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GEOGRAPHICAL DISTRIBUTION OF EGYPTIAN LOT-CHOSEN AND CIVIL ASSOCIATIONS' PILGRIMS - CHRONIC DISEASES AND THEIR DEMOGRAPHIC CHARACTERISTICS

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ABSTRACT

This study examines modes of transport for Egyptian lot-chosen and civil associations' pilgrims and their demographic characteristics in the period starting from 2000 in terms of increase in their number and their modes of transport (Air − Land − Sea). Analysis of Variance (ANOVA) is used to test the differences between pilgrims across various demographic variables and modes of transportations across censuses and Least Square Difference (LSD) test was applied. Maps and scatters are also plotted. By studying the statistical differences between pilgrims in terms of gender, it was found that there was no difference reported by census among the female pilgrims throughout the study period while records of governorates found differences among females. All characteristics revealed the presence of significant differences when applied to the pilgrims' governorates of origin. Till date land travel is more encouraged than sea or air. Hence there is an urgent need to improve land transport and make it more luxurious and convenient for different economic classes.

Keywords: GIS, Egyptian pilgrims, Diseases, Transportation, Civil associations, Lot-chosen, Gender, Educations, Geography.

Contribution/ Originality

This study contributes in the existing literature by comparing the means of transport suitable for pilgrims to Hajj and need for development of specific sectors of transportation. This study is one of very few studies which have investigated the variation in means of transport for pilgrims in line with demographics

1. INTRODUCTION

The Council of Ministers' General Secretariat in Saudi Arabia issued a Royal Decree (Kingdom of Saudi Arabia Council of Ministers General Secretariat, 2006) regulating the transport of pilgrims into Saudi Arabia and their subsequent return to their home countries. Consequently, the Tourism Companies and Tour Guides Division of the Egyptian Ministry of Tourism outlined a number of controls and rules governing[1] Hajj tourism. The aim of the Ministry is to enhance the performance of this sector and provide high quality services through full

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[1] The rules include:
a) Companies must dispatch pilgrims in groups to departure ports, Jamarat Bridge and other holy sites.
b) In the case of pilgrims traveling by land, the vehicle model must not be older than 2006 model, must be equipped with GPS and other safety accessories, and must be technically fit for tourist purposes. The rest of the rules can be viewed at:
Egyptian Ministry of Tourism (1435 AH), Tourism Companies and Tour Guides Division, Controls and Rules Governing Hajj Tourism: http://mot.hajj.gov.eg/Documents/hajj1435.pdf

coordination with concerned authorities in Egypt, Kingdom of Saudi Arabia and the Hashemite Kingdom of Jordan (Campo, 2009). The Ministry also aims to ensure highest quality services, particularly with regards to low-cost Hajj programs offered to low-income people.

The study of movement of pilgrims inside Egypt and in the Kingdom and examination of their demographic characteristics is of paramount importance (Al-Shuwekhi, 2014). This is attributable to the fact that Egyptian pilgrims form the highest proportion of all pilgrims traveling to Mecca, both among pilgrims coming from within Saudi Arabia, who formed 39.5% (of whom 67,088 were Egyptian) of all pilgrims in 1435 AH (Central Department of Statistics & Information, 2014) and among pilgrims coming from outside Saudi Arabia. For that reason, identifying and shedding light on their characteristics is extremely crucial for respective authorities to formulate and implement social, health, food security and transportation programs for pilgrims in the future. Accomplishing such a task would not be possible without having an accurate time series data set of the number of pilgrims. This would also help to estimate the workforce required to serve them.

2. PREVIOUS STUDIES

Several studies have addressed the issue of pilgrim transport within the kingdom of Saudi Arabia. However, a few have addressed the issues of pilgrim transport from outside Saudi Arabia, demographic characteristics of pilgrims, the diseases they suffer from, and classification of pilgrims according to mode of transport. Porter and Saif (2013) noted about on trade routes between the Red Sea and the Indian Ocean and contacts between Egypt and Mesopotamia across the Suez Canal. They observed that local ports used to appear and disappear in relation to the distribution of local produce and the needs of pilgrims and Hajj season. Sidebotham (2011) discussed Romans and Arabs in the Red Sea. Cooper (2014) compared the Nile and the Red Sea in ancient and mediaeval navigation routes. Murray (1926) detailed his exploration of Egypt's Eastern and Western deserts and his investigations titled "Aidhab" pertaining to Red Sea Ports. Pasha (1982)addressed the social and economic characteristics of Pakistani pilgrims sponsored by Pakistani workers as well as the characteristics of sponsors and type of workers. A study by Fadhel and Rabea (1991) explores the demographic characteristics of 1304 pilgrims from various nationalities, excluding pilgrims from within Saudi Arabia. Al-Zahrani and Ali (1990) in their study observed the need to expand waiting areas, monitor employee performance and reduce waiting hours. Motawea (1994) found that %16.5 of 1,000 tested pilgrims were infected with hepatitis B. Agius (2013) talks about the types of boats and ships and their sea-going ability as well as studies by Muslim authors on the subject of pilgrimage travel by sea and related activities.

3. ASSUMPTIONS OF STUDY

A number of assumptions were made in light of the data that the researcher managed[2] to obtain in relation to Egyptian pilgrims. The assumptions are: 1) The number of pilgrims is expected to increase successively across the census periods under study; 2) There are differences among male pilgrims as per census periods and geographical distribution across Egyptian governorates; 3) There is no difference among female pilgrims across census periods while differences exist among them as per governorates; 4) There is no statistically significant difference among

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[2]It is worth noting that the Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS) does not have any data on pilgrims as per a statement by the Information Center. The researcher obtained data from Ministries of Tourism, Interior and Social Affairs.

main age groups of pilgrims in terms of census periods while differences exist among age groups in terms of governorates; 5) There are statistically significant differences among some levels of education and governorates in terms of censuses; 6) There are statistically significant differences among means of transportation in terms of censuses and governorates; 7) There are statistically significant differences among marital statuses in terms of censuses and governorates; 8) There are statistically significant differences among chronic diseases of pilgrims in terms of censuses and governorates.

4. OBJECTIVES OF STUDY

The purpose of the paper is to outline the evolution of Egyptian pilgrims' numbers and reasons behind the increase or decrease in their numbers. It aims to shed light on the differences in the numbers of Egyptian male and female pilgrims in terms of censuses, specify levels of statistical significance between censuses and geographical variations in terms of age groups of Egyptian pilgrims at the governorate level, and categorize Egyptian pilgrims according to level of education, marital status, mode of transport in terms of significant differences for each category according to the census and geographic variation in each governorate.

