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Health Services to Immigrant Patients Provided by Central Health Units in the Region of Eastern Macedonia and Thrace (Greece)

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Abstract

Despite the economic crisis plaguing the Greek economy over the last 5 years, Greece is still considered to be one of the major destinations for immigrants of different population groups, with the Region of Eastern Macedonia and Thrace (AMTh)-Greece being quite an important, if not the main, gate of immigrants entering Greece. The increased entry and stay of immigrants in Greece is an ongoing phenomenon, which involves a number of other important issues, including the provision of health services. This paper outlines the current situation with respect to the services provided to immigrants by the central health units in the Region AMTh, based on data of the official documents recording the flow of patients in hospitals of the Region, particularly the hospitals of "Kavala", "Drama", "Komotini", "Xanthi" and "Didimotichon". The data cover the period 2005-2011 and refer to the immigrants' "citizenship", the "days of hospitalization", the "estimated costing of nursing expenditure", the "clinic of nursing", and the "health insurer" of immigrant patients. The results of this paper highlight the potential of the Region AMTh in providing health services to immigrants and record basic qualitative and quantitative characteristics of the flow of immigrants to hospitals of the Region, both in terms of the hospital concerned as well as over time. The findings of this paper offer the opportunity of assessing key indicators of the hospitalization cost in central health units of AMTh Region and provide basic information that may be used by relevant authorities towards a more rational organization of health services offered to immigrants in the wider area.

Keywords: Health services, immigrant patients, features of hospitalization, public hospitals, Region of Eastern Macedonia and Thrace-Greece

1. Introduction

The socio-economic and political development that occurred in the Balkans, Eastern Europe and the Middle East in recent years, and the immigration policy of the European Union, combined with the geographical position of Greece and the extended length of its borders, were factors that made Greece a main destination for immigrants of different population groups (Hellenic Migration Policy Institute/IMEPO, 2007). In this process, the Region of Eastern Macedonia and Thrace (AMTh) has been and continues to be an important if not the main gate of immigrants entering Greece.

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Despite the impact of the economic crisis besetting the economies of southern EU countries over the last 5 years, the increased entry and stay of immigrants in Greece is still an ongoing and topical phenomenon, which involves a number of other important issues, including that of providing health services (Maratou-Alipranti and Gazon, 2008). This paper outlines the current situation with respect to the services provided to immigrants by the central health units in the Region AMTh.

2. Data Used and Methodology of Statistical Analysis

The data used for the analysis and outline the current situation regarding the health services provided to immigrants by the central health units in the Region AMTh were drawn from the official documents recording the flow of patients in hospitals of AMTh Region, particularly from hospitals of "Kavala", "Drama", "Komotini", "Xanthi" and "Didimotichon" (no available data regarding the hospital of "Alexandroupolis"). The data refer to the immigrants' "citizenship", the "days of hospitalization", the "estimated costing of nursing expenditure", the "clinic of nursing", and the "health insurance" of immigrant patients, covering the period 2005-2011. Based on available data, and for the purposes of the analysis, the term "immigrant" patient is considered as the "foreign" patient who received health services from the hospitals of the Region AMTh. For the statistical analysis and evaluation of the empirical data, both descriptive and inferential methods were used. As all forms of parametric tests are based on the assumptions that the within-groups data are samples drawn from normally distributed populations with equal variances, both formal tests (Shapiro-Wilk and Lilliefors tests) and graphical displays were performed for assessing departures from Gaussian distribution, while variances were tested for homogeneity using the Levene's test. For accessing the assumptions of normality and stability of variances, data were also transformed to $\log_e$, $\log_{10}$ or sqrt (Zolman, 1993). More particularly, in case of normality and variances' homogeneity, for the statistical evaluation of the empirical data one way analysis of variance (ONE-WAY ANOVA) was performed to evaluate possible significant effects of "hospital" and/or "year" on the quantitative variables "days of hospitalization" and "estimated costing of nursing expenditure" of patients. Differences between mean values of specific hospital groups and/or specific year groups were evaluated using the Duncan's new multiple range test. In the cases that assumptions about either variability or the form of the populations distribution were seriously violated, with or no transformed data, the Kruskal-Wallis nonparametric test was applied to evaluate hospital or/and year depended differences, while differences between mean values of specific hospital groups or/and specific year groups were evaluated using the nonparametric Wilcoxon rank sum test (Mann-Whitney U-test).

In addition, regression analysis and especially the Ordinary Least Square method was also applied to estimate the average rate of change over time regarding the "number of immigrant patients", the average number of "hospitalization days", the average "estimated costing of nursing expenditure" of patients, the total "estimated costing of nursing expenditure" of patients, and the total number of "days of hospitalization". More specifically, the average annual changing rates were estimated using the regression model $Y=A*(1+j)^t$, where Y= dependent variable, A=parameter estimate, j=average rate of change and t=year of hospitalization (Batzios, 2001). All analyses were conducted using the statistical software program SPSS for Windows (v.19.0). Significance was declared at $P \leq 0.05$, unless it is differently noted.

