, sleet, snow, fog, wet pavement, snowy/slushy pavement, and/or icy pavement. Twenty-four percent of all crashes are weather related [9]. Weather conditions are considered to be a factor that affects the number of road accidents and casualties significantly, with different effects according to the type of road.
Moreover, as the weather also affects mobility, it is to be expected that the effects of weather on the number of injury accidents and casualties are partly due to the changes in mobility occurring at the same time. Rainfall leads to a decrease of road accidents in the Athens urban area [10].

According to results of the research in Athens is found that contrary to much previous research, increases in rainfall reduce the total numbe r of accidents and fatalities as well as the pedestrian accidents and fatalities, a finding that may be attributed to the safety offset hypothesis resulting from more cautious and less speedy driver behaviour. Similarly, temperature increase was found to lead to increased accidents [11].

This study will examine whether there is an impacts and relationship between the different characteristics of drivers in terms of gender and ages categories with various of weather conditions on different No. of traffic accidents.

II. HYPOTHESES OF STUDY
The main proposed hypothesizes of study as following:

1. There is not influence of weather condition variation on differences of traffic accidents No. that involved of drivers.

2. The No. of traffic accidents, which are resulting through adverse weather conditions are more than the accidents that are occurring during good weather conditions.

3. There is not association between weather conditions and genders of drivers for influencing on different of traffic accidents No..

4. There is not relationship between weather conditions and age categories of drivers for influencing on different of traffic accidents No..

III. METHODOLOGY OF STUDY
The study consists of main steps as the following:

1. Collection the required statistical data from ELSTAT for traffic accidents No. according to variety of weather conditions and drivers information who involved in accidents.

2. Analysis of data according to suitable statistical tests for each part by using SPSS software.

3. Showing the results which got by data analysis and discussion of them.

4. Viewing the conclusions depending on results that got from the study.

5. Showing the recommendations to enhancement of drivers for contribution in satisfying of road safety.

IV. DATA COLLECTION
The study depended on statistical data, which got from ELSTAT and they included traffic accidents No. according to weather conditions at accidents occurred and classified to age and gender groups of drivers during period (2012–2016). In addition, there are very few missing of traffic accidents information consideration to details in tables of data that received from ELSTAT and these missed information are not effecting on the analysis process.

V. ANALYSIS OF DATA
The stage of data analyzing included several of statistical tests for each type of data by using SPSS software. The study through the analysis process are depended on two types of variables which consisted of dependent variables which are included traffic accidents No. and independent variables which are included the weather conditions, gender and ages of drivers who involved in the accidents. The research is containing of four parts for data analysis as the following:

1. Examination the influence of weather conditions variation on differences of total traffic accidents No. that involved of drivers during period (2012 – 2016):

   - Description Analysis:
      The data that got from ELSTAT are included No. of traffic accidents through variable weather conditions at accidents occurrence. The descriptive analysis is clarification that there are differences in traffic accidents No. depending on variety of weather conditions and different characteristics of drivers during the period of study (2012-2016) as shown in the statistical Table 1 and Figure 1.

<table>
<thead>
<tr>
<th>Weather Conditions</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear sky</td>
<td>2012</td>
</tr>
<tr>
<td></td>
<td>2013</td>
</tr>
<tr>
<td></td>
<td>2014</td>
</tr>
<tr>
<td></td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td>2016</td>
</tr>
<tr>
<td>Strong wind</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>28</td>
</tr>
<tr>
<td>Frost</td>
<td>124</td>
</tr>
<tr>
<td></td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>103</td>
</tr>
<tr>
<td></td>
<td>103</td>
</tr>
<tr>
<td>Fog / mist</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Drizzle</td>
<td>451</td>
</tr>
<tr>
<td></td>
<td>423</td>
</tr>
<tr>
<td></td>
<td>468</td>
</tr>
<tr>
<td></td>
<td>379</td>
</tr>
<tr>
<td></td>
<td>362</td>
</tr>
<tr>
<td>Rain</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td>309</td>
</tr>
<tr>
<td></td>
<td>389</td>
</tr>
<tr>
<td></td>
<td>335</td>
</tr>
<tr>
<td></td>
<td>281</td>
</tr>
<tr>
<td>Tempest</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Storm</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Hail</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Snow</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>14</td>
</tr>
<tr>
<td>Smoke</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Dust</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>78</td>
</tr>
<tr>
<td>Total</td>
<td>12,398</td>
</tr>
<tr>
<td></td>
<td>12,057</td>
</tr>
<tr>
<td></td>
<td>11,669</td>
</tr>
<tr>
<td></td>
<td>11,394</td>
</tr>
<tr>
<td></td>
<td>11,071</td>
</tr>
</tbody>
</table>

