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The Correlation Between Burden of Disease and 8 Human Resource Indicators, 4 Technical Resource Indicators and 2 Infrastructure Indicators in 50 European and Central Asian Countries

Dan Ioan Sava[1]

Abstract

The paper checks if there is a linear correlation between burden of disease and 14 indicators below.

The paper studies if there is a linear correlation between burden of disease and the following human resource indicators: practicing physicians / 100000 population, general practitioners / 100000 population, pediatricians / 100000 population, practicing nurses / 100000 population, practicing caring persons / 100000 population, practicing pharmacists / 1000000 population, physicians employed by hospital / 100000 population, nurses and midwives employed by hospital / 100000 population. The linear correlation between burden of disease and the following technical resource indicators was studied: total hospital beds / 100000 population, CT / 100000 population, MRI / 100000 population, radiation therapy equipment / 100000 population. The linear correlation between burden of disease and the following infrastructure indicators was assessed: % of population connected to water supply system, % of population connected to sewage system, septic tank, or other hygienic means of sewage disposal. WHO data from 2004 was used for the following European and Central Asian countries: Albania, Andorra, Armenia, Azerbaijan, Belarus, Belgium, Bosnia & Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, FYR Macedonia, Malta, Moldova, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Turkmenistan, Ukraine United Kingdom and Uzbekistan. Pearson linear correlation coefficient was calculated for all paired indicators and subsequent scatter diagrams were drawn. The r correlation coefficient was compared with critical values of $\alpha = 0.05$ and $\alpha = 0.01$. It was found a linear correlation between burden of disease and the following indicators: general practitioners / 100000 population, pediatricians / 100000 population, practicing caring persons / 100000 population and physicians employed by hospital / 100000 population. It was found a strong linear correlation between burden of disease and the following indicators: practicing pharmacists / 1000000 population, total hospital beds / 100000 population, CT / 100000 population, and MRI / 100000 population. It was found a very strong linear correlation between burden of disease and the following indicators: % of population connected to water supply system, % of population connected to sewage system, septic tank, or other hygienic means of sewage disposal.

The research shows the resources which have a linear correlation with burden of disease, and to what degree. It provides policymakers a hint to improve allocation efficiency, an insight regarding flaws of health systems and sheds light upon the influence of non-specific factors (infrastructure) upon the health system.

Keywords

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The burden of disease is a multidimensional notion encompassing the impact of diseases on a population. Diseases - measured as incidence and prevalence – have an impact on individuals (morbidity) and sometimes lead to their death (mortality). This loss of healthy living years either by death or by illness (time lived in bad health) incurs financial costs to the respective society, either because of the costs of health care or by dwindling the number of working individuals. Health care costs are spent to buy resources to be used in the system for the purpose of providing care. These resources can be human resources (salaries and wages), technical resources (equipment, materials, pharmaceuticals). Before putting these resources to work, two things are essential: training the workforce and investing in facilities and equipment. In order for health care to be effective, technical and human resources are bound together by specific information and knowledge. Access is key factor in putting together the demand for care and the supply of it.

Purpose

The purpose of this paper is to analyze whether there is a linear correlation between burden of disease and several human and technical resource indicators in the health care system, together with few infrastructure resources in European and Central Asian countries. Based on the existence or non-existence of linear correlations as well as their strengths, the paper wants to be a first step in string of studies aimed at helping decision-makers in various countries understand better the flaws of their health system, and help policy-makers choosing various policies in order to improve technical and allocational efficiency. Another purpose is to allow comparison between countries and reveal certain common policies in clusters of countries.

Method

It was studied if there is any linear correlation between burden of disease indicator and the following human resource indicators of the health system: practicing physicians / 100000 population, general practitioners / 100000 population, pediatricians / 100000 population, practicing nurses / 100000 population, practicing caring persons / 100000 population, practicing pharmacists / 1000000 population, physicians employed by hospital / 100000 population, nurses and midwives employed by hospital / 100000 population. Then, it was studied the linear correlation between burden of disease indicator and the following technical resource indicators: total hospital beds / 100000 population, CTs / 100000 population, MRIs / 100000 population, radiation therapy equipment / 100000 population. Finally, it was studied the linear correlation between burden of disease indicator and the following infrastructure indicators was assessed: % of population connected to water supply system, % of population connected to sewage system, septic tank, or other hygienic means of sewage disposal.