3. Descriptive Statistics of Nursing Immigrant Patients

Tables 1 and 2 present descriptive statistics regarding the estimated costing of nursing expenditure of immigrant patients and the days of hospitalization of immigrant patients in hospitals of Region AMTh, for the period 2005-2011. The evaluation of the above tables' information shows that, during the period 2005-2011, the highest average estimated costing of nursing expenditure of immigrant patients occurred in 2007 and it was calculated 664.43±4505.12 Euro (Mean±SD) (Table 1).

Table 1: Estimated Costing of Nursing Expenditure of Immigrant Patients in the Hospitals of Region AMTh

Year	Number of immigrant patients*	Estimated costing of nursing expenditure of immigrant patients*							
		Mean	SEM	SD	Mode	Q1	Q2 Median	Q3	Total expenditure
2005	1,492/ 1,492*	417.60	49.47	1,911.08	88	88.04	190.74	366.81	623,052
2006	1,682/ 1,682*	521.76	74.36	3,050.03	88	88.04	190.74	357.06	877,592
2007	1,759/ 1,959*	664.43	107.41	4,505.12	88	88.04	190.74	366.81	1,168,736
2008	2,337/ 2,259*	473.49	30.09	1,430.29	88	88.04	203.16	381.52	1,069,625
2009	2,203/ 2,169*	518.83	30.25	1,409.18	88	88.04	225.96	381.52	1,125,350
2010	2,250/ 2,216*	494.12	43.65	2,055.09	88	88.04	190.74	375.80	1,094,971
2011	2,320/ 2,287*	447.74	23.72	1,134.60	73	88.04	220.10	420.00	1,023,983
Total years	**14,043/ 13,864***	**503.70**	**20.15**	**2,372.82**	**88**	**88.04**	**203.08**	**381.52**	**6,983,309**

*Note: Estimated costing of nursing expenditure is based on the numbers of immigrant patients indicated with an *.*

At the same time, the average number of days of hospitalization of immigrant patients ranged from 3.62 to 4.47 days, with the highest average value in 2006 (4.47±6.388) and the lowest in 2011 (3.62±3.77) (Table 2) .

Table 2: Hospitalization days of Immigrant Patients in the Hospitals of Region AMTh

Year	Number of immigrant patients	Days of hospitalization of immigrant patients							
		Mean	SEM	SD	Mode	Q1	Q2 Median	Q3	Total days
2005	1,492	4.25	0.098	3.802	2	2	3	5	6,347
2006	1,682	4.47	0.156	6.388	2	2	3	5	7,517
2007	1,759	4.46	0.236	9.878	1	2	3	5	7,849
2008	2,337	4.29	0.091	4.422	2	2	3	5	10,019
2009	2,203	4.16	0.132	6.194	1	2	3	5	9,172
2010	2,250	4.16	0.171	8.095	1	2	3	5	9,364
2011	2,320	3.62	0.078	3.77	1	1	3	5	8,406
Total years	**14,043**	**4.18**	**0.054**	**6.389**	**1**	**2**	**3**	**5**	**58,674**

As for the citizenship of the hospitalized immigrants received health services in hospitals of the Region AMTh, the dominant population group consists of patients of Albanian nationality (46%), followed by the patients of Bulgarian (12.7%), Georgian (8.6 %), Russian (8.2%), German (3.9%) and Armenian (3.8%) citizenship. Other smaller groups of hospitalized immigrants are Moldovans, English, Ukrainians, Turks, Kazakh, Serbian, Egyptians, Iraqis and Romanians (Table 3).

Table 3: Frequency Distribution of Immigrant Patients Hospitalized in the Hospitals of Region AMTh by Citizenship in Descending Order (2005-2011)

Citizenship	Frequency	Percentage (%)	Citizenship	Frequency	Percentage (%)
Albania	6,464	46.0	India	14	0.1
Bulgaria	1,790	12.7	Croatia	14	0.1
Georgia	1,214	8.6	Belgium	11	0.1
Russia	1,145	8.2	Brazil	10	0.1
Germany	542	3.9	Australia	8	0.1
Armenia	528	3.8	Jordan	8	0.1
Moldova	210	1.5	Portugal	8	0.1
UK	183	1.3	Algeria	7	0
Ukraine	160	1.1	Lithuania	6	0
Turkey	146	1.0	Morocco	6	0
Kazakhstan	130	0.9	Nigeria	6	0
Serbia	124	0.9	Canada	5	0
Egypt	118	0.8	Angola	4	0
Iraq	117	0.8	Unknown	4	0
Romania	114	0.8	Eritrea	4	0
Italy	78	0.6	Norway	4	0
Syria	64	0.5	Not recorded	3	0
Poland	58	0.4	Japan	3	0
Uzbekistan	55	0.4	Myanmar	3	0
China	51	0.4	Bangladesh	3	0
Cyprus	47	0.3	Tanzania	3	0
The Netherlands	45	0.3	Philippines	3	0
Pakistan	43	0.3	Azerbaijan	2	0
Argentina	42	0.3	Bosnia-Herzegovina	2	0
Palestine	32	0.2	Dominican	3	0
Spain	30	0.2	Slovenia	2	0
Czech Republic	29	0.2	Sri Lanka	2	0
France	28	0.2	Tajikistan	2	0
Afghanistan	27	0.2	Venezuela	1	0
Sweden	26	0.2	Cashmere	1	0
Skopje	34	0.3	Kenya	1	0
Slovakia	23	0.2	Korea	1	0
Somalia	23	0.2	Libanos	1	0
Belarus	22	0.2	Mauritania	1	0
Austria	21	0.1	Mongolia	1	0
Denmark	21	0.1	New Zeeland	1	0
IPAN	20	0.1	Ruanda	1	0
Hungary	20	0.1	Soudan	1	0
Chile	20	0.1	Turkmenistan	1	0
USA	19	0.1	Tunisia	1	0
Switzerland	18	0.1			
Total				**14,043**	**100.00**

