ARAŞTIRMA / RESEARCH ARTICLE

Sürdürülebilir Sağlık Sistemleri, Sağlık İnsan gücü Planlaması

(*Building Sustainable Healthcare Systems: Health Human Resources Planning*)

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Özet

Pozisyonun gerekliliklerini karşılamak amacıyla kişilerin eğitimleri ve yetenekleri doğrultusunda en uygun işe seçilmeleri insan gücü planlaması olarak tanımlanır. Sağlık kuruluşları verdikleri hizmetin çeşitliliği, büyüklüğü gibi bazı faktörleri göz önün alarak yeterli insan gücünü bulundurma zorundadır. Dünyada sağlıkta insan gücü planlaması ve seçiminde en önemli problemlerden birisi yeterli sayıda sağlık insan gücü kaynağının olmamasıdır. Dünya Sağlık Örgütü bugün, dünyada 4 milyondan fazla doctor, hemşire, ebe ve diğer sağlık personeli açığı olduğu ve bu sayının her geçen gün arttığını belirtmektedir.
Bu makalede sağlık kuruluşlarında görev yapan insan kaynakları uzmanları ya da Başhekim gibi yöneticilere insan gücü planlamasına yönelik bazı pratik öneriler ve ip uçları sunulmaktadır.

Abstract

The selection of suitable candidates on the basis of their skill-set and requirements of the job is known as manpower staffing. Health services depend critically on the size, skills, and commitment of the healthcare workforce adequate. One of the main problems in staffing issues in the world is shortage of health care professionals worldwide. WHO estimates a shortage of more than 4 million doctors, nurses, midwives and other healthcare professionals in the world.
Objective: This article summarizes some features and practical suggestions to human resource managers and Chief Medical Officers in developing a holistic view of human resource planning in health care.
Methods: It will provide some practical information through a case study and will summarize the main developments and methods have been used in the area of healthcare workforce policy and how these have affected key health workforce performance outcomes.
Results and Conclusion: The staffing plan in a healthcare setting should be based on the level of scope of care provided, the frequency of care and the level of competency of staff necessary to provide quality care. Number, types, and desired qualifications of staff shall be identified using a recognized staffing method for each category and documented in the plan. The authors recommends that in view of inevitable and sometimes unforeseeable changes in the healthcare field and in the wider political and economic situation it is essential to make regular and systematic reviews of the Staffing, Recruitment and Retention Plans.

Anahtar Kelimeler:
Sağlık İnsan Gücü Planlaması, Personel Planlaması, Pratisyen Hekim

Key Words:
health human resource planning, staffing plan, physician staffing

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INTRODUCTION

Manpower management and planning forms the core of human resource management and deals with the human resources of an organization (1). Human Resources are central to healthcare services and meeting the strategic goals, operations, operational outcomes, economic, and cultural considerations are becoming increasingly important to human resource management and workforce planning in health care settings (1-3). It consists of the process of selection of appropriate individuals as employees based on their skills, making sure they are smoothly fitted into their assigned roles and the overall system, thus ensuring a smooth functioning of the organization. Besides selecting suitable employees, manpower planning also deals with the process of upgrading the existing employees (4-7).

Health services depend critically on the size, skills, and commitment of the healthcare workforce adequate. Yet, in many regions relevant information on healthcare workers remain far from. This inadequacy limits the ability to monitor access to adequately trained and motivated healthcare workers in their respective

jurisdictions. The human resources are the most valuable asset of any organization as they contribute to the realization of its business objectives. Thus, the process of manpower planning and staffing is crucial to the business development of an organization (3-7).

