Araştırma / Research Article

Kuzey Kıbrıs Türk Cumhuriyeti'nde sağlık çalışanlarının ve kamu hastanelerindeki yatak sayılarının yeterliliğinin zaman eğilim analizi

A Time-trend analysis for assessing density of healthcare workforce and hospital beds in Turkish Republic of Northern Cyprus

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ÖZET

Araştırma Problemi: Sağlık bakımı ile ilgili kaynakların değerlendirilmesi toplumların sağlık bakım ihtiyaçlarının giderilmesi bakımından önemlidir. Yüksek kalitede sağlık bakım hizmeti verilmesinde sağlık çalışanları önemli bir rol oynamaktadır. Sağlık çalışanlarının yeterliliğinin belirtilmesi için bir standart oluşturulması güç olmasına rağmen, Dünya Sağlık Örgütü (DSÖ) her 10. 000 kişiye 23 sağlık çalışanından (doktor, hemşire ve ebe) az düştüğü durumda, Milenyum Gelişim Hedefleri doğrultusunda öncelikli sağlık bakım müdahalelerinin kapsamının yeterli olmayacağı belirtilmiştir. Hastane yatak sayısı da sağlık hizmetlerinin elverişliliğini değerlendirmekte önemli olan bir diğer ölçüttür. Hastane yatağı yoğunluğunu belirlemek güç olsa da, istatistiklere bakıldığında DSÖ'nün Avrupa bölgesinde 10. 000 kişiye 60 yatak düşerken, Afrika bölgesinde bu sayı 10 000 kişiye 10 yatak olarak görülmektedir. Kuzey Kıbrıs Türk Cumhuriyeti'nde sağlık hizmetleri çoğunlukla ulusal sigorta sistemi ile desteklenen kamu hastanelerinde verilmektedir. Fakat, ülkede yaşanan politik anlaşmazlıklardan ve politik sorunların neden olduğu ekonomik engellerden dolayı, sağlık bakım kaynaklarında önemli problem yaşanmaktadır. **Araştırmanın Amacı:** Bu çalışma Kuzey Kıbrıs Türk Cumhuriyeti'nde 2007 ve 2015 yılları arasındaki sağlık çalışanları ve hastane yatakları yoğunluğundaki eğilimleri değerlendirmeyi amaçlamaktadır. **Yöntem:** Bu çalışma, uzunlamasına ekolojik çalışma yöntemi kullanarak 2007 ve 2015 yılları arasındaki sağlık çalışanları ve hastane yatakları yoğunluğunun zaman-eğilim analizini değerlendirmeyi amaçlamıştır. Tanımlayıcı yöntemler kullanılarak, ilk olarak, sağlık çalışanlarında ve hastane yatak yoğunluğu değerlendirililmiştir. Daha sonra ise sağlık personellerinde ve yatak yoğunluğundaki belirtilen yıllar arasındaki değişiklikler grafikler kullanılarak değerlendirilmiştir. **Bulgular ve Sonuçlar:** Sağlık çalışanları ve hastane yatak yoğunluğu değerlendirmeleri sonucunda Kuzey Kıbrıs'taki sağlık çalışanları ve hastane yatak yoğunluklarının yüksek gelirli ülkelerdekinden daha az olmadığı görülmektedir. Sonuçlar göstermiştir ki sağlık ihtiyaçlarının karşılanması için sağlık alanında özel sektöre bir yönelme olmaktadır. Özel sağlık kuruluşlarından alınan hizmetlerin genel sağlık sigortası tarafından karşılanmadığı ülkede bu durum endişe yaratmaktadır. Kuzey Kıbrıs'ta kamu sektörünün kalite anlamında özel sektörle yarışır hale gelebileceği bir sağlık reformu kaçınılmazdır.