As for the frequency distribution of days of hospitalization, the highest percentage of immigrants who were hospitalized in hospitals of the Region AMTh, for the period 2005-2011, remained hospitalized for one day (21.4%), while a significant percentage of those hospitalized for two days (18.4%). In cumulative terms, 78.6% of immigrants remained hospitalized for four days (Table 4).

Table 4: Frequency Distribution of days of Hospitalization of Immigrant Patients (2005-2011)

Days of hospitalization	Frequency	Percentage (%)	Cumulative percentage (%)
1.00	3,009	21.4	21.5
2.00	2,582	18.4	39.8
3.00	2,120	15.1	54.9
4.00	1,956	13.9	68.9
5.00	1,364	9.7	78.6
6.00	870	6.2	84.8
7.00	567	4.0	88.8
8.00	518	3.7	92.5
9.00	332	2.4	94.9
10.00	157	1.1	96.0
More than 10	568	4.0	100.0
Total	**14,043**	**100.0**	

Meanwhile, regarding clinic nursing of immigrants, the most preferred clinic is the Gynaecology/ Obstetrics (23.4%), followed by Surgery (11.7%) and Paediatrics (10%) (Table 5).

Table 5: Frequency Distribution of Immigrant Patients by Clinic of Nursing (2005-2011)

Clinic of nursing	Frequency	Percentage (%)	Cumulative percentage (%)
GYNAECOLOGY/ OBSTETRICS	3,290	23.4	23.4
SURGERY	1,639	11.7	35.1
NOT RECORDED	1,595	11.4	46.5
PAEDIATRICS	1,404	10.0	56.5
INTERNAL MEDICINE	1,101	7.8	64.3
1E DAY CLINIC OF INTERNAL MEDICINE	882	6.3	70.6
ORTHOPAEDICS	725	5.2	75.8
PRETERMS	558	4.0	79.8
PNEUMOLOGY	457	3.3	83.1
UROLOGY	433	3.1	86.2
CARDIOLOGY	354	2.5	88.7
ENT	282	2.0	90.7
NEUROLOGY	247	1.8	92.5
1 DAY CLINIC OF PSYCHIATRY	196	1.4	93.9
REUMATOLOGY	153	1.1	95.0
OPHTHALMOLOGY	130	0.9	95.9
NEUROSURGERY	126	0.9	96.8
PSYCHIATRY	120	0.9	97.7
NEPHROLOGY	110	0.8	98.5
1 DAY CLINIC OF GENERAL SURGERY	73	0.5	99.0
THALASSEMIA	45	0.3	99.3
ONCOLOGY	43	0.3	99.6
INTENSIVE CARE UNIT	23	0.2	99.8
RADIOTHERAPY	22	0.2	..
INCUBATOR	12	0…..	..
1 DAY CLINIC OF CARDIOLOGY	11	0…..	..
1 DAY CLINIC OF UROLOGY	4	0…	..
1 DAY CLINIC OF ORTHOPAEDICS	2	0…..	..
1 DAY CLINIC OF PAEDIATRICS	2	0…..	..
INTENSIVE CARE UNIT OF CARDIOLOGY	2	0…	..

Clinic of nursing	Frequency	Percentage (%)	Cumulative percentage (%)
GYNAECOLOGY/ OBSTETRICS	3,290	23.4	23.4
SURGERY	1,639	11.7	35.1
NOT RECORDED	1,595	11.4	46.5
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NEUROLOGY	247	1.8	92.5
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REUMATOLOGY	153	1.1	95.0
OPHTHALMOLOGY	130	0.9	95.9
NEUROSURGERY	126	0.9	96.8
PSYCHIATRY	120	0.9	97.7
NEPHROLOGY	110	0.8	98.5
1 DAY CLINIC OF GENERAL SURGERY	73	0.5	99.0
THALASSEMIA	45	0.3	99.3
ONCOLOGY	43	0.3	99.6
INTENSIVE CARE UNIT	23	0.2	99.8
RADIOTHERAPY	22	0.2	..
INCUBATOR	12	0…..	..
1 DAY CLINIC OF CARDIOLOGY	11	0…..	..
1 DAY CLINIC OF UROLOGY	4	0…	..
HEMODIALYSIS	2	0…..	100.00
Total	**14,043**	**100.0**	

Moreover, regarding the health insurer of hospitalized immigrant patients, 38.2% of them belong to IKA, while an also high percentage declared the OGA (24.9%) as a health insurer. A reasonable percentage of immigrants declared that they paid the nursing expenditure by themselves (14.4%) (Table 6).