OBJECTIVES

This article summarizes some features and practical suggestions to human resource managers and Chief Medical Officers in developing a holistic view of human resource planning in health care. It will provide some practical information through a case study and will summarize the main developments in the area of healthcare workforce policy and how these have affected key health workforce performance outcomes. Specifically, the main objectives are:

- Summarize the current situation in key healthcare workforce outcomes by using a case study
- Compare health workforce outcomes in the case study to international figures
- Highlight key health workforce policy issues for the future

METHODOLOGY

Health Human Resources Planning (HHRP) is aimed at having the right number of people with the right skills in the right place at the right time to provide the right services to the right people (3.4). It involves comparing estimates of future requirements for and supplies of human resources and considering policy options for addressing any differences between requirements and supplies (3,5). In the development of criteria to determine on equitable distribution of health care professional particularly physician by specialty type, several factors emerge from a host of possible criteria as key factors to consider. These factors include relative population need, resource availability and resource accessibility. Relative population need is often measured through adjustments for differing socio-demographic characteristics and disease incidence and prevalence from some standard populations. Resource availability is sometimes measured through resource-to-population ratios and geographical accessibility through time-to-service. We believe that these ratios serve as a useful starting point in assessing community need for physicians, but that by themselves they do not constitute the basis of a comprehensive medical staff plan. Patient demographics, physician demographics, physician practice styles, payment systems, and disease incidence vary widely from market to market. A complete medical staff plan therefore takes into account a rigorous and comprehensive evaluation of health care professional Full Time Equivalent (FTEs), patient demographics, disease incidence and a variety of other factors.

The literature on HHRP presents several methods for organizations to consider when developing plans, which include population based approaches, need-based approaches, training output evaluation, demand assessment and benchmarking (3-7).

The evaluation of these methods reflects the on-going changing and dynamics in health care and also related to the relationships between healthcare outcomes and types and numbers of health care professionals involved in health care. Some of the models are;

Population based models represent some of the simple ways to determine healthcare workforce needs. Actually these may only be relevant for a broad discussion about workforce planning in health care however gives an idea to the planners. More sophisticated methods involving collaboration with healthcare providers, analysis of empirical evidence about ratios and health outcomes and recognition of other factors are needed. (7)

Benchmark Models: The hypothesis in this model is supported by one of the earliest, notable and more frequently benchmark approaches for forecasting staff need (mainly physicians), which was developed by Jonathan Weiner, MD of John Hopkins School of Public Health. His analysis which appeared in July 20, 1994, Journal of the American Medical Association, assuming that physician requirement would be only 124 per 100,000 population in an integrated networks and 146 per 100,000 in staff or group model HMOs. These ratios became the norm for community need analyses in mid-to late 1990s and many health care researchers follow this approach. Then David Goodman, and Eliot Fisher compared physician to population ratios for primary health care, medical specialists, surgical specialists and hospital-based specialist across 306 referral regions. (8)

Need Based Models**;** This estimates health care professional requirement based on the services needed to deal with the anticipated incidence, prevalence, and epidemiology of diseases, like the model developed by the Graduate Medical Education National Advisory Committee (GMENAC).In this model healthcare researchers and health policy analysts have attempted to determine the optimal size and specialty mix of the physician workforce since 1933. (9)

Demand Based Models**:** Demand based models, which typically extrapolate current patterns of health care professional and current workload use to determine future health care professional need, are the most frequently used to forecast future physician requirements. Although most demand-based models account for expected changes in patient mix and patterns of insurance coverage, typically assumes no radical

changes in current practice patterns, it has limitations. One challenge is deciding which units of service to use to measure the demand for physician services. Patient visits are commonly used measure but demand for physician services is a composite of consults, surgical and non-surgical inpatient procedures, and a broad spectrum of outpatient tests and procedures performed in several settings. Further, as the delivery of healthcare changes, corresponding changes in the mix of physician activities and in the amount of physician time each unit of activity requires.(7)

An example is given in Table 1 for a certain disease. Let's assume that on recurring basis, an illness affects approximately 15 % of a population of 100.000. The provision of care for this illness has been shown to take approximately one hour of a primary care physician's time. The available work hours for the physician are defines as the number of workdays per year, less vacation days, multiplied by the number of working hours per day. Thus an annual basis, based on an 8-hour work day and 260 days of work per year, 81.5 physicians would be needed to treat that illness. These calculations, based on Folland, Goodman and Stano's work (10), provides an example of the approach (Table 1)

As we discussed, with these models, determining community physician need is an important tasks for hospitals and health systems especially those seeking to enhance clinical programs or dealing with current or anticipated healthcare professional, particularly physician shortages. However, there are many other aspects of medical staff planning and development that are outside the scope of the community need analysis or required more detailed investigations. For instance in determining physician need for a hospital for a hospital or health system; calculating effective service population, examining primary care need by subarea, accounting for hospitals, determining sub-specialties, using activity levels to determine physician full-time equivalents (FTE) and projecting future physician need and supply are also important issues.