Consideration to values in Table 1 and as shown in the Figure 1; the clear sky of weather condition has the bigger No. of traffic accidents comparison to other weather conditions and the year of 2012 had the most amount of accidents during the period of study.
H0 = There are not relationship between traffic accidents No. the following: drivers and weather conditions. The hypothesis that assumed as the following:

H0 = There are not relationship between traffic accidents No. which involved of drivers and different weather conditions at accidents occurrence.

There is relationship between different of total traffic accidents and variation of weather conditions; also, there are significant between them at level (p < 0.05).

2. Studying of association level between weather conditions and genders for effecting on traffic accidents No. during period (2012 – 2016):

- Description Analysis:

The data that collected from ELSTAT for traffic accidents No. through variable weather conditions at accidents occurrence divided according gender of drivers who caused those accidents during the period of study (2012-2016) as shown in the Table 4 and Figure 2.

Table 4: Traffic Accidents No. According to Variation of Weather Conditions Divided According to Gender of Drivers

<table>
<thead>
<tr>
<th>Weather Condition</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear sky</td>
<td>9649</td>
<td>44099</td>
<td>43468</td>
</tr>
<tr>
<td>Strong wind</td>
<td>26</td>
<td>0</td>
<td>26</td>
</tr>
<tr>
<td>Frost</td>
<td>132</td>
<td>8647</td>
<td>8669</td>
</tr>
<tr>
<td>Fog / Mist</td>
<td>2083</td>
<td>367</td>
<td>2450</td>
</tr>
<tr>
<td>Drizzle</td>
<td>2212</td>
<td>1740</td>
<td>3952</td>
</tr>
<tr>
<td>Rain</td>
<td>1894</td>
<td>242</td>
<td>2136</td>
</tr>
<tr>
<td>Tempest</td>
<td>40</td>
<td>34</td>
<td>74</td>
</tr>
<tr>
<td>Storm</td>
<td>1882</td>
<td>20</td>
<td>1902</td>
</tr>
<tr>
<td>Hail</td>
<td>8561</td>
<td>120</td>
<td>8681</td>
</tr>
<tr>
<td>Smoke</td>
<td>8647</td>
<td>344</td>
<td>12091</td>
</tr>
<tr>
<td>Dust</td>
<td>85576</td>
<td>9507</td>
<td>94083</td>
</tr>
<tr>
<td>Other</td>
<td>1135</td>
<td>9072</td>
<td>10338</td>
</tr>
<tr>
<td>Total</td>
<td>113620</td>
<td>98699</td>
<td>110069</td>
</tr>
</tbody>
</table>

Consideration to statistical data in Table 4 and as shown in Figure 2; the gender drivers has the bigger No. of traffic accidents at clear sky of weather condition comparison to others conditions during period of study.

Consideration to the results in Table 2 and Table 3 of analysis; the values of calculated (F = 1290.437) and the statistical significant at level (p = 0.00 < 0.05). So that, we rejected the hypothesis (H0) and accepted the hypothesis (H1).
This type of analysis includes testing the significance of association between variation of weather conditions and genders of drivers for influencing on different traffic accidents No.. The hypothesis that assumed as the following:

H₀ = There are not association between variation weather conditions and genders of drivers for influencing on different traffic accidents No.

H₁ = There are association between variation weather conditions and genders of drivers for influencing on different traffic accidents No.

For interpretation, the association between them used the statistical test "Univariate Analysis of Variance".