Table 6: Frequency Distribution of Hospitalized Immigrant Patients by Heath Insurer (2005-2011)

Health insurer	Frequency	Percentage (%)	Cumulative percentage (%)
IKA	5,360	38.2	38.2
OGA	3,497	24.9	63.1
INDIVIDUALS	2,025	14.4	77.5
DESTITUTE	977	7.0	84.5
ABEYANCE	842	6.0	90.5
EUROPEAN HEALTH INSURANCE CARD /EHIC	616	4.4	94.9
PUBLIC	263	1.9	96.8
OTHER INSURERS	219	1.6	98.4
O.A.E.E.(TEBE-TAE)	182	1.2	99.6
INMATES	46	0.2	99.8
ARMY	10	0.1	99.9
NOT RECORDED	6	0.0	100.0
Total	**14,043**	**100.0**	

4. Results of Statistical Analysis of Hospitalization Variables of Immigrant Patients

Table 7 presents the estimates (Mean±SEM) as well as the results of the statistical analysis of the key variables of immigrant patients' hospitalization, namely estimated costing nursing expenditure and days of hospitalization in hospitals of the Region AMTh, cumulatively.

Table 7: Comparative Analysis of Hospitalization days and Estimated Costing Nursing Expenditure of Immigrants in Hospitals of the AMTh Region (2005-2011)

Year	Days of hospitalization (Mean ± SEM)	Estimated costing nursing expenditure (Mean ± SEM)
2005	4.25±0.098[a]	417.60±49.47 [a,c]
2006	4.47±0.156 [a]	521.76±74.36 [a]
2007	4.46±0.236 [b,d]	664.43±107.41 [a,d]
2008	4.29±0.091 [a]	473.49±30.09 [c,d,e]
2009	4.16±0.132 [a,d,e]	518.83±30.25 [b,d]
2010	4.16±0.171 [b,e]	494.12±43.65 [a,e,f]
2011	3.62±0. 078 [c]	447.74±23.72 [ab,d,f]
Note: a, b, c, d, ..: Mean values in the same column with a different superscript differ significantly ($P \leq 0.05$).		

The evaluation of these estimates shows that the average number of days of hospitalization immigrants for the year 2011 is considerably lower compared to all the previous years of the period under study ($P \leq 0.05$). Generally, after the year 2007, the average number of days of hospitalization of immigrants showed a significant fall. Meanwhile, regarding the estimated costing nursing expenditure of immigrant patients, the average value ranged from 417.60 Euros (in 2005) to 664.43 Euros (in 2007). From the statistical evaluation of the temporal fluctuations, it is derived that after a peak in 2007, from 2008 and on, the average value of estimated costing nursing expenditure was significantly lower. Aiming to fix a fuller picture regarding the provision of health services to immigrants in hospitals of the AMTh Region for the period 2005-2011, Table 8 presents the estimates of the average estimated costing of nursing expenditure and the mean number of hospitalization days of immigrant patients, both in terms of the hospital concerned as well as over time. Additionally, the superscripts denote the results of the statistical analysis of the estimates (a, b, c..: comparisons between years for the same hospital and A, B, C..: comparisons between hospitals for the same year).

Table 8: Comparative Analysis of Key Variables of Immigrant Patients' Hospitalization for the period 2005-2011