Table 1. Simple mix method for human resource planning

Size of the population	**100.000**
Prevalence	100.000X 15%=15.000
Time to treat	1 hour
Total time required for treatment	15.000X1(hour)=15.000
Treatment hours available	
Days of work/year	260(52 weeksX5 days)
Vacation days/year	30
Work hours/day	8
Total hours	(260-30)X801840
Total number of physician needed	15.000/1840= 8.1

Source: Folland, S., Goodman, A.C., & Stano, M. (2001). The economics of health and health care. Upper Saddle River, N.J: Prentice-Hall, Inc.

RESULTS AND DISCUSSION

By using a case study, the authors explained different methods and compared health workforce outcomes in the sample region with a total population of 107.000 and the catchment areas for each hospital are 33.900, 16.500, 17.300, 9.300, 5.500 and 24.500 respectively. They also compare the estimates to international figures in order to provide practical information to the readers. As we discussed the models in detail in the methodology part, health human resource (HHR) ratios are one measure of workforce supply, and are often expressed as a ratio in the number of health professionals to a sub-set of the population. Therefore the authors did the first analysis based on the population of the case study (Figure 1&2).

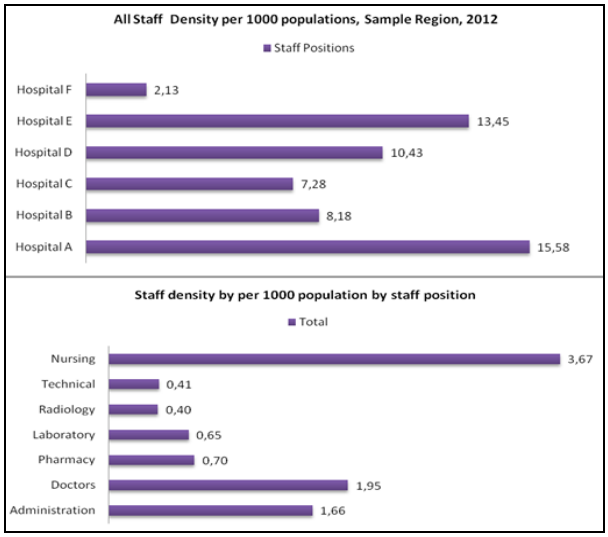

Figure 1. Staff Density per 1,000 Populations by Staff Positions and Health Care Facilities in the Sample Region

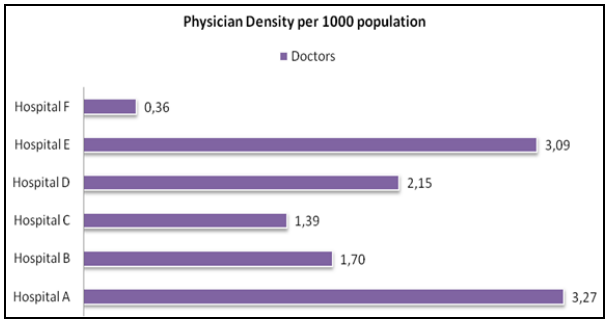

Figure 2. Physician Density per 1,000 populations, Sample region

As shown in Figure 1 and 2, none of the hospitals in the case study would be considered to be suffering from an overall staff shortage according to the World Health Organization's recommendations of 2.28 health worker per 1,000 populations as a minimum. However in terms of nurses and physicians the region has the lowest number of physicians and nurses per capita. The population had 1.95 per 1000 population for physicians

and 3.67 per 1000 population for nurses in the case study, which is much lower than the OECD average of 3.0 per 1000 for physician and 8.9 per 1000 for nurses respectively. (Figure 2).The analysis also shows that compared to other OECD countries, the region has two types of skill mix distribution imbalances: (1) those between general practitioners and specialist and (2) between physicians and nurses. As for skill mix between nurses and physician, relative to the other countries, the sample region has a low nurse to physician it is 1.86 and this is in comparison to the OECD average of 3.1. This shows a relative imbalance in the total number of nurses in the region in relation to the total number of physicians. The relatively low nurse density rate also suggests that some clinical tasks that could be handled by a nurse are conducted by physicians, leading to a relatively inefficient use of skills.(Figure 3)