ABSTRACT

Research Problem: Governments are required to evaluate their healthcare related resources in order to determine the healthcare needs of their populations. Healthcare workforce is one of the important element that is essential to provide good quality of healthcare to the populations. Although there is not a standard that has been set for determining the sufficiency of healthcare workforce, World Health Organization (WHO) has predicted that if there are less than 23 healthcare professionals, including physicians, nurses and midwives) per 10 000 population, coverage rates for prioritized primary healthcare interventions in Millennium Development Goals would be insufficient. Number of hospital beds is also important in assessing the inpatient service availability. There is not a standard to density of hospital beds, however whilst hospital bed density in WHO European region is 60 per 10 000, it is 10 in 10 000 for African region. In Turkish Republic of Northern Cyprus (TRNC), healthcare provided in public hospitals are invested through national insurance. However due to political disputes that the government has gone through and the economic barriers that political disputes lead to, there are major problems in the management of healthcare resources. **Research Purpose:** This study is aiming to assess the trends in the number and density of healthcare workforce and hospital beds in TRNC from 2007 to 2015. **Method:** A longitudinal ecological study design was employed to conduct time-trend analysis for the health number of healthcare professionals and the density of hospital beds from 2007 to 2015. Descriptive statistics was first applied to analyse the sufficiency of healthcare workforce and the hospital bed density. The trends in healthcare workforce and the hospital bed density were tested using graphical plots, displaying the data over time period from 2007 and 2016. **Findings and Results:** Assessment of density of health care workforce and hospital beds showed that the average density of health care workforce and hospital beds in TRNC are not beyond those of high-income countries. The private health care services have been developing to meet the health needs of the population, although public insurance do not cover their expenditure, causing high spending of out-of-pocket expenditure, suggests a need for urgent action for health care reform in North Cyprus to plan and develop health care services to compete with private health care sector.

INTRODUCTION AND AIMS

In the healthcare management, managing resources to meet the health needs of the populations plays important role.[1] Human resources and the availability of hospital beds are among the resources, which need to be managed in terms of ensuring the quality of healthcare and patient safety. Due to demographic transition, populations in most countries have been aging, increasing the demand for healthcare workforce[2] and adequate hospital beds[3] to provide care for aging populations with chronic and multiple long-term conditions.

There are a number of challenges regarding human resources in the delivery of healthcare services.[4] Inadequate numbers of healthcare staff is one of the most important challenges among the others; such as, aging healthcare staff, with increasing demand for young workforce; imbalances in the skills of the healthcare professionals, with inadequate numbers of practitioners, nurses and midwives in a variety of settings; and limitations in healthcare staff education.[5] Many countries are having problems in providing quality care with adequate healthcare staff.[6] Evidence suggests that inadequate numbers of healthcare staff leads to high workload and unstable working conditions, leading to poor patient outcomes; such as high mortality and morbidity rates.[7] The increased workload due to inadequate workforce leads to reduction in morale and motivation of healthcare workers and this causes leaves in the professions, leading them to proceed in the professions, not including direct care.[8] These consequences must be controlled by policies and effective planning to meet the demand for adequate healthcare workforce.[9]

According to WHO's estimations, there are 27.2 million skilled health professionals available for the population of the whole world. Estimates show that there is a deficit of 7.2 million skilled health professionals globally, with half of this deficit belonging to South East Asia and 25% of it belonging to African Region. The variations in sufficiency of healthcare professional were assessed by WHO using three thresholds of 22.8, 34.5 and 59.4 health professionals per 10 000 population.[7] WHO estimated that it will be unlikely for countries with less than 23 healthcare professions per 10 000 population to meet the Millennium Development Goals set for achieving primary healthcare interventions.[5] It is also important to note that the nurse to physician ratio is also an important indicator for availability of healthcare workforce in countries, with an average of 2.8 nurses to 1 physician reported for OECD (Organisation for Economic Co-operation and Development) countries.[7]

Density of Hospital beds per 10 000 population is an important indicator for the availability of inpatient services[5] and the limited number of beds available in hospitals causes delays in the treatment of patients. Restrictions in the availability beds are mostly due to inadequate finance allocated for healthcare services or due to limitations in the management of healthcare resources.[9] Evaluation of allocation and use of hospital beds are therefore one of the most important concerns in ensuring the quality and cost-effective care provided to populations.[10]