Hospital	Year	Mean value of estimated costing nursing expenditure (Mean ± SEM)	Mean number of days of hospitalization (Mean ± SEM)
Kavala =1	2005	441.21±59.2^{A,B,a}	4.31±0.11^{A,a}
	2006	559.67±89.31^{A,a}	4.56±0.18^{A,a,b}
	2007	702.26±129.8^{A,a}	4.23±0.14^{A,B,b}
	2008	504.20±35.11^{A,a}	4.13±0.11^{A,b}
	2009	598.21±40.85^{A,B,a}	4.19±0.18^{A,b}
	2010	565.31±61.53^{A,a}	3.87±0.08^{A,C,b}
	2011	494.06±31.34^{A,a}	3.59±0.09^{A,c}
Drama =2	2008	269.77±23.447^{A,a}	3.75±0.254^{A,a,b}
	2009	241.71±14.484 ^{A,a}	3,77±0.177$^{A,B,\ a,b}$
	2010	269.25±13.847^{A,a}	4.47±0.233^{B,b}
	2011	239.34±17.297^{A,a}	3.80±0.263^{B,a}
Komotini =3	2008	294.63±12.27^{A,a}	5.24±0.26^{B,a}
	2009	284.18±17.19^{A,C,a}	4.32±0.23^{B,C,b}
	2010	245.79±14.67^{A,a}	6.43±1.73^{A,D,b}
	2011	266.51±15.46^{A,a}	3.86±0.22^{B,c}
Xanthi =4	2005	313.85±27.20^{A,a}	4.01±0.244^{A,a}
	2006	291.90±23.62^{A,a}	3.81±0.221^{A,a}
	2007	444.54±96.07^{A,b}	4.93±1.242^{A,a}
	2008	340.55±48.13^{A,b,d}	3.62±0.185^{A,a}
	2009	451.57±95.61^{B,C,D,c,d}	4.34±0.310^{A,C,b,d}
	2010	369.07±97.90^{A,a}	3.55±0.273^{C,a,d}
	2011	362.79±63.08^{A,c,d}	3.22±0.180^{A,c}
Didimotichon =5	2005	268.08±35.68^{B,a}	3.78±0.279^{A,a}
	2006	459.03±180.88^{A,a,b}	4.55±0.616^{A,a}
	2007	653.00±281.63^{A,b,d,f}	6.96±2.315^{B,a}
	2008	950.88±359.26^{A,a,d,e}	4.49±0.579^{A,a}
	2009	362.45±58.18^{A,D,a,d,g}	3.73±0.24^{A,a}
	2010	625.08±187.16^{A,e,d,g,h}	4.70±0.424^{B,D,a}
	2011	436.37±43.12^{B,c,f,h}	4.16±0.342^{B,a}

A, B, C, D…: Mean values in the same column and for the same year with a superscript in common do not differ significantly (P>0.10) [comparisons between hospitals]

a, b, c……. : Mean values in the same column and for the same hospital with a different superscript differ significantly (P≤0.05) [Npar test Kruskal-Wallis & Mann-Whitney] [comparisons between years]

The assessment of the estimates of hospitalization variables regarding immigrant patients who received health services in hospitals of the Region AMTh during the period 2005-2011, leads to the following: With respect to the hospital providing the health services, both the average value of estimated costing of nursing expenditure and the average number of hospitalization days of immigrant patients showed significant differences between the various hospitals of the Region AMTh, and for most years of the period under study ($P \leq 0.05$). Specifically:

- In 2005, the average value of estimated costing of nursing expenditure of immigrant patients was assessed as significantly higher in the hospital of Xanthi, compared to that in the hospital of Didimotichon ($P \leq 0.05$). On the contrary, no significant difference was observed in relation to that in the hospital of Kavala (P>0.05). Meanwhile, the average number of days of hospitalization of immigrant patients shows no significant differences between the hospitals of Kavala, Xanthi and Didimotichon, for which data are available.

- In 2006, both the average value of estimated costing of nursing expenditure and the average number of days of hospitalization of immigrant patients did not show significant differences between the of hospitals of Kavala, Xanthi and Didimotichon (P>0.05).
- In 2007, the average value of estimated costing of nursing expenditure of immigrant patients did not show significant differences between the hospitals of Kavala, Xanthi and Didimotichon, while the average number of hospitalization of immigrant patients in the hospital of Didimotichon is estimated as significantly higher, compared to that in hospital of Xanthi ($P \leq 0,05$).
- A similar picture is derived for 2008, with no significant differences in the average estimated costing of nursing expenditure of immigrant patients between the hospitals of Kavala, Drama, Komotini, Xanthi and Didimotichon, while the average number of days of hospitalization of immigrant patients is estimated significantly higher in the hospital of Komotini, compared to all other hospitals in the region AMTh. However, no significant variation in the average number of days of hospitalization of immigrant patients was observed among other hospitals in the Region AMTh.
- Respectively, in 2009 there are significant differences of immigrant patients' hospitalization variables between hospitals in the Region. Thus, the average number of days of hospitalization at the hospital of Komotini does not differ significantly from that in the hospitals of Xanthi and Drama, but it differs from that in the hospitals of Kavala and Didimotichon.
- Meanwhile, in 2010 the average estimated costing of nursing expenditure immigrant patients did not show significant differences between hospitals in the Region AMTh. In contrast, significant variations in the average number of days of hospitalization of immigrant patients are observed between hospitals. In particular, the hospital of Xanthi exhibits a significantly lower average number of days of hospitalization of immigrant patients, compared to other hospitals. Significantly higher average number of days of hospitalization is also showed by the hospital of Drama compared to other hospital in the Region AMTh, excluding the hospital of Didimotichon.
- Finally, in 2011 the average estimated costing of nursing expenditure of immigrant patients was found significantly higher in the hospital of Didimotichon compared to that of other hospitals. Meanwhile, the average number of days of hospitalization of patients is assessed as significantly lower in the hospitals of Kavala and Xanthi, compared to other hospitals in the region AMTh, but with no significant differences between these two hospitals.