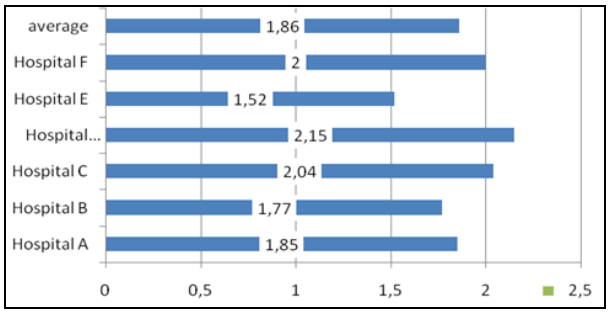

Figure 3. Physician to Nurse ratio, Sample region

The sample region currently has an average of 1.95 physicians per 1,000 populations (Figure 3), in contrast to the OECD 2009 average of 3 and 2 while the United States has an average of 2.42 (Figure 4). Hospital A and Hospital E are the closest comparators, at 3.27 and 3.09 respectively.

Next the authors described the approaches followed in physician staffing worldwide and calculate the current situation based on 4 different models. They used four models explained in the methodology part then they compared sample region's current situation with those models. The distribution of total physician for per 100.000 populations and the comparison with the models and standards worldwide is shown in Figure 5.

In determining physician needs for a hospital, some additional quantitative analysis is helpful. One of the other important analyses in addition to patient profiles, disease incidence and provenance, is calculating effective service population. No hospital or health system provides 100% of the medical care required by the residents of the communities it serves. Therefore the authors also took into consideration the physician-to population ratio in sample region based on effective population assuming that the market share in the area is 85 % and calculated the physician need by specialty. In Figure 5 the physician per population ratios are presented assuming 100% market share and 85 % market share. (11-14). As seen in Figure 5, the distribution of total physicians is higher than the world-wide standards for Hospital A. The authors did this distribution for emergency, medical, surgical, obstetrical, pediatric, hospital-based services and for each subspecialty separately and compared the current situation of the case study with the standards and world-wide figures. (Figure5, Table 2)(7-14)

The specialist listed in Table 3 provides sufficient detail for most of the hospitals and health systems. A practical approach is to estimate the demand for the unique services the subspecialists provide and determine the number of (FTE) physician required to meet that demand based on per physician activity benchmarks (7)

Let's do an exercise on calculation of target cardiology medical staff based on a scope of service, patient volume and acuity. Suppose that yearly outpatient volume in Clinic A is 5000 while having 1500 inpatient and 3000 consultation cases. The number of procedures is: 800 cardiac catherization, 300 24h holter monitoring, 500 exercise treadmill, 100 temporary pacing, TTE 5000, TEE 150 and dobutamine stress 100 respectively.

Total visit time (A) = 45 minutes

Total no.of visit type(B) =3

Total no. of visits/year© =9500

Total no. of most common cardiology procedure(D)=7

Total no. of patients utilizing common procedures/year(E) =7000

Total time for most common procedures(G) =195 minutes

Average time for each visit(X) =A/B

Total time needed to perform visit services(X_1) =C$x$$X_1$, 142500 min.

Average time needed for each procedure =G/D, 30 minutes

Total time needed for each procedure(X_2) =Ex X_2=210000min.

Total time needed to complete work/year (X_4) =X_1+X_2= X_4X_4=52500minute

Total time needed to complete work/day(X_5) =X_4/365=965min.