Cyprus is an Island located in the Mediterranean see that was divided in North and South parts due to political disputes. Whilst South Cyprus is supported by international organizations, since it is ruled under Republic of Cyprus, the official government of Cyprus and it joined European Union in 2004, North Cyprus is governed under the Turkish Republic of Northern Cyprus (TRNC) that is internationally unrecognized. There is a public health care system in the TRNC, where those employed in public and private sectors and those self-employed have social security insurance covering the majority of the health care expenses. However, due to poor quality of health care services in public sector and worries on patient safety, people have been highly choosing to seek health care from private hospitals or clinics, from health care organizations in Turkey or from public or private health services in South Cyprus. The expenses of alternative ways of receiving care mostly covered up by out-of-pocket expenses.[11] The population in Cyprus has been showing annual increase since 1946, with more than 2% annual increase in population number in 2006. As well as this population increase, particularly after 1974 with immigrations from Turkey, a large population of students have been accommodated in TRNC, with an increase in the number of universities founded in the country.[12;13]

In this study, we aimed to evaluate the number of healthcare staff, including physicians, nurses and midwifery personnel, and density of hospital beds available in healthcare organizations in TRNC health institutions. This is important in providing implications for allocating healthcare resources effectively by ensuring adequate number of healthcare workforce is employed in healthcare services and adequate number of beds are allocated in healthcare services for quality healthcare provided to the population.

METHODOLOGY

This study uses a time-trend study design, which is a form of longitudinal ecological study. The study aimed to look at the trends and changes in availability of healthcare workforce and bed density in TRNC. The data on number of health care workers, including physicians, nurses and midwives, employed in public hospitals; and the number of beds in public and private hospitals were collected from the statistical yearbooks of State Planning Organization of Turkish Republic of Northern Cyprus.[12] Ecological data on these variables were collected for years from 2007 to 2016 inclusively.

De-jure population numbers were also collected from the records of the State Planning Organization to determine the density of healthcare personnel and hospital beds. De-jure population determined at the censuses in 2006 and 2011 were used for calculation of density of healthcare workers and beds between 2007 and 2016. Population number was 256 644 according to the census conducted in 2006; which was used for density calculation for years between 2007 to 2010 and population number according to 2011 census was 286 257, which was used for density calculation for years between 2011 and 2016.[12]

Univariate analysis was first performed to determine the characteristics of variables using descriptive statistics. Graphical plots, displaying the data over time period from 2007 and 2016, were used to assess the changes in the trends in density of healthcare workforce employed in public hospitals and density of beds in public and private organizations. These were used to interpret on the sufficiency of the healthcare workforce and hospital beds in TRNC. The statistical analysis in this study was performed using STATA version 11.2 SE.

RESULTS

The number and density of physicians, and nursing and midwifery personnel in the years from 2007 and 2016 are shown in Table 1 and the number and density of hospital beds in public and private hospitals in the years from 2007 and 2016 are presented in Table 2. Summary statistics for number and density of healthcare staff were determined for years from 2007 to 2016 (Table 3). The average number of physicians between 2007 and 2016 was 254 (±20,5), whilst this equals to a density of physicians of 9.26 (±0,51) per 10 000 population. Average number of nursing and midwifery staff was

707.2 (±27,2), with a density of 25.8 (±1.4), per 10 000 populations. For total healthcare staff, including doctors and nursing and midwifery staff, the mean density between 2007 and 2016 was 35.1 (±0.91). The ratio of number of nurses to doctors was 2.8 in average.

Summary statistics for the number and density of hospital beds found in public and private hospitals between 2007 and 2016 are shown in Table 4. This showed that the average number of public hospital beds between 2007 and 2016 was 1019.7 (±34.6), with 37.3 (±2.14) public hospital beds per 10 000 population. The private hospital beds were counted as 429.6 (±130.4) in average, with 15.6 (±4.58) private hospital beds per 10 000 population. In total, the average number of public and private hospital beds was 1449.3 (±147.2), with a density of about 53 (±5.04) beds per 10 000 population.

The time-series of the trends in density of healthcare professionals were studied using line graphics (Figure 1). The density of physicians per 10 000 population increased from 2007 to 2011, with a sharp decline from 2012, continuing till 2016. Density of nurses and midwifery personnel per 10 000 population showed an increase from 2007 to 2009, after which it declined until 2011. After 2011, there was again an increase in nursing and midwifery personnel until the end of the study period.

The trends in density of public and private hospital beds are shown in Figure 2. The public hospital bed density reduced from 2010 to 2012, which then showed a steadiness between 2012 and 2015 and sudden increase in 2016. The trends in density of private hospitals was opposite with a sharp increase in density of private hospital beds in 2010, which was then in decline after 2011 due to increase in population count, but the density of private beds was greater at the end of study period in 2016 compared to beginning in 2007.