With respect to the year when the health services provided, both the average estimated costing of nursing expenditure of immigrant patients and the average number of days of hospitalization showed significant differences between the various years of hospitalization. Specifically:

α) Kavala Hospital

The average number of days of hospitalization ranged between 4.13 and 4.56 days, with the highest value occurring in 2006 and the lowest in 2011. Statistically, the average number of days of hospitalization for the year 2011 are estimated to be considerably lower than in previous years of the period under study ($P \leq 0.05$), while it does not significantly differ between the years 2005 and 2006, nor between the years 2006 till 2010 (P>0.05). Meanwhile, the average estimated costing of nursing expenditure of immigrant patients was ranged from 441.21 Euros (in 2005) to 702.26 Euros (in 2011), but these differences are not significant (P>0.05).

β) Drama Hospital

The average number of days of hospitalization was ranged between 3.70 and 4.47 days, with the highest value occurring in 2010 and the lowest in 2011. The average number of hospitalization days for the year 2011 is estimated as significantly lower compared to the previous years of the period under study ($P \leq 0.05$). Moreover, the average number of days of hospitalization does not significantly differ between the years 2008 -2010 (P>0.05). At the same time, the average estimated costing of nursing expenditure of immigrant patients was ranged from 239.33 Euros (in 2011) to 269.76 Euros (in 2008), but the observed differences are not significant (P>0.05).

γ) Komotini Hospital

The average number of days of hospitalization was ranged between 3.86 and 6.43 days, with the highest value in 2010 and the lowest in 2011. Statistically, the average number of hospitalization days for the year 2011 is estimated to be considerably lower than in previous years of the study period ($P \leq 0.05$). Moreover, the average number of days of hospitalization does not significantly differ between the years 2009 -2010 (P> 0.05).

At the same time, the average estimated costing of nursing expenditure of immigrant patients was ranged from 245.79 Euros (in 2010) to 294.63 Euros (in 2008), but these differences are not significant (P>0.05).

δ) Xanthi Hospital

The average number of days of hospitalization was ranged between 3.22 and 4.93 days, with the highest value in 2007 and the lowest in 2011. Statistically, the average number of hospitalization days for the year 2011 is estimated to be considerably lower than in all previous years of the period under study ($P \leq 0.05$). Moreover, the average number of days of hospitalization does not differ significantly between the years 2005-2008, nor between the years 2009-2010 (P>0.05). The average estimated costing of nursing expenditure of immigrant patients was ranged from 291.90 Euros (in 2006) to 451.57 Euros (2009). In terms of statistics, the average value increased significantly in 2007 and 2008 compared to previous years of the study period (2005 and 2006). Similarly, the average value in 2009 was significantly higher, and then declined significantly.

ε) Didimotichon Hospital

The average number of hospitalization days ranged between 3.73 and 6.96 days, with the highest value in 2007 and the lowest in 2009. Statistically, the average number of hospitalization days does not significantly differ between 2005-2011 (P>0.05). Meanwhile, the average estimated costing of nursing expenditure of immigrants ranged from 268.08 Euros (in 2005) to 950.88 Euros (in 2008), with significant differences between the various years of the study period (P>0.05). Specifically, the average estimated costing of nursing expenditure for 2011 is estimated as significantly higher compared to the remaining years of the study period. Table 9 presents the temporal evolution of the main variables of hospitalization of immigrant patients admitted to the hospitals of AMTh Region, during the period 2005-2011. Generally, the number of immigrant patients who received health services from hospitals of AMTh Region during the period 2005-2011 increased over the time, until 2008, and then it was stabilized at relatively lower values (Diagram 1).

Table 9: Temporal Evolution of Basic Variables of Hospitalization of Immigrant Patients in the Hospitals of the Region AMTh (2005-2011)

Year	Number of immigrant patients	Mean estimated costing nursing expenditure	Total costing nursing expenditure	Mean number of days of hospitalization	Total days of hospitalization
2005	1,492	417.60	623,052	4.25	6,347
2006	1,682	521.76	877,592	4.47	7,517
2007	1,759	664.43	1,168,736	4.46	7,849
2008	2,337	473.49	1,069,625	4.29	10,019
2009	2,203	518.83	1,125,350	4.16	9,172
2010	2,250	494.12	1,094,971	4.16	9,364
2011	2,320	447.74	1,023,983	3.62	8,406
2005-2011	**14,043**	**503.70**	**6,983,309**	**4.18**	**58,674**
Average annual rate* of change, j%, 2005-2011	***+7.89%***	***NS***	***NS***	***-2.47%***	***+5.23%***
*Average annual changing rates were estimated using the regression model $Y=A*(1+j)^t$, where Y=dependent variable, A=parameter estimate, j=average rate of change and t=year of hospitalization.					

Meanwhile, the average and the total estimated costing of nursing expenditure of immigrant patients increased until 2007, and then were corrected at lower levels, following a relatively stable pattern until 2011.