**Table 5: Univariate Analysis of Variance Test**

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>3.79E+10</td>
<td>25</td>
<td>1.52E+09</td>
<td>2356.471</td>
<td>0</td>
</tr>
<tr>
<td>Intercept</td>
<td>3271990.34</td>
<td>1</td>
<td>3271990.34</td>
<td>5.082</td>
<td>0.024</td>
</tr>
<tr>
<td>Weather Condition</td>
<td>4.57E+09</td>
<td>12</td>
<td>3.81E+08</td>
<td>591.215</td>
<td>0</td>
</tr>
<tr>
<td>Gender</td>
<td>1136089.6</td>
<td>1</td>
<td>1136089.6</td>
<td>1.765</td>
<td>0.184</td>
</tr>
<tr>
<td>Weather Condition * Gender</td>
<td>1.61E+09</td>
<td>12</td>
<td>1.34E+08</td>
<td>207.787</td>
<td>0</td>
</tr>
<tr>
<td>Error</td>
<td>3.77E+10</td>
<td>58563</td>
<td>643835.914</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2.63E+11</td>
<td>58589</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>7.56E+10</td>
<td>58588</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Depending on the values in Table 5 of analysis; the value of (df-Gender * Weather Condition = 12), (F- Gender * Weather Condition = 207.787) and the value of significance (p= 0.000 < 0.05). So that, we reject the hypothesis (H₀) and accept the hypothesis (H₁). Then there is association between variations of Weather conditions and gender of drivers in influencing on different of traffic accidents No. and there is significant at level (p < 0.05).

3. Studying of association level between weather conditions and age categories for effecting on traffic accidents No. during period (2012 – 2016):

- Description Analysis:

The data that collected from ELSTAT for traffic accidents No through variable weather conditions at accidents occurrence divided according to six age categories of drivers who involved of those accidents during the period of study (2012-2016) as shown in the in Table 6 and Figure 3.
H$_1$ = There are association between variation weather conditions and age categories of drivers for influencing on different traffic accidents No..

For interpretation, the association between them used the statistical test "Univariate Analysis of Variance".

Table 7: Univariate Analysis of Variance Test

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>4.584E10</td>
<td>67</td>
<td>6.842E8</td>
<td>1344.068</td>
<td>0.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>1910737.892</td>
<td>1</td>
<td>1910737.892</td>
<td>3.753</td>
<td>0.053</td>
</tr>
<tr>
<td>Weather Condition</td>
<td>1.422E9</td>
<td>12</td>
<td>1.185E8</td>
<td>232.814</td>
<td>0.000</td>
</tr>
<tr>
<td>Age</td>
<td>2738009.562</td>
<td>5</td>
<td>547601.912</td>
<td>1.076</td>
<td>0.371</td>
</tr>
<tr>
<td>Corrected Model * Age</td>
<td>2.198E9</td>
<td>50</td>
<td>4.396E7</td>
<td>86.361</td>
<td>0.000</td>
</tr>
<tr>
<td>Total</td>
<td>2.633E11</td>
<td>58589</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Depending on the values in Table 7 of analysis; the value of (df=Weather Condition * Age=50) (F=Weather Condition * Age=86.361) and the value of significance (p = 0.000 < 0.05). So that, we rejected the hypothesis (H$_0$) and accepted the hypothesis (H$_1$). Then there is association between weather conditions and age categories of drivers in influencing on different of traffic accidents No. and there is significant at level (p < 0.05).

4. Analysis of Model

The model comprise of equation which identification No. of traffic accidents, which are resulting in Greece through variety of weather conditions and according to some characteristics of drivers. This branch of study considered the dependent variables which were No. of traffic accidents and the independent variables that were age categories and gender of drivers during period (2012 – 2016).

The equation model resulted by Log Linear Regression Analysis and it considered female of gender variables, (36-49) of age categories variables of drivers and Strong wind of weather condition the references in the analysis as showing in the following:

\[ \log(Y) = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \ldots + \beta_nX_n \]  

\[ \log(\text{No. of Traffic Accidents}) = \beta_0 + \beta_1 \text{Gender1 (Male)} + \beta_2 \text{Age Category (1)} + \beta_3 \text{Age Category (2)} + \beta_4 \text{Age Category (4)} + \beta_5 \text{Age Category (5)} + \beta_6 \text{Age Category (6)} + \beta_7 \text{W.C. (1)} + \beta_8 \text{W.C. (3)} + \beta_9 \text{W.C. (4)} + \beta_{10} \text{W.C. (5)} + \beta_{11} \text{W.C. (6)} + \beta_{12} \]
Consideration to the calculated values, which produced in the following Table 8; the equation model of traffic accidents variability is explained by the independent variables. In addition, the value of $R^2$ indicates that almost (98.8%) of the total No. of traffic accidents variability is explained by the independent variables. As shown in Table 8; R value is (0.994) which indicates a high degree of correlation between the dependent variable of total No. of traffic accidents and the independent variables. In addition, the value of $R^2$ indicates that almost (98.8%) of the total No. of traffic accidents variability is explained by the independent variables.