5. METHODOLOGY

The population under study comprise of male and female pilgrims across Egyptian governorates for different census periods (2010 to 2014). ANOVA of Census Differences was used to identify the differences in average numbers of male pilgrims. ANOVA shows the way groups differ internally against the differences between them. Both within group and between group variation is possible with ANOVA (Miller, 1997). To identify the direction of differences between censuses based on this variable, the Least Square Difference (LSD) Test for Post Hoc Comparisons. Differences in pilgrims were estimated as per gender, age, education level, marital status, chronic diseases and modes of transportation (land, air, sea) between governorates and also between lot-chosen and civil associations' pilgrims. Scatter plots and mapping are used as tools of visual representation.

6. GENDER CHARACTERISTICS

6.1. Evolution of the Number of Pilgrims by Gender

In 2004, the number of Egyptian pilgrims dropped from 70,000 pilgrims to 53,000 pilgrims, making it the lowest number of Egyptian pilgrims as shown in Figure 1. The figure shows the evolution of the number of Egyptian pilgrims traveling through the three main *Tafweej* (pilgrim group dispatching) systems: lot-chosen, tourist and civil associations' pilgrims. The decrease in the number of pilgrims was attributable to a number of reasons, including increased costs of Hajj for that particular year[3]. There was a decrease in the number of Egyptian pilgrims in that year, where Egyptian pilgrims formed 3.9% of the overall pilgrims from outside Saudi Arabia, 5.8% of pilgrims from within Saudi Arabian, and 2.8% of overall pilgrims arriving at Mecca in that year. The latter percentage was close to the percentage of Malaysian pilgrims among overall Asian pilgrims recorded for that year (Al-Sharif, 2004).

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[3]That is true. Possibly, some people didn't take the trouble to ascertain that information and failed to realize that Mina is just one of the rites of Hajj. They also failed to ascertain whether they will stay in Mina the whole Hajj period or whether the stay is only for the day of Tarwiyah after moving from Muzdalifah and completing the stoning ritual.

The bottom of the curve represents forgoing of the number of Egyptian pilgrims as well as reasons behind it. On the other hand, the peak of the curve suggests the highest number of Egyptian pilgrims traveled in 2010. This increase in the number of Egyptian pilgrims was accompanied by an increase in the overall number of pilgrims compared to the previous year (2009) by 20.58% (CDSI, 2014). Accordingly, the percentage of Egyptians among pilgrims coming from outside Saudi Arabia increased to about 4.17%. The reasons are successful negotiations between the Egyptian Travel Agents Association (ETAA) and the Saudi *Tawafa* Establishment to reduce the cost of services provided to Egyptian pilgrims at Mena and Arafat areas by SR10 million. As a result, the cost of Hajj packages dropped in that year.
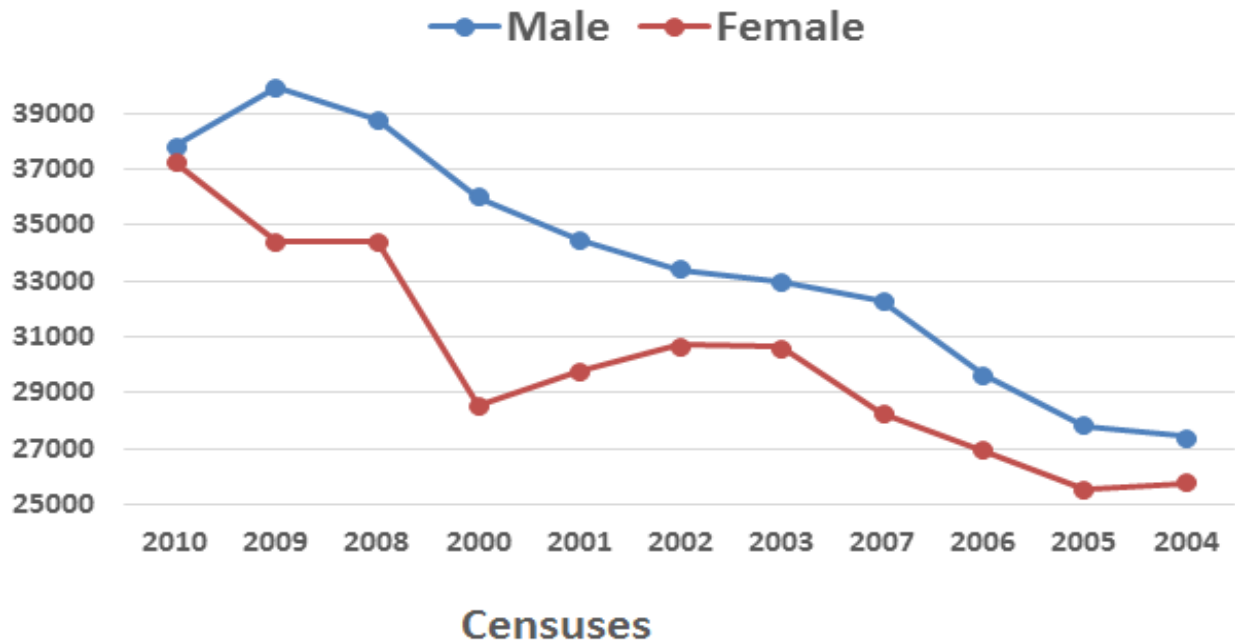

Figure-1. Evolution of the Number of Egyptian Pilgrims (lot-chosen, tourist and civil associations) by Gender in the period 2000 – 2010

In addition, ETAA managed to reduce the price of land tourist Hajj packages to less than that of lot-chosen Hajj packages (using air travel) that are not inclusive of meals. When it comes to differences between the number of males and females in the same period, it has always been in favor of males. The difference between the two groups was most pronounced in the year 2000 at 11.5% more males than females, followed by the years 2009, 2001, 2007 and 2008 with 6.8% more males than females in average.

7. CENSUS DIFFERENCES BY MALE AND FEMALE PILGRIMS

ANOVA of Census Differences was used to identify the differences in average numbers of male pilgrims. The calculated F-value and statistical significance were found to be 7.065 and 0.001, respectively. This means that differences exist in average numbers of male pilgrims as illustrated in Table 1.