Actual working time for each doctor(X_6)=International standard work time per day$x$ % actual work time= 8 hours$x$70%= 5.6 hours per day

or 336 minutes per day

No. of doctors needed to cover all services depending on time(X_7)=X_5+X_6, X_7=965/336=3 physicians, 2 additional doctors needed to overcome the shortage that may occur during attending Continuous Medical Education hours, vacation time, busy seasons and fluctuation in actual acuity levels.

As for in-patients as following the same approach every 5 bed need 3 specialist/hospitalist. A similar approach could be used for any specialty for instance spine surgery, using estimates of the population based demand for discectomies, spinal fusion and laminectomies, and a benchmark for the number of surgeries performed annually by an FTE spine surgeon(7)

The other approach in manpower planning is to calculate the required manpower based on the number of total beds in the hospitals. There are many international standards being used in the world based on the total number of beds. In this case study, the European standards for rural hospitals that provide the number of staff required to manage the hospital in full capacity i.e. full occupancy level, are used as one of the model for planning the staff requirements because the case study is also from rural area. By using activity levels explained by an example above and the manpower based on the number of total beds the authors estimated the number of physicians for each specialty and hospital in the case study and the results are presented in Table 3.

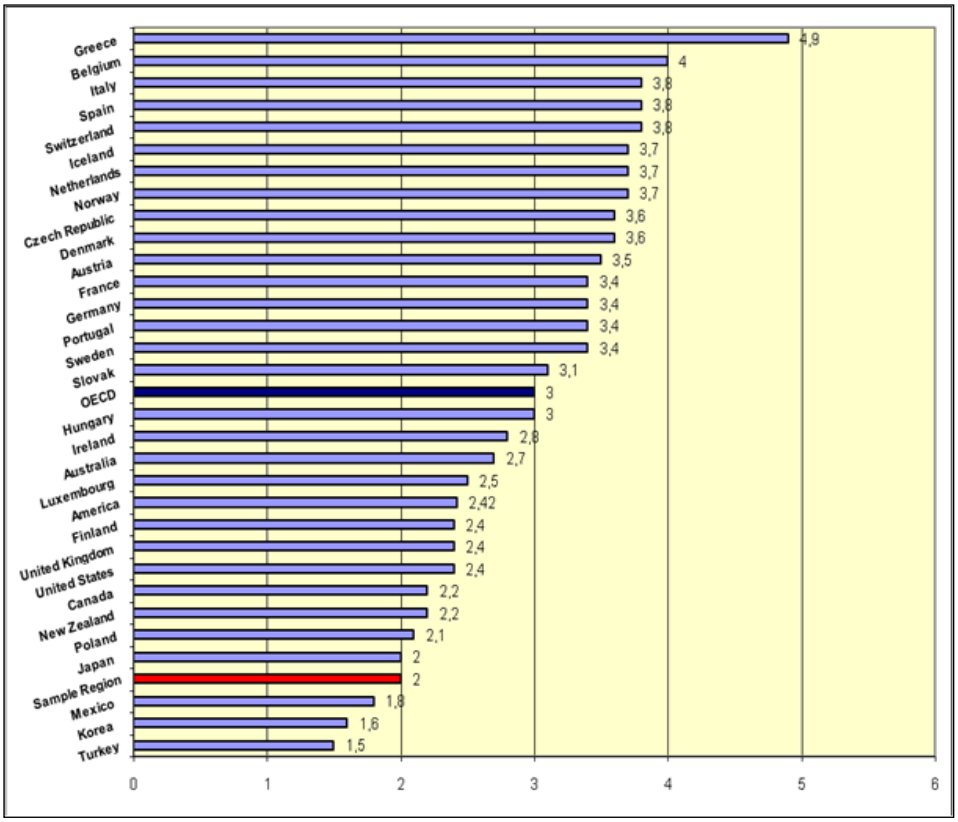

Figure 4. Physician density per 1,000 population in the sample region and comparison with OECD countries