Table 8: Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>0.994*</td>
<td>0.988</td>
<td>0.1478</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Gender1, Age1, Age2, Age4, Age5, Age6, W.C.1, W.C.3,……….., W.C.13

As shown in Table 8; R value is (0.994) which indicates a high degree of correlation between the dependent variable of total No. of traffic accidents and the independent variables. In addition, the value of $R^2$ indicates that almost (98.8%) of the total No. of traffic accidents variability is explained by the independent variables.

Table 9: ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>102115.363</td>
<td>18</td>
<td>5673.076</td>
<td>259504.207</td>
<td>0.000</td>
</tr>
<tr>
<td>Residual</td>
<td>1280.411</td>
<td>18</td>
<td>0.022</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>103395.774</td>
<td>58588</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b. Dependent Variable: log (Total No. of Traffic Accidents)

According to values in Table 10; the log regression equation of this model as the following:

$$\text{log (No. of Traffic Accidents)} = (0.490) + (1.488) \text{Gender1 (Male) } - (3.205) \text{Age Category } (1) + (0.289) \text{Age Category } (2) - (0.399) \text{Age Category } (4) - (0.837) \text{Age Category } (5) - (1.681) \text{Age Category } (6) + (5.810) \text{W.C. (1) } + (1.137) \text{W.C. (3)} - (0.195) \text{W.C. (4)} + (2.580) \text{W.C. (5)} + (2.364) \text{W.C. (6)} - (0.698) \text{W.C. (7)} + (2.078) \text{W.C. (8)} + (1.308) \text{W.C. (9) } - (0.392) \text{W.C. (10)} - (1.078) \text{W.C. (11)} - (1.688) \text{W.C. (12)} + (0.684) \text{W.C. (13)}$$

(3)

- The value of (1.488) that resulted indicating for the total traffic accident No., which resulted by male drivers that in average is bigger than value of total No. of traffic accident which resulted by female drivers.
- The value of (3.205), which resulted indicating that the total No. of traffic accident for drivers who are in age category (1) of (0-17), in average is less than the total No. of traffic accidents of the drivers who are in age category (3) of (36-49).
- The value of (0.289), which resulted indicating that the total No. of traffic accident for drivers who are in age category (2) of (18-35), in average is bigger than the total No. of traffic accidents of the drivers who are in age category (3) of (36-49).
The value of (0.399), which resulted indicating that the total No. of traffic accident for drivers who are in age category (4) of (18-35), in average is less than the total No. of traffic accidents of the drivers who are in age category (3) of (36-49).

The value of (0.837), which resulted indicating that the total No. of traffic accident for drivers who are in age category (5) of (18-35), in average is less than the total No. of traffic accidents of the drivers who are in age category (3) of (36-49).

The value of (1.681), which resulted indicating that the total No. of traffic accident for drivers who are in age category (6) of (unknown), in average is less than the total No. of traffic accidents of the drivers who are in age category (3) of (36-49).

The value of (5.810), which resulted are indicating about No. of traffic accidents which occurred in weather condition 1 (Clear sky), in average is bigger than the value of total traffic accidents No. which occurred in weather condition 2 (Strong wind).

The value of (1.137), which resulted are indicating about No. of traffic accidents which occurred in weather condition 3 (Frost), in average is bigger than the value of total traffic accidents No. which occurred in weather condition 2 (Strong wind).

The value of (0.195), which resulted are indicating about No. of traffic accidents which occurred in weather condition 4 (Fog / mist), in average is less than the value of total traffic accidents No. which occurred in weather condition 2 (Strong wind).