Table-1. Results of ANOVA of Census Differences by Gender

Source		Sum of Squares	Degrees of Freedom	Mean Squares	Calculated F-Value	Level of Significance
Male	Intergroup	948992.80	3	316330.93	*7.065	.001
	Intragroup	4477423.12	100	44774.23		
	Total	5426415.91	103			
Female	Intergroup	63002.34	3	21000.78	.812	.490
	Intragroup	2585510.19	100	25855.10		
	Total	2648512.53	103			

* Level of significance: 0.001

From the previous table, it is clear that the results of ANOVA did not reveal statistically significant differences between censuses in terms of average number of females at $\alpha \leq 0.05$ significance level with a calculated F-value and statistical significance of 0.812 and 0.490, respectively. Giza, Sharqia, Beheira and Qalubia ranked in the first four positions in the five censuses with average number of female pilgrims of 390, 349, 320, and 288, respectively. Governorates of Aswan, South Sinai and New Valley always come last with average number of female pilgrims of 28, 22 and 21, respectively.

The above table shows that statistically significant differences exist between 2013 census and all other censuses (2010, 2011, and 2012) at a level of significance of 0.001. In 2013, the percentage of male pilgrims was significantly larger than in all other censuses. This is illustrated by Figure 2, which shows the geographical distribution of Civil Association's pilgrims traveling by air according to the gender of pilgrims. The highest percentage of male pilgrims was from Cairo Governorate at 13%, followed by Giza Governorate at 8.3%. In contrast, the lowest percentage of male pilgrims was from new Valley Governorate at 0.4%.This is explained by the phenomena where many residents of other Governorates join Civil Associations in demographically-attractive governorates.

Comparing between other censuses, it is noted that the differences between 2010, 2011 and 2012 were not statistically significant. This result implies that the average number of Egyptian male pilgrims in these censuses was similar. Consequently, it confirms with statistical significance that the averages are similar across geographical distribution in all of the above five censuses as shown by the Map below:

8. CHARACTERISTICS OF CIVIL ASSOCIATIONS' PILGRIMS TRAVELING BY AIR BY AGE

Table 2 illustrates that the results of the ANOVA did not reveal any statistically significant differences between censuses based on different age groups of pilgrims (26-59, 60-69, 60+) at a level of significance of 0.005. For the first age group, the calculated F-value and statistical significance were found to be 1.44 and 0.242, respectively. Similarly, the calculated F-value and statistical significance of the second age group were found to be 1.03 and 0.362, respectively. For the third and final age group, the calculated F-value and statistical significance were found to be 1.35 and 0.264, respectively. This indicates that the three age groups have no significant influence on the differences between the census periods that were studied. Other studies have demonstrated similar numbers for different age groups (Fadhel and Rabea, 1991) in different census periods as shown by Figure 3.

The average age of Egyptian pilgrims was found to be 52 years (Bhatnagar, 1993) compared to 44.7 years for pilgrims from outside Saudi Arabia and 34.9 years (Fadhel and Rabea, 1991) for pilgrims from within Saudi Arabia in 1411 AH. In terms of the number of pilgrims, no statistically significant differences were found between Alexandria and a large number of Governorates, including Sohag, Gharbia, Faiyum, Giza, Monufia, Kafr el-Sheikh and Dakahlia. On the other hand, statistically significant results were found between Alexandria and the rest of the governorates and results.
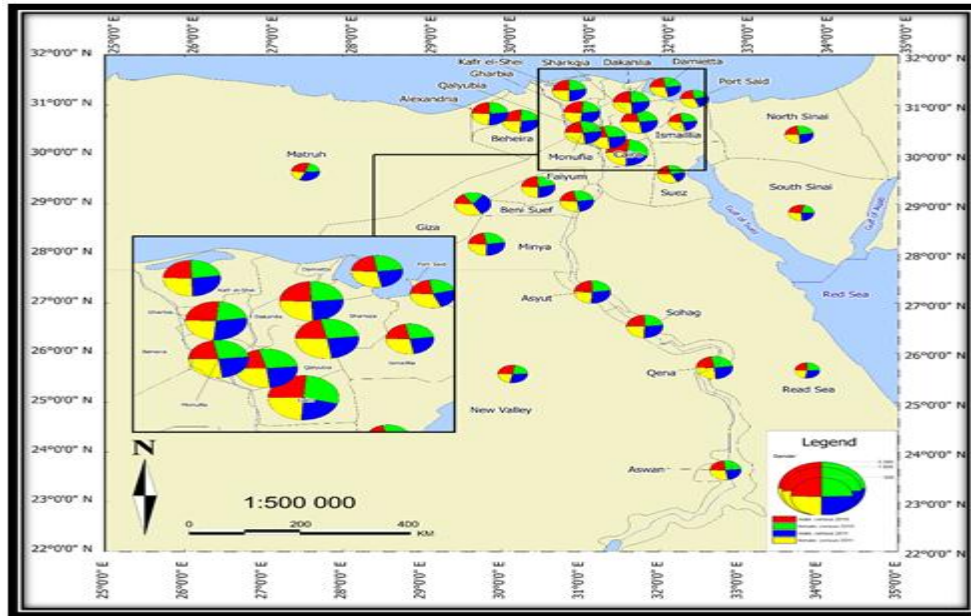

Figure-2. Evolution of the Number of Egyptian Pilgrims (lot-chosen, tourist and civil associations) by Gender for censuses 2010 and 2011

Table-2. Results of ANOVA of Census Differences by Age Groups

| Source		Sum of Squares	Degrees of Freedom	Mean Squares	Calculated F-Value	Level of Significance
59-26	Intergroup	2861392.37	2	36736.168	1.44	.242
	Intragroup	2755212.57	75	53089.897		
	Total	106179.79	77			
69-60	Intergroup	430950.11	2	5592.245	1.03	.362
	Intragroup	419418.34	75	5765.885		
	Total	11531.76	77			
69+	Intergroup	201633.34	2	2594.731	1.35	.264
	Intragroup	194604.80	75	3514.269		
	Total	7028.53	77			