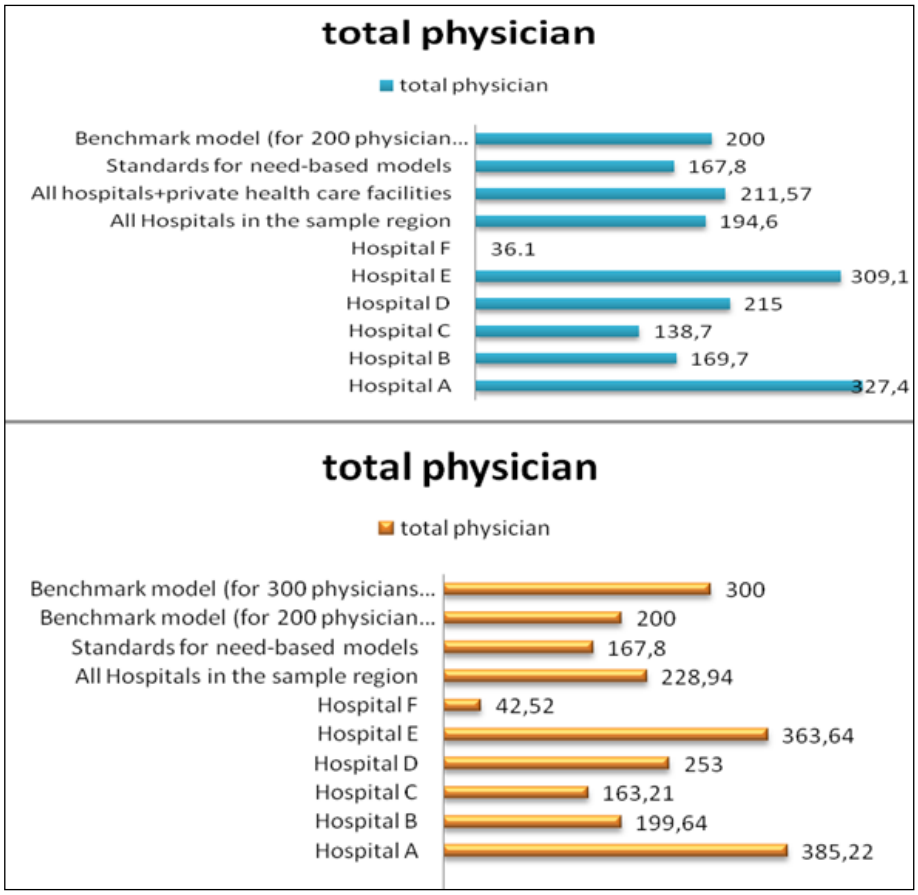

Figure 5. Distribution of total physician for per 100,000 populations based on the standards and in the sample region, 2012 (Assuming 100% and 85 % market share)

Table 2. The recommended by the standards by specialties based on total population in sample region 2012

Per 100,000 Population	Hospital A	Hospital B	Hospital C	Hospital D	Hospital E	Hospital F	Total
total population	33.900	16.500	17.300	9.300	5.500	24.900	107.400
GPs+ Int. Medicine	19	8	8	4	3	13	55
Emergency medical services	3	2	1	1	-	2	9
Pediatric Medical care	5	2	2	2	1	3	15
Obstetrical Services	4	2	2	2	1	1	12
Medical Specialties	14	5	2	2	1	-	24
Surgical specialties	12	8	7	4	3	3	37
Hospital-based	12	6	4	4	2	3	31
Total physician	69	33	26	19	11	25	**183**

The authors next proceed to examine the staffing for each health care facility and position, including the number and characteristics of healthcare workers region-wide. For this purpose, For non-nursing staff, they used the workload, demand model to forecast staff requirement.

For nursing staff, translating future demand for nursing services into the number of FTE nurse needed to meet that demand shall be done. Usually the in the method for calculating FTE, the authors used bed occupancy, which means total number of patients/total occupied bed daysx100, then bed occupancy x number of hours for the unit x days of the week the service

operates give the nursing hours per week and the nursing hours per week/48 (Hours for one FTE) gives us FTE. Therefore 1 FTE means one nurse working for 48 hours in a week for 52 weeks in a year less than 110 days off in a year (20 days average vacation, 10 days average sick leave, 10 days average professional development etc.)