In the WHO World Health Report 2004, the burden of disease was calculated as DALY (Disability Adjusted Life Years) with age – standardized weighting and time discounting. DALY measures life time lost due premature health (Years of Life Lost or YLL) combined with life time lost due to ill health or disability (Years Lost due to Disability). Years of Life Lost were calculated based on the formula: $YLL = N \times L$ where N = number of deaths and L is standard life expectancy at age of death in years. Years Lost due to Disability were calculated based on the formula: $YLD = I \times DW \times L$ where I = number of incident cases, DW = Disability weight, L = average duration of case until remission or death (years) (1).

Research Design

Data used comes from 2004 burden of disease study of WHO and resource data (the indicators) comes from Health for All data base of WHO in the same year (2).The resource indicators are also from 2004. Burden and disease was paired with each of the resource indicators, for each country.

Thus, Pearson linear correlation coefficient was calculated for all paired indicators and subsequent scatter diagrams were drawn. The calculated (r) correlation coefficient (3) was compared with critical values of $\alpha = 0.05$ and $\alpha = 0.01$ (4), and depending on the value of r we came out with 4 categories: no correlation, correlation, strong correlation and very strong correlation. When r was between 0 and the +/- value of the correlation coefficient for that number of pairs it was considered no correlation. When (r) was between the critical values $\alpha = 0.05$ and $\alpha = 0.01$ ($\alpha = 0.05 < r < \alpha = 0.01$) it was considered there is a linear correlation between the burden of disease and the respective indicators. In other words (r) exceeding the critical value for $\alpha = 0.05$ means that there is a 95% chance there is a linear correlation. When calculated (r) for certain pairs was between +/1 and +/- $\alpha = 0.01$ respectively, it was considered a strong correlation between burden of disease and the respective indicators. In other words (r) exceeding the critical value for $\alpha = 0.01$ means that there is a 99% chance there is a linear correlation. When calculated r was almost double the value of $\alpha = 0.01$ it was considered a very strong correlation.

Because in real life the burden of disease is the result of many factors, for the paired indicators which showed a linear correlation or stronger, (r^2) was calculated in order to show to which proportion the variation of a variable is attributed to the other variable. The value of (r^2) was translated as % of influence of that factor on the burden of disease (5).

Universe and Sampling

We used data from WHO Health-for-All-Data Base, from the year 2004, when WHO had a large study concerning the burden of disease. This study is the most comprehensive and recent study regarding burden of disease in European and Central Asian countries. To pair burden if disease and the health system resource and infrastructure indicators we used also the 2004 values of the indicators for the respective countries.

The countries included on this study are: Albania, Andorra, Armenia, Azerbaijan, Belarus, Belgium, Bosnia & Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, FYR Macedonia, Malta, Moldova, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Turkmenistan, Ukraine United Kingdom and Uzbekistan.

Unfortunately we did not find data for all countries and all indicators. This is why the number of pairs ranges from 17 for radiation therapy equipment indicator to 50 for % of population connected to water supply system and % of population connected to sewage system, septic tank, or other hygienic means of sewage disposal indicator respectively. There are also large variations regarding the human resource indicators, variations explained by the way the health system of that country is designed. This specific design puts an emphasis or neglects certain types of health workers. This is reflected in the data reported. However, this variation of data is offset by the calculation method; the correlation coefficient varies with the number of pairs, and in order to assess the linear correlation a table with the critical values of the linear correlation coefficient was used, as stated above. Unfortunately for small

samples the critical values of the α coefficient are high and correlation is difficult to prove. This was a limitation in at least two cases.

Data Analysis

For the pairs between burden of disease and the 8 human resources indicators, the findings of this study are the following:

It was found no linear correlation (-α = 0.05 < r < α = 0.05) between burden of disease and practicing physicians / 100000 population, practicing nurses / 100000 population, nurses and midwives employed by hospital / 100000 population and radiation therapy equipment / 100000 population.