* Level of significance: 0.001
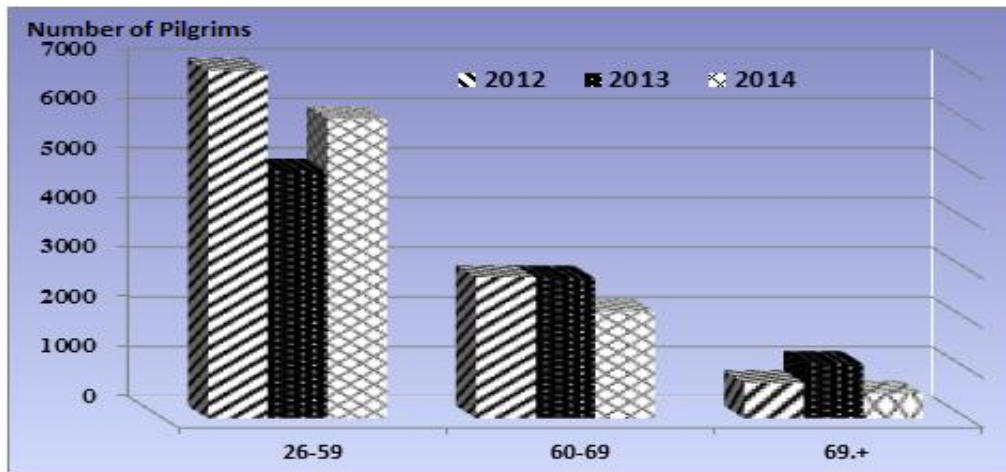
Figure-3. Prevailing Age Groups of Civil Associations' Pilgrims Traveling by Air in the 2012 – 2014

9. CENSUS DIFFERENCES BY LEVEL OF EDUCATION

To know more about these differences, ANOVA was used. The calculated F-value and statistical significance for the variables Illiterate, Average and University Level indicate that these three levels of education (i.e. Illiterate, Average and University Level) have no influence on the difference between censuses. Nonetheless, statistically significant differences were found between censuses based on the variable Below Average with a calculated F-value and statistical significance of 13.971 and 0.001, respectively. In other words, this confirms that this level of education (i.e. Below Average) has influence on the differences between censuses. To identify the trends of differences between censuses based on this variable, the LSD Test for Post Hoc Comparisons was used and the following table illustrates the results of these comparisons:

There are statistically significant differences at a 0.001 level of significance between 2010 census and all other censuses (i.e. 2011, 2012, 2013, and 2014). All of these differences are in favor of 2010 census, which means that in the year 2010, the percentage of pilgrims with Below Average level of education was significantly greater than in all other censuses. When we compare between 2011, 2012, 2013, and 2014 censuses, we find that the differences between them are not statistically significant, with the exception of the difference between the 2012 and 2014 censuses. In the latter, statistically significant differences were found at a 0.001 level of significance in favor of 2012 census. This result indicates that the percentage of pilgrims with Below Average level of education was significantly greater in 2012 census compared to 2014 censuses.

9.1. Differences in Illiterate Pilgrims Traveling by Air between Governorates

By studying geographical variation of illiterate pilgrims between governorates in the period under study (2010-2014), it was found that statistically significant differences exist between governorates. In addition, the percentage of illiterate pilgrims in Metropolitan and desert governorates was found to be low. The governorates can be categorized into different categories based on their average numbers of illiterate pilgrims.

A group of Governorates in which average numbers of illiterate pilgrims are above 180. Dakahlia Governorate ranked first with an average number of illiterate pilgrims of 202, followed by 192 and 184 for Cairo and Red Sea Governorates, respectively. A group of Governorates in which average numbers of illiterate pilgrims ranged between 90 and 179. This group comprises a large number of Governorates with South Sinai Governorate

ranking first at an average number of 177 illiterate pilgrims followed by Qalyubia at 158 illiterate pilgrims. The governorates with the least number of illiterate pilgrims in this group were found to be North Sinai at 92 and Port Said at 104. A group of Governorates in which average numbers of illiterate pilgrims ranged between 30 and 89. This group comprises major cities in Greater Cairo Governorate and elsewhere. The Governorates with the highest average number of illiterate pilgrims in this group were found to be Beheira, Giza and Alexandria with an average number of illiterate pilgrims of 62, 57 and 30, respectively. A final group of Governorates in which average numbers of illiterate pilgrims was less than 30, with Aswan and Matruh ranking first at an average number of illiterate pilgrims of 17 and 3, respectively. Map in figure 4 illustrates gender wise distribution of the illiterate pilgrims.

There are no statistically significant differences between Governorates in pilgrims with average qualification. There are statistically significant differences between Governorates in pilgrims with average qualification. The governorates can be categorized as follows: Governorates with high averages of pilgrims with above average qualification exceeding 150 pilgrims, such Cairo, Giza and Beheira Governorates; governorates with medium number of pilgrims with above average qualification ranging between 90 and 149 pilgrims. Governorates with highest number of pilgrims in this group were Sharqia, Dakahlia and Alexandria Governorates (145, 138 and 132 pilgrims, respectively), while those with the lowest were Asyut and Sohag at 94 and 96 pilgrims, respectively; governorates were the number of pilgrims with above average qualification is lower than 90. This group includes the rest of the Governorates with BeniSuef and Faiyum leading this group at 64 and 58 pilgrims, respectively. The Governorates ranking last in this group were found to be South Sinai and New Valley Governorates at 6 pilgrims.

By examining the geographical distribution to gather information about the main trends of differences between major Governorates based on this variable (i.e. pilgrims with above average qualification) and using the LSD Test of Post Hoc comparisons, the following are the key findings.

No statistically significant differences were found between Alexandria and Gharbia, Dakahlia, Sharqia and Beheira. The levels of significance ranged between 0.162 and 0.990, i.e. the number of pilgrims with above average qualification had no influence on the differences between Alexandria and these Governorates. The average number of pilgrims with above average qualification in Qalyubia and in several other Governorates is similar. This is evidenced by the lack of statistically significant differences between Qalyubia and a group of Governorates, including Matruh, South Sinai, Red Sea, New Valley, North Sinai, Aswan and Damietta. The levels of significance ranged from 0.141 and 0.981.
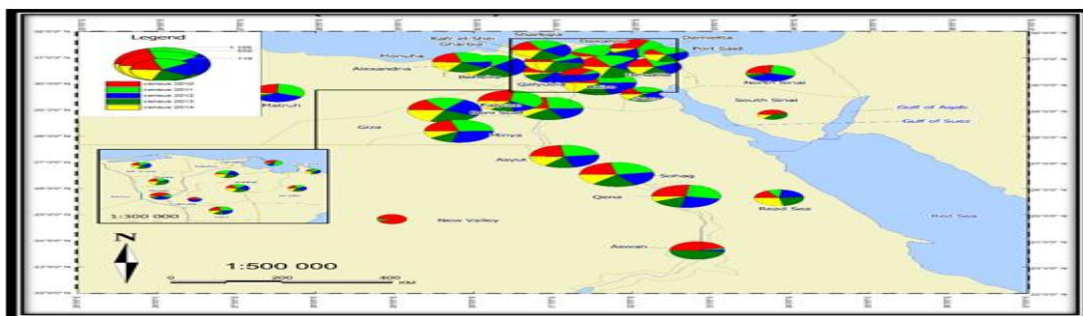