There are some international ratios, which shows the minimum, specific, and numerical licensed nurse-to-patient ratios by licensed nurse classification and by hospital unit (e.g Minimum Nurse Staffing Ratios in California Acute Care Hospitals www.chcf.org).The system developed by the authors included but also not be limited to, the individual patient care requirements, the patient care delivery system and generally accepted standards of nursing practice, as well as elements reflective of the unique nature of the hospital's patient population. (15-17). The plan shall also include the staffing requirements as determined by the patient classification system for each unit, documented on a day-to-day, shift-by-shift basis, the actual staff and staff mix provided, documented on a day-to-day, shift-by-shift basis and the variance between required and actual staffing patterns, documented on a day-to-day, shift-by-shift basis.

By applying all the models explained briefly above , the authors estimated 1.536 as a total number of FTEs for the year 2012 for the sample region (Table 4)

Table 3. The distribution of Physician in a Sample Region,

	Hospital A 135 beds	**Hospital B 33 beds**	**Hospital C 28 beds**	**Hospital D 21 beds**	**Hospital E 28 beds**	**Hospital F Ambulatory care**	**Total**
Anesthesia and ICU	8	2	2	2	2		16
Biochemistry	2	1	1	1	1		6
Dermatology	3	2	1	1	1		8
Ear/Nose/Throat	4	2	1	1	1		9
Endocrinology	1						1
Emergency	5	1	1	1	1	2	10
Family Medicine		1	1	3	1	1	22
General /internal Medicine	6	3	2	2	2		15
Cardiology	2						2
General Practitioner*	20	13	8	8	8	8	65
General Surgery	6	3	2	2	2		15
Infectious Disease specialist	1	1		1	1		4
Neonatology	1	1					2
Neurology	2	1	1	1	1		6
Neurosurgery	1						1
Nephrology	3	1		1			5
Obstetrics & Gynecology	5	3	2	2	2		14
Ophthalmology	3	2	1	1	1		8
Orthopedic Surgery	5	3	1	1	1		11
Pediatrics	5	3	2	2	2	3	17
Pediatric Surgery	1						1
Physical Medicine & Rehabilitation	2						2
Physiciathry	2						2
Pulmonologist and Tuberculosis	2						2
Pathology	2	1					3
Radiology	3	2	1		1		7
Urology	3	1	1		1		6
Total	102	46	28	30	29	14	264

Table 4. Estimated Numbers of FTEs in the sample region (main categories)

Health Care Professional	Hospital A	Hospital B	Hospital C	Hospital D	Hospital E	Hospital F	TOTAL
Physician overall (+dentist)	132	50	30	29	27	14	282
Nursing	247	67	53	40	29	20	458
Ancillary services	110	48	38	29	30	14	269
Administrative staff	91	45	34	34	30	18	252
Facility support staff**	112	35	44	31	31	24	277
Total	692	245	199	163	147	90	1536

Projections or forecasts may be used to develop health policies. It is common practice to develop two estimates of healthcare professional need and supply; one current and one five years into the future. Many factors may contribute to changes in hospital staff need such as; aging of the population, changes in physician practice patterns, projected growth of decline or decline in the resident population in the service area, which will cause a proportional change in the effective service population for each specialty and targeted market share growth in selected specialties, reflecting the hospital's current or future clinical program priorities. There are also some factors may contribute to projected changes in physician supply such as retirement of physicians on the active medical staff, declining activity levels of healthcare professional and recruitment of physicians who are active in the community but who practice only at other institutes(7).

By taking into consideration the changes on population, demographic changes, disease profile time and technological developments, regression models are applied in various indicators and health profile projections. In forecasts parabolic regression estimation, trend analysis, time series and also the compound annual growth rate (CAGR) could be used for population estimation.(18-19).

Forecasts from the study concerning the trends of the population, number of expected cases in the coming years, disease profiles, outpatient visits to the different departments in each hospital, admissions, ER visits, dental visits, patient days, primary health care visits, births and deaths in the sample region for the years 2010, 2011, 2012,2013,2014,2015 have been performed and based on those data, the authors forecasted the required number of staff at each category for 6 different health facilities in the sample region. In table 5, the estimated numbers of staff in the sample region between the years 2010-2015 is presented. Ultimately, the difference between projected healthcare professionals need and the baseline estimate of healthcare professional in each category identifies and quantifies future recruitment targets for the hospital or health system.