It was found a linear correlation (-α = 0.01 < r < α = - 0.05 or α = 0.05 > r > α = 0.01) between the burden of disease and the following indicators: general practitioners / 100000 population, pediatricians / 100000 population, practicing caring persons / 100000 population and physicians employed by hospital / 100000 population.

It was also found a strong linear correlation (r < -α = 0.01 or r > α = 0.01) between burden of disease and the following indicators: practicing pharmacists / 1000000 population, total hospital beds / 100000 population, CT / 100000 population, and MRI / 100000 population.

Finally it was found that there is a very strong linear correlation (r << -α = 0.01 or r> > α = 0.01) between burden of disease and the following indicators: % of population connected to water supply system, % of population connected to sewage system, septic tank, or other hygienic means of sewage disposal.

The above is illustrated in Table 1 below:

Table 1. Linear Correlation Between Burden of Disease and Indicators

VARIABLES PAIRED WITH BURDEN OF DISEASE	n (pairs)	r value	α = 0.05	α = 0.01	interpretation
practising physicians / 100000 population	39	-0.243	0.335	0.430	no correlation
general practitioners / 100000 population	33	-0.377	0.361	0.463	correlation
paediatricians / 100000 population	38	0.371	0.335	0.430	correlation
practising nurses / 100000 population	39	-0.326	0.335	0.430	no correlation
practising caring persons / 100000 population	20	-0.469	0.444	0.561	correlation
practising pharmacists / 1000000 population	36	-0.506	0.335	0.430	strong correlation
physicians employed by hospital / 100000 population	35	-0.352	0.335	0.430	correlation
nurses and midwives employed by hospital / 100000 population	19	-0.418	0.456	0.575	no correlation
total hospital beds / 100000 population	47	0.393	0.294	0.378	strong correlation
CT / 100000 population	24	-0.577	0.444	0.561	strong correlation
MRI / 100000 population	22	-0.568	0.444	0.561	strong correlation
radiation therapy equipment / 100000 population	17	-0.349	0.482	0.606	no correlation
% of population connected to water supply system	50	-0.626	0.279	0.361	very strong correlation
% of population connected to sewage system, septic tank, or other hygienic means of sewage disposal	50	-0.658	0.279	0.361	very strong correlation

Here is the description of the findings for each pair of indicators: burden of disease and resource indicator:

For the variables burden of disease and practicing physicians / 100000 population, there were 39 pairs, corresponding to 39 countries. The r value found was -0.243 and for this number of pairs the correlation coefficient for α = 0.05 was 0.335 and the correlation coefficient for α = 0.01 was 0.430. Hence, no Pearson linear correlation was found. This is illustrated in Figure 1below:
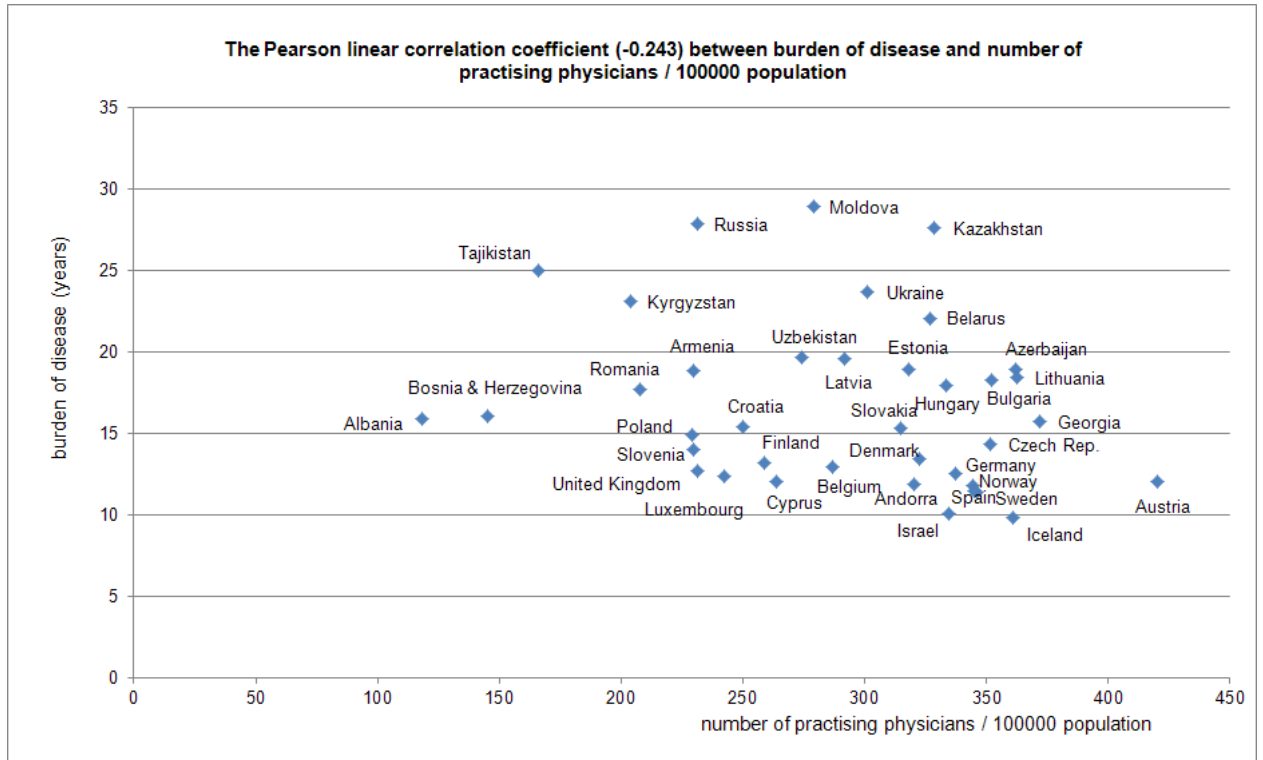
Figure 1. Correlation Between Burden of Disease and Number of Practicing Physicians

It may seem hard to believe that there is no linear correlation between burden of disease and the number of practicing physicians / 100000 population. Indeed countries like Russia and United Kingdom have roughly the same number of practicing physicians / 100000 population but the burden of disease is more than double in Russia than in UK. Similarly, Albania and Georgia have roughly the same burden of disease, while there are 3.5 times more practicing physicians / 100000 population in Georgia than in Moldova. The explanation might rely in the complexity of the health care system where the number of physicians is not a decisive factor. However the fact that there is a negative correlation between the two variables, suggests that having many doctors is more likely to reduce the burden of disease than having less.