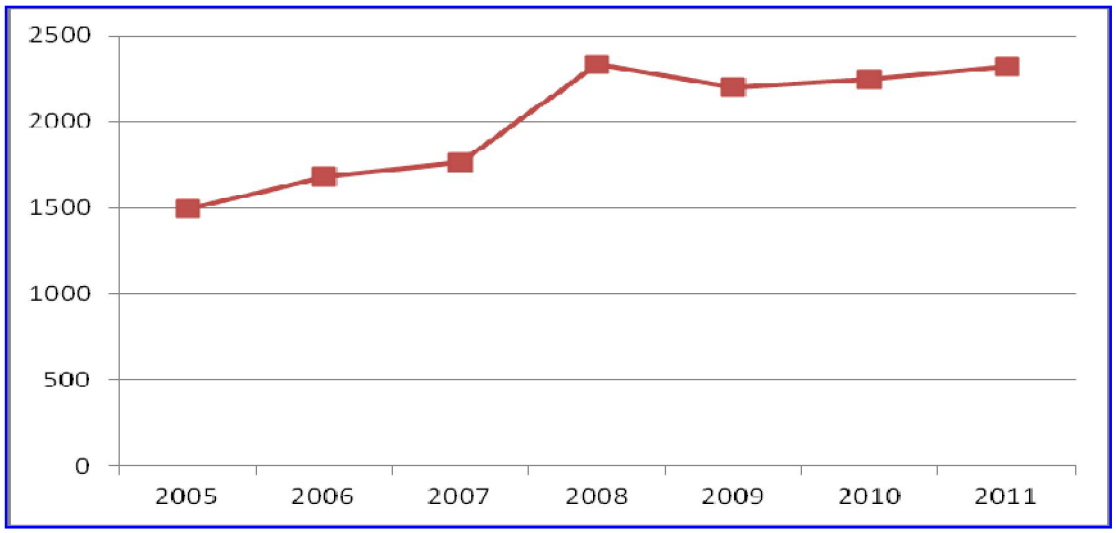

Diagram 1: Immigrant Patients Hospitalized in Hospitals of AMTh Region (2005-2011)

In particular, in overall terms, the number of immigrant patients showed an annual increase of 7.89%, while the average number of days of hospitalization in the hospitals of the Region AMTh showed an annual decrease of -2.47%. At the same time, the total days of hospitalization of immigrant patients showed an annual increase of 5.23%. In contrast, the average and the total estimated costing of nursing expenditure of immigrant patients showed fluctuations over time, but they do not delineate a systematic change tendency. Table 10 presents the flows of immigrant patients to the hospitals of the Region AMTh, with respect to the five main population groups, for the research period 2005-2011. The general conclusion derived from this table is that, during the period 2005-2011, the number of Albanians who received health services in the hospitals of the Region AMTh showed an average annual increase of 5.44%, while the Bulgarian patients increased by 10.96% per year. Similarly, the flows of Georgians, Russians and Germans showed weak fluctuations over time, but they do not delineate a systematic change tendency (Table 10 & Diagram 2).

Table 10: Temporal Evolution of the Flows of Major Population Groups of Immigrant Patients to the Hospitals of the Region AMTh

Year	Number of immigrant patients				
	Albanians	**Bulgarians**	**Georgians**	**Russians**	**Germans**
2005	720	160	137	120	79
2006	879	217	122	117	53
2007	854	224	123	116	78
2008	972	271	242	257	78
2009	995	306	215	171	69
2010	1,043	314	196	169	72
2011	1,001	298	179	195	113
2005-2011	**6,464**	**1,790**	**1,214**	**1,145**	**542**
Average annual rate* of change, j%, 2005-2011	***+5.44%***	***10.96%***	***NS***	***NS***	***NS***

*Average annual changing rates were estimated using the regression model $Y=A*(1+j)^t$, where Y=dependent variable, A=parameter estimate, j=average rate of change and t=year of hospitalization.

5. Concluding Remarks

The capacity of the Region AMTh for providing health services to immigrant patients is evident, as during the period 2005-2011 a total of 14,043 immigrants received health services from hospitals of this Region, showing an average annual growth rate of 7.89% and burdening the budget of the health units with 6,983,309.00 Euros in terms of estimated costing of nursing expenditure. The immigrant patients constitute the 2.57% of all admissions to hospitals in the region AMTh during the period from 2005 to 2011, which is significantly lower than the corresponding rate of 7% immigrants recorded by the Census of 2001 for the whole country (EL.STAT, 2001), or the respective rate of 6.2% immigrant patients recorded in a pilot research conducted by a hospital of Attica Region in 2003 (MIGHEALTHNET, 2009; Maratou-Alipranti and Gazon, 2005).