The value of (2.580), which resulted are indicating about No. of traffic accidents which occurred in weather condition 5 (Drizzle), in average is bigger than the value of total traffic accidents No. which occurred in weather condition 2 (Strong wind).

The value of (2.364), which resulted are indicating about No. of traffic accidents which occurred in weather condition 6 (Rain), in average is bigger than the value of total traffic accidents No. which occurred in weather condition 2 (Strong wind).

The value of (0.988), which resulted are indicating about No. of traffic accidents which occurred in weather condition 7 (Tempest), in average is less than the value of total traffic accidents No. which occurred in weather condition 2 (Strong wind).

The value of (0.698), which resulted are indicating about No. of traffic accidents which occurred in weather condition 8 (Storm), in average is less than the value of total traffic accidents No. which occurred in weather condition 2 (Strong wind).

The value of (1.308), which resulted are indicating about No. of traffic accidents which occurred in weather condition 9 (Hail), in average is less than the value of total traffic accidents No. which occurred in weather condition 2 (Strong wind).

The value of (0.392), which resulted are indicating about No. of traffic accidents which occurred in weather condition 10 (Snow), in average is less than the value of total traffic accidents No. which occurred in weather condition 2 (Strong wind).

The value of (1.078), which resulted are indicating about No. of traffic accidents which occurred in weather condition 11 (Smoke), in average is less than the value of total traffic accidents No. which occurred in weather condition 2 (Strong wind).

The value of (1.688), which resulted are indicating about No. of traffic accidents which occurred in weather condition 12 (Dust), in average is less than the value of total traffic accidents No. which occurred in weather condition 2 (Strong wind).

The value of (0.684), which resulted are indicating about No. of traffic accidents which occurred in weather condition 13 (other), in average is bigger than the value of total traffic accidents No. which occurred in weather condition 2 (Strong wind).

VI. CONCLUSIONS

Based on the data that collected and the results of the analysis which observed; there are main conclusions and facts that obtained as the following:

1. The differences in the weather conditions at occurrence of traffic accidents lead to differences of traffic accidents No.. In addition, during clear sky of weather condition, the drivers are more negatives impact on road safety comparison to other conditions depended on No. of traffic accidents.

2. There is association between the gender of drivers and the variety of weather conditions which lead to be differences in No. of traffic accidents. However, male drivers are caused of traffic accidents in clear sky of weather condition.

3. There is relationship between the diversity of weather conditions and age categories of drivers which is resulting to be differences in No. of traffic accidents. Also, the age category (18-35) of drivers are more caused to traffic accidents in the clear sky of weather condition.

4. The weather condition of clear sky in Greece urging the drivers to do more traffic accidents comparison to other weather condition. Approximately at a rate (51%-68%) along a year, the weather is clear sky in most Greek cities, and this is providing to be bigger No. of traffic accidents during good weather conditions.
5. The existence of bad weather conditions during driving of vehicles such as poor vision and glides may increase the attention and caution of drivers; Also, improving their commitment to traffic regulations. Thus, it result to decrease No. of traffic accidents.

VII. RECOMMENDATION

Depended on the results and conclusions which obtained by the study; There are some recommendations that are contribution in preventing of traffic accidents occurring and encouraging the drivers for commitment to traffic instructions through driving; some of the recommendations as the following:

1. Continuing of traffic awareness to all drivers’ categories and development the means of various types of visual and audio announcements.

2. Explain the risk of non-compliance of traffic safety instructions that required on the roads by drivers and the results of traffic accidents that may lead to death, injury or at least cause damage to vehicles and economic losses.

3. Development the means of traffic monitoring for drivers by using the modern intelligent systems.

4. Conduct a field study to identify the reasons why young drivers of male and female are consider more likely to cause the traffic accidents comparison to other categories of drivers. In addition, studying the reasons that make the male gender have the bigger No. of traffic accidents comparison to female gender.

5. Applying the means of laws to deter violations to drivers for decreasing the reasons, which lead to occurrence of traffic accidents.

6. Urge the drivers to observe the necessary precautions and advice during driving in different weather conditions.

7. Raising the awareness of drivers to increase their attention during bad weather when the vision is not clear, such as rain, fog, dew, etc.

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IX. REFERENCES