For the variables burden of disease and general practitioners / 100000 population, there were 33 pairs, corresponding to 33 countries. The r value found was -0.377 and for this number of pairs the correlation coefficient for or $\alpha = 0.05$ was 0.361 and the correlation coefficient for or $\alpha = 0.01$ was 0.463. Hence a Pearson linear correlation was found. This is illustrated in Figure 2 below:
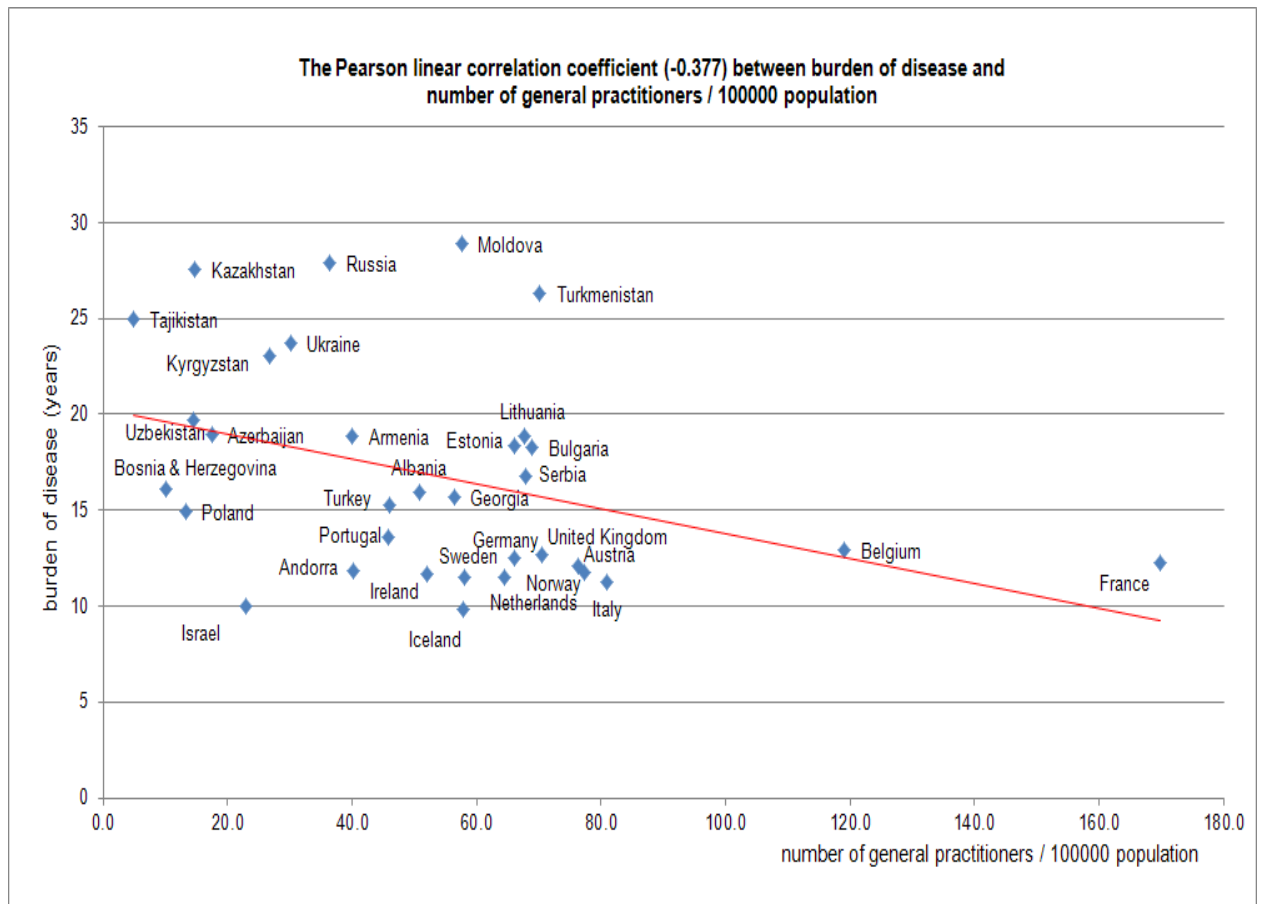
Figure 2. Correlation between Burden of Disease and Number of General Practitioners

The r^2 was 0.14.

As expected, there is a negative linear correlation between the burden of disease and the number of general practitioners. / 100000 population. This was expected, considering that many GPs provide widespread access to the chronic diseases treatment especially at old age. Former soviet republics (except Turkmenistan and the Baltics) have a weak network of GPs below 40 / 100000 population, this group of countries having a burden of disease of 19 years and above. Belgium and France are special cases with large numbers of GPs, probably due to their large network of nursing homes. However the fact that r^2 was only 0.14 suggests that the correlation between the burden of disease and the number of GPs is not very strong, the latter's influence being only 14% of the total factors influencing burden of disease.