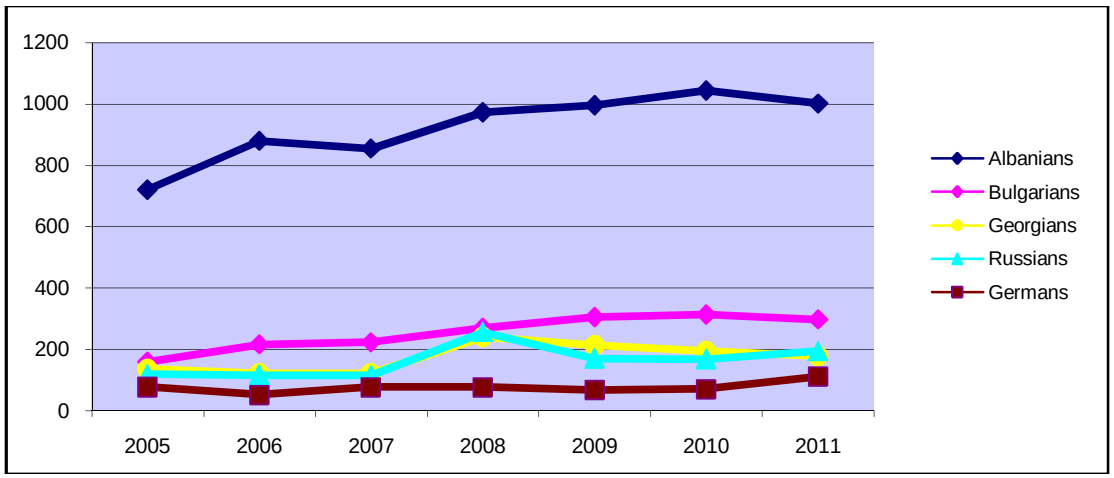

Diagram 2: Evolution of the Number of Major Population Groups of Immigrant Patients Hospitalized in the Hospitals of Region AMTh (2005-2011)

During the period 2005-2011, the average number of days of hospitalization of immigrant patients in the hospitals of the Region AMTh ranged between 3.62 and 4.47 days per patient, with a significantly lower value in 2011, compared to the previous years of the research period ($P \leq 0.05$). Generally, the pattern of the variable followed a significant fall, with an annual average decline rate of -2.47%. At the same time, the average estimated costing of nursing expenditure of immigrant patients ranged from 417.60 (2005) to 664.43 Euros (in 2007), and followed significantly lower levels, especially after 2008. The five largest population groups of immigrant patients who received health services in the hospitals of the Region AMTh, during the period 2005-2011, are Albanians, Bulgarians, Georgians, Russians and Germans, in descending order. Other smaller groups of hospitalized immigrants are Armenians, Moldavians, the English, Ukrainians, Turks, Kazakh, Serbian, Egyptians, Iraqis and Romanians. During the period 2005-2011, the number of Albanian patients who received health services in the hospitals of the Region AMTh showed an annual average increase of 5.44%, while the Bulgarian patients increased by 10.96% per year. Respectively, the flows of patients of other nationalities showed fluctuations, which do not delineate any significant systematic change tendency. The highest percentage of immigrants admitted to the hospitals of Region AMTh remained hospitalized for one day (21.4%), while a significant percentage of them were hospitalized for two days (18.4%). In cumulative terms, 78.6% of immigrants remained hospitalized up to five days. The most frequent flow of immigrant patients is observed towards Gynaecology/ Obstetrics Clinic (23.4%) of the hospitals of the Region AMTh followed by this towards Surgery (11.7%) and Paediatrics (10%). Quite similar findings (20.0%) are reported for Gynaecology/ Obstetrics Clinics regarding the use of health services in Cyprus by housemaids from non-European countries (Kantaris and Theodorou, 2013). As for their health insurer, 38.2% of immigrant patients belong to IKA, while a significantly higher percentage belongs to OGA (24.9%). In addition, a significant percentage of immigrant patients paid the cost of hospitalization by themselves (14.4%), while 7% stated to be destitute. Different findings are reported for a Prefectural General Hospital of Attica Region in 2003 regarding the immigrant patients who belong to IKA (73%), but similar for those who paid the cost of hospitalization by themselves (14%) (Maratou-Alipranti and Gazon, 2005).

As to the time of provision of health services, both the average estimated costing of nursing expenditure and the average number of days of hospitalization of immigrant patients showed significant differences between the various hospitalization years of patients, for all hospitals of the research. Similarly, significant differences were noted between the various hospitals of the Region AMTh, for most years of the period under study.

mIn general, it is derived that the average estimated costing of nursing expenditure of immigrant patients hospitalized in 2011 is estimated significantly higher in the hospital of Didimotichon compared to the other hospitals in the region, while for the rest of the years of the research period there is not clear diversification of hospitals regarding the particular hospitalization variable. In addition, the hospital of Drama shows the lowest average estimated costing of nursing expenditure for all years which data are available for. Meanwhile, the average number of hospitalization days of immigrant patients is estimated significantly higher for three years of the research period in the hospital of Didimotichon, for two years in the hospitals of Komotini and Drama, and for one year in the hospital of Kavala. In addition, the hospital of Xanthi shows the lowest average number of days of hospitalization of immigrants for the years 2009 and 2010. These findings offer the ability to assess key indicators of hospitalization cost of the central health units in the Region AMTh and provide the basic information that may be used by relevant authorized bodies towards the rationalization of health services for immigrants in the area. At the same time, they outline the flows of immigrants to the hospitals in the Region AMTh and generally to Greece, revealing key qualitative features.

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