Table 1: The number and density of physicians, nursing and midwifery personnel and total number of healthcare professionals in years 2007 and 2016.

Year	Physicians		Nursing and midwifery personnel		Total healthcare professionals (doctors and nurses and midwives)	
	Number	Density*	Number	Density*	Number	Density*
2007	227	8,85	673	26,22	900	35,07
2008	230	8,97	682	26,57	912	35,54
2009	239	9,32	699	27,24	938	36,55
2010	252	9,83	688	26,81	940	36,63
2011	284	9,92	689	24,07	973	33,99
2012	284	9,92	705	24,63	989	34,55
2013	265	9,26	716	25,01	981	34,27
2014	265	9,26	723	25,26	988	34,51
2015	254	8,87	735	25,68	989	34,55
2016	240	8,38	762	26,62	1002	35,00

* Density in 10 000 population

Table 2: The number and density of public and private hospital beds in years 2007 and 2016.

	Public Hospitals		Private Hospitals		Total Hospital Beds	
Year	Number	Density*	Number	Density*	Number	Density*
2007	1022	39,85	358	13,96	1380	53,81
2008	971	37,86	240	9,36	1211	47,22
2009	1015	39,58	290	11,31	1305	50,89
2010	1026	40,01	590	23,01	1616	63,02
2011	1028	35,91	641	22,39	1669	58,30
2012	1007	35,18	303	10,58	1310	45,76
2013	1007	35,18	470	16,42	1477	51,60
2014	1007	35,18	470	16,42	1477	51,60
2015	1007	35,18	470	16,42	1477	51,60
2016	1107	38,67	464	16,21	1571	54,88

* Density in 10 000 population

Table 3: Summary statistics for number and density of healthcare staff employed between 2007 and 2016.

Variable	Mean	SD	Minimum Value	Maximum Value
Number of Physicians	254	20,5	227	284
Density of Physicians (per 10 000 population)	9,26	0,51	8,34	9,91
Number of Nursery and Midwifery personnel	707,2	27,2	673	762
Density of Nursery and Midwifery personnel (per 10 000 population)	25,8	1,04	24,07	27,24
Number of Total Healthcare staff	961,2	35,9	900	1002
Density of Total Healthcare staff (per 10 000 population)	35,1	0,91	33,99	36,63
Ratio of Nursery to Doctors	2,80	0,23	2,43	3,175

Table 4: Summary statistics for number and density of public and private hospital beds between 2007 and 2016

Variable	Mean	SD	Minimum Value	Maximum Value
Number of Public Hospital Beds	1019,7	34,6	971	1107
Density of Public Hospital Beds (per 10 000 population)	37,3	2,14	35,18	40,01
Number of Private Hospital Beds	429,6	130,4	240	641
Density of Private Hospital Beds (per 10 000 population)	15,6	4,58	9,36	23,01
Number of Total Hospital Beds	1449,3	147,2	1211	1669
Density of Total Hospital Beds (per 10 000 population)	52,9	5,04	45,76	63,02

DISCUSSION

It is crucial to manage the resources to meet the demands of populations, where nowadays the proportion of elderly has been increasing in many countries, increasing demand for healthcare workforce and number of hospital beds to provide care for those with chronic illnesses of elderly. Mean density of hospital staff (including physicians and nursing and midwifery staff) in 10 years between 2007 and 2016 was 35.1 per 10 000 population. This was well over 23 healthcare professionals per 10 000 that was a threshold determined by WHO for meeting the millennium goals for primary care interventions.[5] This density of healthcare workforce is also just above the second threshold of 34.5 per 10 000 population determined by WHO, which is a level of density that is seen
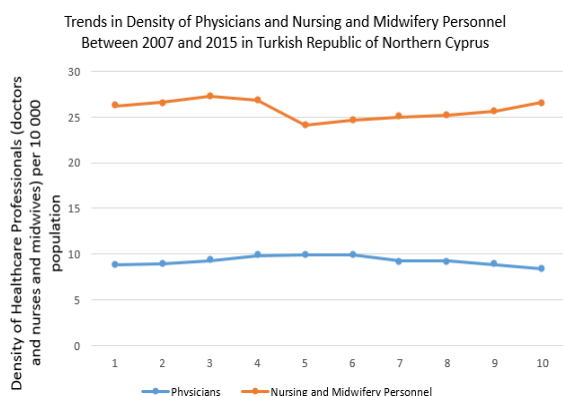
Figure 1. Trends in Density of Physicians and Nursing and Midwifery Personnel Between 2007 and 2015 in Turkish Republic of Northern Cyprus