For the variables burden of disease and pediatricians / 100000 population, there were 38 pairs, corresponding to 38 countries. The r value found was 0.371 and for this number of pairs the correlation coefficient for or $\alpha = 0.05$ was 0.335 and the correlation coefficient for or $\alpha = 0.01$ was 0.430. Hence a Pearson linear correlation was found. This is illustrated in Figure 3 below:
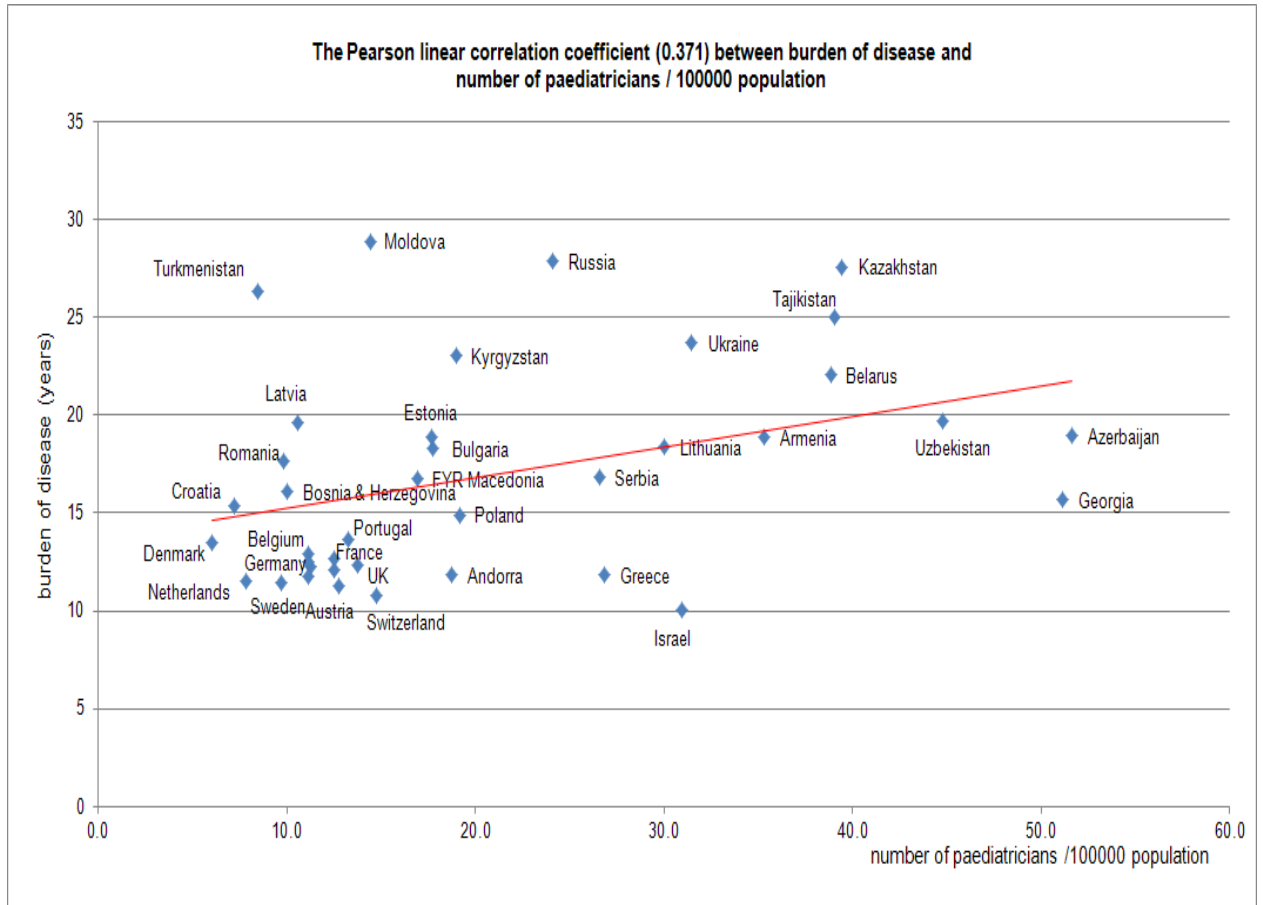
Figure 3. Correlation Between Burden of Disease and Number of Pediatricians

The r^2 was 0.14.

The burden of disease is positively correlated with the number of pediatricians / 100000 population. Former soviet republics (with few exceptions, again Turkmenistan) have large numbers of pediatricians (above 31 pediatricians / 100000 population have only the former soviet republics. This might explain the positive correlation, because if we eliminate from this set the former soviet republics the sign of correlation reverses, although it is not statistically significant. This suggests that there is a model of organizing the health system based on large numbers of pediatricians. Interesting enough if we consider only the former soviet republics in this set, we get also a negative correlation, again not statistically significant; however the majority of these republics have a burden of disease more than 20 years. Because the r^2 was 0.14, we can infer that this is not an important factor in influencing the burden of disease.