Figure-4. Distribution of Civil Associations' Pilgrims Traveling by Air by Level of Education

Statistically significant differences were found between Governorates in terms of the number of pilgrims with tertiary qualification. The calculated F-value and statistical significance were found to be 68.085 and 0.001, respectively. In other words, the number of pilgrims with tertiary qualification was found to have an influence on differences between Governorates. This can be illustrated by the average numbers of pilgrims with tertiary qualification in each Governorate, with the exception of Cairo Governorate which had the highest average number of pilgrims among all Governorates (466 pilgrims). Governorates with an average number of pilgrims with tertiary qualification exceeding 170 pilgrims. The leading Governorate in this group, after Cairo, was Giza, Sharqia, Dakahlia, Beheira, Gharbia and Alexandria. Governorates with an average number of pilgrims with tertiary qualification ranging between 100 and 169 pilgrims, such as Qena, Sohag, Asyut and Monufia. Governorates with an average number of pilgrims with tertiary qualification lower than 100 pilgrims. This group comprises the remainder of the Governorates with Minya ranking first at 68 pilgrims and Matruh and New Valley ranking last with 10 and 4 pilgrims, respectively.

To identify the main trends of differences between Governorates based on this variable (i.e. pilgrims with tertiary qualification), the LSD Test of Post Hoc comparisons was used. There were governorates with similar average number of pilgrims with tertiary qualification as Dakahlia where no statistically significant differences were found between them and Dakahlia. These Governorates include Beheira, Gharbia, Sharqia, and Alexandria. The levels of significance ranged between 0.08 and 0.587. In contrast, statistically significant differences were found between the remaining Governorates and Dakahlia at a significance level of 0.001. In Governorates of Upper Egypt, no statistically significant differences were found between Sohag on one hand and Qena, Asyut and Monufia on the other hand. In contrast, statistically significant differences were found between Sohag and the remaining Governorates.

10. CHARACTERISTICS OF CIVIL ASSOCIATIONS' PILGRIMS TRAVELING BY AIR BY MARITAL STATUS

10.1. Census Differences by Marital Status

Table 3 shows the results of the ANOVA, which show that no statistically significant differences were found between censuses in terms of marital status according to variables widowed, divorced and single and at a significance level of $\alpha \leq 0.05$. For the category of widowed pilgrims, the calculated F-value and statistical significance were found to be 0.495 and 0.064, respectively, while they were found to be 0.453 and 0.716, respectively, for the category of divorced pilgrims. Lastly, the calculated F-value and statistical significance were found to be 0.721 and 0.542, respectively, for single pilgrims. In other words, the marital status of pilgrims (i.e. widowed, divorced and single) has no influence on census differences. However, when the variable "married" was considered, statistically significant differences were found between censuses. For this category, the calculated F-value and statistical significance were found to be 3.130 and 0.029, respectively. In other words, the marital status of "married" has influence on censuses differences. Further explanation of the geographic distribution of married pilgrims across Governorates will follow as illustrated in figure 5.

Table-3. Results of ANOVA of Census Differences by Marital Status (Married, Widowed, Divorced, and Single)

Marital Status		Sum of Squares	Degrees of Freedom	Mean Squares	Calculated F-Value	Level of Significance
Married	Intergroup	382818.65	3	127606.22	* 3.130	.029
	Intragroup	4076674.38	100	40766.74		
	Total	4459493.04	103			
Widowed	Intergroup	9368.65	3	3122.88	2.495	.064
	Intragroup	125147.46	100	1251.47		
	Total	134516.12	103			
Divorced	Intergroup	15.11	3	5.04	.453	.716
	Intragroup	1111.65	100	11.12		
	Total	1126.76	103			
Single	Intergroup	104.38	3	34.79	.721	.542
	Intragroup	4826.08	100	48.26		
	Total	4930.46	103			

* Level of significance: 0.05

To identify the main trends of differences between Governorates based on this variable (i.e. marital status of pilgrims), the LSD Test of Post Hoc comparisons was used.

There is statistically significant difference at a 0.05 level of significance between 2010 census and two other censuses (i.e. 2013, and 2014). All of these differences are in favor of 2010 census, which means that in the year 2010, the percentage of married pilgrims was significantly greater than in the two other censuses (i.e. 2013, and 2014). When comparison is made between 2012, 2013, and 2014 censuses, the differences between them are found not to be statistically significant, and the same is true for differences between 2010 2012 censuses.

10.2. Differences by Marital Status of Pilgrims Traveling by Air among Governorates

By investigating the differences between Governorates, they can be categorized into the different groups: a group of Governorates in which the average number of married pilgrims is more than 400 pilgrims, including Giza, Sharqia and Dakahlia; a group of Governorates in which the average number of married pilgrims ranges between 200 and 399 pilgrims, which including Beheira, Gharbia, Alexandria, Sohag, Qena, Asyut and Monufia; a group of Governorates in which the average number of married pilgrims is less than 200 pilgrims, which includes the rest of the Governorates with Minya and Faiyum ranking first and second at 199 and 185 pilgrims, respectively. Conversely, South Sinai and New Valley Governorates ranked last at 36 and 12 pilgrims, respectively.