Figure 2. Density of Public and Private Hospital Beds per 10 000 population in Turkish Republic of North Cyprus

majorly in high income countries. The average ratio of nurses to physicians between 2007 and 2010 was 2.8 nurses to 1 physician, which was just the average of OECD countries.[7] These may suggest that healthcare workforce availability in TRNC are comparable with the high-income (developed) countries. However, it is very important to consider how the censuses have been carried out in TRNC and if the population counted reflects the actual number of population to be served in the region.

When trends in changes healthcare workforce density between 2007 and 2010 are considered, it is observed that with the increase in population number, the density of healthcare workforce decreases. This suggests that the planning of the healthcare related resources may not be done based on the changes in the population between censuses and also short-term populations, such as students and tourists and expats (majorly elderly from European countries) may not be taken into account.[14] The present workforce may not be sufficient for the population that grows with the temporary populations, reducing the quality of health care services and threatening patient safety. This may explain, why the

majority of population in TRNC tend to use private health care services or seek care from abroad, majorly from Turkey or Southern Cyprus.[11]

The average public hospital bed density in 10 years of study period was found to be 37.3 per 10 000 population, which becomes about 53 beds per 10 000 population when combined with private hospital beds. The total density of hospital beds in TRNC is competing with those in high-income countries, especially when private hospital beds are considered. Trends in hospital beds show that although pubic hospital beds density remained steady for years until 2015 after the reduction with detected growth in population in 2011, private hospital bed density increased after 2011 showing that the private sector in TRNC has been developing to meet the demands of population, who tend to cover
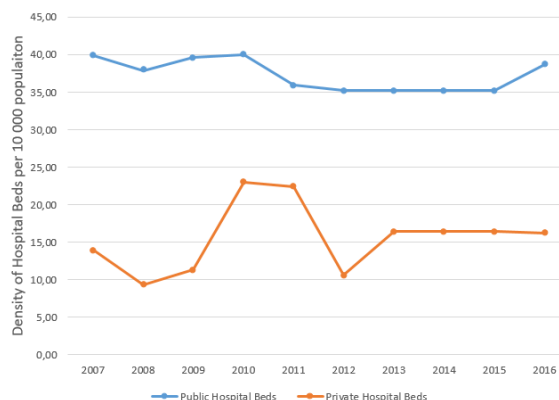
their usage with out-of-pocket expenses. This requires urgent action for health care reform to ensure that high quality health care services are provided in public sector, which is covered by national security insurance, not leading population to seek care with out-of-pocket expenditure.[11]

This study used an ecological study design; therefore there are number of limitations in the study. Ecological fallacy is one of these limitations,[15] the data collected is on national scale and a number of factors may be associated with the variables used in the study. Longitudinal data was available for 10 years only, which limited further multifunctional analysis, such as regression. The changes in health care workforce and hospital beds could only be assessed using univariate analysis. However, ecological studies are descriptive epidemiological studies and they help in setting hypothesis. Based on the results from this study, it is possible to predict that the population number determined in censuses may not reflect the actual population to be served in health care facilities in TRNC. The density of health care workforce and hospital beds must be analysed by taking the number of expats, number of students having education in universities, birth rates, death rates and a number of other factors relative to population dynamics to evaluate the health care workforce and facilities in the country.[14]

CONCLUSIONS

Health care workforce and hospital beds are among important resources that are required to meet the health care needs of the populations. In North Cyprus, there is an obvious tendency for use of private facilities, which raises questions regarding the quality of health services. The assessment of density of health care workforce and hospital beds in TRNC showed that the average density of health care workforce and hospital beds are not beyond those of high-income countries. However, as the data shows, the private health care services have been developing to meet the health needs

of the population, although public insurance do not cover their expenditure, leading to high spending of out-of-pocket expenditure. This suggests that there is need for urgent action for health care reform in North Cyprus to plan and develop health care services in the way that high quality health care services are provided in public health care organizations to compete with private health care sector.

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