Table 5. Estimated Numbers of Staff in the sample region, between 2010-2015

	2010	**2011**	**2012**	**2013**	**2014**	**2015**
Hospital A	692	722	754	765	793	805
Hospital B	245	249	260	270	274	276
Hospital C	199	205	208	210	213	224
Hospital D	163	164	166	168	174	178
Hospital E	147	148	149	154	162	167
Hospital F	90	112	115	118	122	126
Total	**1536**	**1600**	**1652**	**1685**	**1738**	**1776**

Suppose that a hospital or health system has completed a community need analysis or hospital need analysis as explained above. The logical next step might be to develop a recruitment plan that specifies how many new healthcare professionals the hospital or health system will recruit. Staffing Planning is the anticipation of how many practitioners and support workers the hospital will require to achieve its mission. Each year the Staffing Plan will be defined to decide how many employees are required by the hospital with particular interest in the particular type of employees required for the current year. The staffing plan involves; making an inventory of manpower resources and assessing the extent to which these resources are employed optimally. Forecasting future manpower requirements in terms of judgmental estimates based on the specific future plans of X hospital. The Staffing Plan will ensure that future manpower requirements are suitably met and serve as a guide in implementing programs relating to; rrecruitment, selection, training, career development, internal transfer, promotion, motivation and compensation.

The staffing plan in a healthcare setting should be based on the level of scope of care provided, the frequency of care and the level of competency of staff necessary to provide quality care. Each department shall have an approved yearly staffing budget based on the workloads (for administration) including patient ratio for medical, clinical and nursing services. Human Resources Department shall ensure that the provision of staffing is within the approved budget, and that the candidates to fill in the budgets are deployed to the department in timely manner. Each Department head shall submit a quarterly staffing report to Human Resources Department so as to determine the necessity to recruit or facilitate approval of additional staff required. Each department should have a master-staffing plan that includes the basic staff needed to cover the department in each shift for 24 hours round-the-clock service. A provision of cover-up for offs including holidays, unexpected sick or emergency leave (out of scheduled leave). Therefore staffing plan shall be developed in collaboration with all heads of departments. Number, types, and desired qualifications of staff shall be identified using a recognized staffing method and documented in the plan. Effectiveness of the staffing plan shall be monitored on ongoing basis. At appropriate intervals, probably every year, there will be a thorough and detailed review of all matters relating to staffing and human resource development. The Hospital Director will be responsible for the timely conduct of these reviews. These evaluative activities may lead to very considerable reformulation of the health workforce plan in light of any major changes in government policy, in the country's health situation, or in other areas having significant impact upon the country's and regional health care delivery system.

CONCLUSION

Based on the various models the authors applied during the case study, they concluded that; none of the sample areas would be considered as suffering from overall staff shortage according to the world- average figure per 1,000 populations. (9.3 per 1000) The density is found to be 10.85 per 1.000 for the region; this is 18.9 for Europe and 24.8 per 1000 for America continent. In comparison to all other OECD member countries, our sample has the lowest number of physicians and nurses per capita. **I**n terms of nurses and physicians, the region has the lowest number of physicians and nurses. Sample region had 1.95 per 1000 population for physician and 3,67 per 1000 population, which is much lower than the OECD average of 3.0 per 1000 for physician and 8.9 per 1000 for nurses respectively. Their analysis revealed that the case study had two types of skill mix distribution imbalances – those between (1) general practitioners and specialist and (2) between physicians and nurses.

The authors recommends that in view of inevitable and sometimes unforeseeable changes in the healthcare field and in the wider political and economic situation it is essential to make regular and systematic reviews of the Staffing, Recruitment and Retention Plans. The authors suggest that this annual review, revision and roll over of the staffing plan is to be undertaken in association with the annual budget preparation process. The Human Resources Department could be responsible for the preparation of an annual overview report of staffing statistics, training statistics and other matters relevant to the review of the plan.

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