By taking Alexandria as an example, the difference between it and a group comprising such Governorates as Gharbia, Beheira, Sohag, Qena, Dakahlia, Monufia, Asyut and Sharqia was not found to be statistically significant. The levels of significance ranged from 0.08 and 0.74, which implies that their average numbers of married pilgrims was similar.
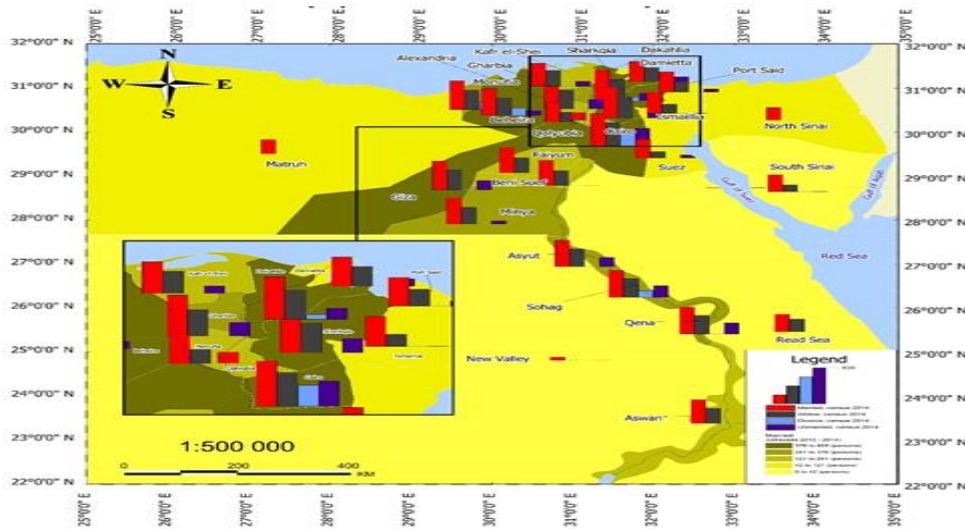
Figure-5. Distribution of Lot-chosen Pilgrims Traveling by Air by Marital Status

11. CHARACTERISTICS OF CIVIL ASSOCIATIONS' TRAVELING BY AIR BY DISEASES

11.1. Census Differences by Chronic Diseases (Hypertension, Diabetes)

The results of the ANOVA did not show any statistically significant differences between censuses in terms of chronic diseases at a significance level of $\alpha \leq 0.05$. For Hypertension, the calculated F-value and statistical significance were found to be 0.487 and 0.745, respectively, while they were found to be 0.350 and 0.843, respectively, for Diabetes. This means that the Chronic Diseases variable does not have any influence on the differences between censuses. The map below shows the geographic distribution and variation between Governorates in terms of Chronic Diseases. However the cases of influenza or respiratory disorders such as Pertussis (Wilder-Smith, 2015) are not considered. Pilgrims are advised to take influenza vaccine before going for Hajj (Aberie, 2014; Charrel, 2015). Cardiovascular morbidities and mortality are also common during Hajj against which awareness is required (Al-Shimemen, 2011).
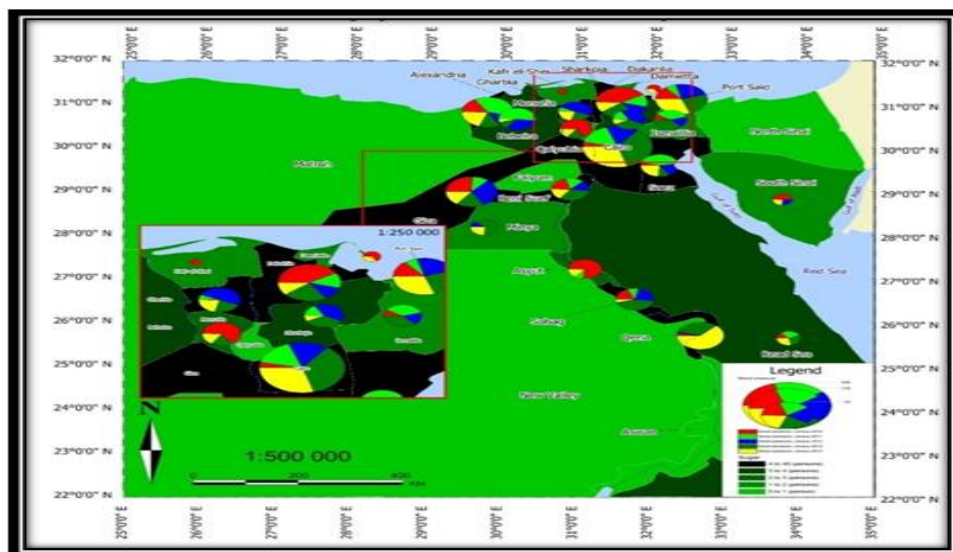

Figure-6. Distribution of Lot-chosen Pilgrims Traveling by Air by Chronic Diseases

12. MODE OF TRANSPORT OF PILGRIMS

12.1. Mode of Transport of Lot-Chosen Pilgrims By Means Of Transportation

12.1.1. Sea Transport of Lot-Chosen Pilgrims

Population growth, removal of trade barriers and high standard of living has contributed to the ongoing development and evolution of maritime transportation, particularly in countries with long coastlines. The International Sanitary Conference in Venice in 1892 regulated Maritime traffic between Asia and Europe, particularly during the Hajj season(International Sanitary Conference, 7th: 1892: Rome, Italy). The International Quarantine Board (headquartered in Cairo and Alexandria) was formed to stop the spread of Cholera. The available statistical data does not explain the details of the pilgrims' land or sea travel. For example, a pilgrim could initially travel by land or sea, and then continue the journey with another means of transportation.

12.2. Air Transport of Lot-Chosen and Civil Associations' Pilgrims

The results of ANOVA show that statistically significant differences have been found between censuses for the variable "air transport of pilgrims" at a level of significance of $\alpha \leq 0.001$. The calculated F-value indicates that air transport of pilgrims has influence on the differences between censuses. Differences were found between the number of pilgrims in 2009 census and in the rest of the censuses (Appendix 5).

There are statistically significant differences at a 0.05 level of significance between 2000 census and all other censuses (i.e. 2004, 2007, 2010, 2011, 2012, 2013 and 2014). In the year 2000, the percentage of Civil Associations' pilgrims traveling by air was significantly greater than in all other censuses (i.e. 2013, and 2014). The differences between censuses 2012, 2013 and 2014 and between 2010 2012 censuses are not statistically significant.

Considering 2004 census and 2010, 2012, 2013 and 2014 censuses, differences were in favor of 2004. There are statistically significant differences between 2007 census on one hand and 2012 and 2013. Likewise, statistically significant differences exist between 2010 and 2011 censuses, in favor of 2010 census, and between 2010 and 2012 censuses, in favor of 2010 census. However, when we compare between 2012, 2013 and 2014 censuses, the differences among them are not statistically significant, which means that the average number of Civil Association's pilgrims traveling by air in these years was not significant.

Apart from Cairo with its high number of pilgrims traveling by air (at 2119 pilgrims) due to population density and services in the capital, we can explain the geographical distribution of pilgrims traveling by air. Using the mean differences over the period between 2000 and 2014 we find governorates with a high number of pilgrims traveling by air range between 500 and 1000 pilgrims; governorates in which the number of pilgrims traveling by air range between 200 and 499 with Kafr el-Sheikh, Minya and Asyut ranking highest at 475, 453 and 445 pilgrims, respectively, and Aswan and Port Said ranking lowest at 224 and 214 pilgrims, respectively; and governorates in which the number of pilgrims traveling by air is lower than 200 with Ismailia and Suez ranking highest with 188 and 140 pilgrims, respectively, and South Sinai and New Valley ranking lowest at an average of 36 pilgrims. Low number of pilgrims traveling by air from desert Governorates can be explained by the low overall number of Civil Associations' pilgrims traveling by air and the relatively low population in those governorates. This is demonstrated by the Map below.
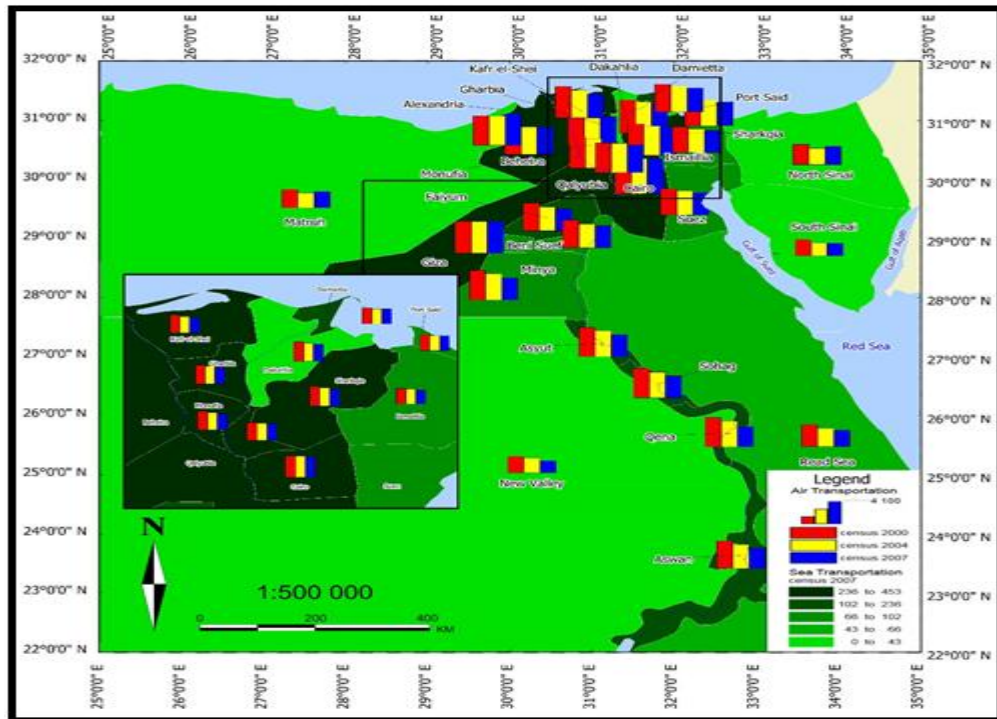
Figure-8. Distribution of Lot-chosen Pilgrims Traveling by Sea and Air

From the geographic distribution of pilgrims traveling by air, following observations might be noted. There are no statistically significant differences between Gharbia Governorate on one hand and Kafr el-Sheikh, Asyut, Minya, Giza, Sohag and Qena Governorates on the other. The levels of significance range between 0.12 and 0.22, which indicates that there is similarity to some extent between the number of pilgrims traveling by air in these governorates and that differences are not significant. By contrast, statistically significant differences exist between Gharbia Governorate and the rest of the Governorates. No statistically significant differences were found between Suez and 16 other Governorates. However, statistically significant differences were found between Suez and a group of Governorates comprising Monufia, Qalyubia, Beheira, Gharbia, Alexandria, Sharqia, Dakahlia, Giza and Cairo. This is because the latter 10 Governorates ranked highest in terms of averages.

12.3. Land Transport of Pilgrims

Low income pilgrims from Egypt find road travel very convenient (either via the Nuweiba-Aqaba route or through other ports) owing to geographical proximity with KSA. The percentage of low-cost Hajj packages increased to 64% due to the increasing number of people applying for such packages comparing to last year. During last year, there were 104,000 applicants for low-cost Hajj packages, 52,000 for Hajj packages involving land travel, and 36,000 tourist Hajj packages. The number of pilgrims traveling by land doubled from 6,000 in 2010 to 12,489. The Egyptian Ministry of Tourism has put in place several regulations which include the Model Year of the bus should not be older than 2007, the vehicle must be equipped with GPS; the company should not be involved in organizing any other form of Hajj packages, be it tourist Hajj packages or low-cost Hajj packages involving air travel; and companies possessing more than 9 years of experience in organizing Hajj trips may serve

up to 190 passport holders, while those with 6-8 years of experience may serve up to 160 passport holders. For newly formed companies and those with up to 5 years of experience, they may serve up to 130 passport holders.

13. CONCLUSION

Essentially for hajj pilgrims two aspects are significant – finance and health. If a pilgrim can afford the cost and his health permits he can fulfill this final pillar of Islam successfully (Russel, 2013). For all the censuses and governorates of Egypt under study, male pilgrims are significantly more than female pilgrims. While number of male pilgrims have increased significantly in 2013 census the number of female pilgrims has not. Participation of females in pilgrims also depends a lot on family structures, immigration and even poverty levels. Expansion of privileges for pilgrims does not directly lead to more opportunities for women and economic development also improves the benefits of male pilgrims more than females (Bianchi, 2004). Also a Muslim woman needs a *mahram* (husband or some male guardian) before going to Hajj (Madani, 2006). Until she has one, Hajj is at least not obligatory on her part (Raj and Bozonelos, 2015). Going by age groups (26-59, 60-69, 60+ years) no significant differences in number of pilgrims were found across the census. But intra group (between governorates) differences were found in one case. While considering different levels of education, only below average group has significant impact on number of pilgrims across censuses – the number was highest in 2010 compared to other censuses and in 2012 compared to 2013 data. For illiterate and above average pilgrims, differences exist across governorates in terms of those traveling by air. Going to Hajj has established social statuses of pilgrims irrespective of education level especially if they can afford the cost (Matthee, 2008). For diabetes and hypertension among the pilgrims significant differences were found but no other chronic contagious diseases are considered which require vaccination of the pilgrims before going for Hajj (Wilder-Smith, 2003). The study finds that it is difficult to separate and distinguish between pilgrims transported by sea and land transport. For air transport, differences exist across censuses and more pilgrims travelled by air in 2009 and 2000 compared to other censuses. People from Suez and Gharbia travelled more by air than other governorates. But going by averages the other governorate group is on higher end. This shows that majority of the total does not travel by air. Land transport is still more popular. In fact more and more pilgrims are traveling by land due to the increase in low cost Hajj packages (Saudi Gazette, 2015) and other regulations of the government. Hence more low income pilgrims are finding it convenient. This has policy implications for reducing the cost of air travel for the pilgrims so that more people can consider this choice based on their necessities (health, time constraints, etc).

Aswan	Qena	Sohag	New Valley	Asyut	Minga	Faiyum	Beni Suef	Soth Sinai	North Sinai	Port Said	Red Sea	Ismailia	Suez	Damietta	Sharqia	Dakahlia	Menofia	Kafr el-Sheikh	Matruh	Beheira	Garbia	Giza	Qalyubia	Alexandria	Governorates	
																										1
1895.50000	1691.12500	1686.50000	2083.50000	1674.00000	1666.00000	1802.00000	1824.87500	2083.62500	2040.37500	1905.00000	2053.00000	1931.75000	1979.50000	1868.62500	1275.25000	1229.87500	1541.62500	1644.50000	2051.87500	1461.75000	1390.50000	1134.87500	1503.00000	1322.50000	Cairo	2
573.00000	368.63	364.00	761.00000	351.50	343.50	479.50000	502.37500	761.12500	717.87500	582.50000	730.50000	609.25000	657.00000	546.12500	-47.25	-92.63	219.13	322.00	729.37500	139.25	68.00	-187.63	180.50		Alexandria	3
392.50	188.13	183.50	580.50000	171.00	163.00	299.00	321.88	580.62500	537.37500	402.00	550.00000	428.75000	476.50000	365.63	-227.75	-273.13	38.63	141.50	548.87500	-41.25	-112.50	-368.13			Qalyubia	4
760.62500	556.25000	551.62500	948.62500	539.12500	531.12500	667.12500	690.00000	948.75000	905.50000	770.12500	918.12500	796.87500	844.62500	733.75000	140.38	95.00	406.75	509.62500	917.00000	326.88	255.63				Giza	5
505.00000	300.63	296.00	693.00000	283.50	275.50	411.50	434.37500	693.12500	649.87500	514.50000	662.50000	541.25000	589.00000	478.12500	-115.25	-160.63	151.13	254.00	661.37500	71.25					Garbia	6
433.75000	229.38	224.75	621.75000	212.25	204.25	340.25	363.13	621.87500	578.62500	443.25000	591.25000	470.00000	517.75000	406.88	-186.50	-231.88	79.88	182.75	590.12500						Beheira	7
-156.38	-360.75	-365.38	31.63	-377.88	-385.88	-249.88	-227.00	31.75	-11.50	-146.88	1.13	-120.13	-72.38	-183.25	776.62500-	-822.00000-	-510.25000-	-407.38							Matruh	8
251.00	46.63	42.00	439.00000	29.50	21.50	157.50	180.38	439.12500	395.88	260.50	408.50	287.25	335.00	224.13	-369.25	-414.62500-	-102.88								Kafr el-Sheikh	9
353.88	149.50	144.88	541.87500	132.38	124.38	260.38	283.25	542.00000	498.75000	363.38	511.37500	390.13	437.87500	327.00	-266.38	-311.75									Menofia	10
665.62500	461.25000	456.62500	853.62500	444.12500	436.12500	572.12500	595.00000	853.75000	810.50000	675.12500	823.12500	701.87500	749.62500	638.75000	45.38										Dakahlia	11
620.25000	415.87500	411.25	808.25000	398.75	390.75	526.75000	549.62500	808.37500	765.12500	629.75000	777.75000	656.50000	704.25000	593.37500											Sharqia	12
26.88	-177.50	-182.13	214.88	-194.63	-202.63	-66.63	-43.75	215.00	171.75	36.38	184.38	63.13	110.88												Damietta	13
-84.00	-288.38	-293.00	104.00	-305.50	-313.50	-177.50	-154.63	104.13	60.88	-74.50	73.50	-47.75													Suez	14
-36.25	-240.63	-245.25	151.75	-257.75	-265.75	-129.75	-106.88	151.88	108.63	-26.75	121.25														Ismailia	15
-157.50	-361.88	-366.50	30.50	-379.00	-387.00	-251.00	-228.13	30.63	-12.63	-148.00															Red Sea	16
-9.50	-213.88	-218.50	178.50	-231.00	-239.00	-103.00	-80.13	178.63	135.38																Port Said	17
-144.88	-349.25	-353.88	43.13	-366.38	-374.38	-238.38	-215.50	43.25																	North Sinai	18
-188.13	-392.50	-397.13	-0.13	-409.63	-417.62500-	-281.63	-258.75																		Soth Sinai	19
70.63	-133.75	-138.38	258.63	-150.88	-158.88	-22.88																			Beni Suef	20
93.50	-110.88	-115.50	281.50	-128.00	-136.00																				Faiyum	21
229.50	25.13	20.50	417.50000	8.00																					Minga	22
221.50	17.13	12.50	409.50																						Asyut	23
-188.00	-392.38	-397.00																							New Valley	24
209.00	4.63																								Sohag	25
204.38																									Qena	26

Appendix-5. LSD Test of Post Hoc Comparisons between Governorates for Civil Associations' and Lot-chosen Pilgrims in Terms of Mode of Transport in the Period 2000 – 2014een Governorates for Civil Associations' and Lot-chosen Pilgrims in Terms of Mode of Transport in the Period 2000 – 2014

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