For the variables burden of disease and practicing nurses / 100000 population, there were 39 pairs, corresponding to 39 countries. The r value found was -0.326 and for this number of pairs the correlation coefficient for or $\alpha = 0.05$ was 0.335 and the correlation coefficient for or $\alpha = 0.01$ was 0.430. Hence no Pearson linear correlation was found. This is illustrated in Figure 4 below:
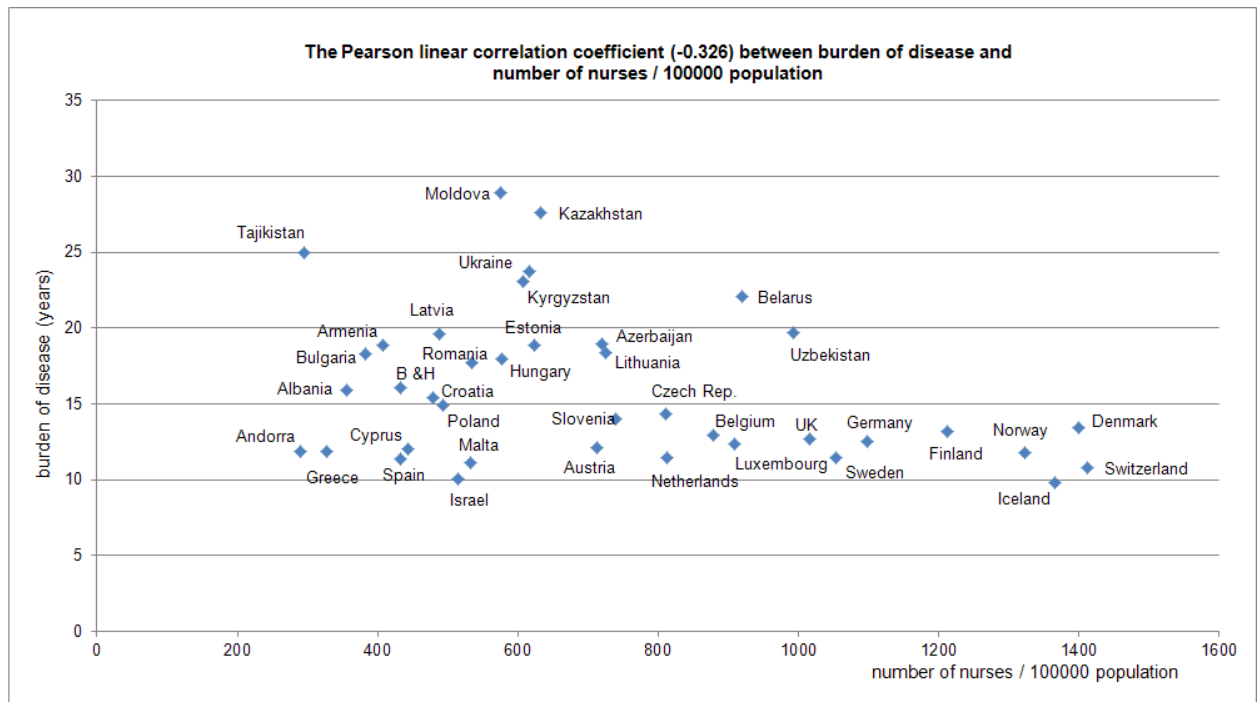
Figure 4. Correlation Between Burden of Disease and Number of Nurses

The only countries with burden of disease above 20 years are former soviet republics , but within this group the number of nurses varies a lot (296/100000 in Tajikistan and 994/100000 in Uzbekistan) , so this makes the whole set of data statistically not significant. Again we can see a pattern all Scandinavian countries have large numbers of nurses (all above 1050 / 100000).

For the variables burden of disease and practicing caring persons / 100000 population, there were 20 pairs, corresponding to 20 countries. The r value found was -0.469 and for this number of pairs the correlation coefficient for or $\alpha = 0.05$ was 0.444 and the correlation coefficient for or $\alpha = 0.01$ was 0.561. Hence a Pearson linear correlation was found. This is illustrated in Figure 5 below:
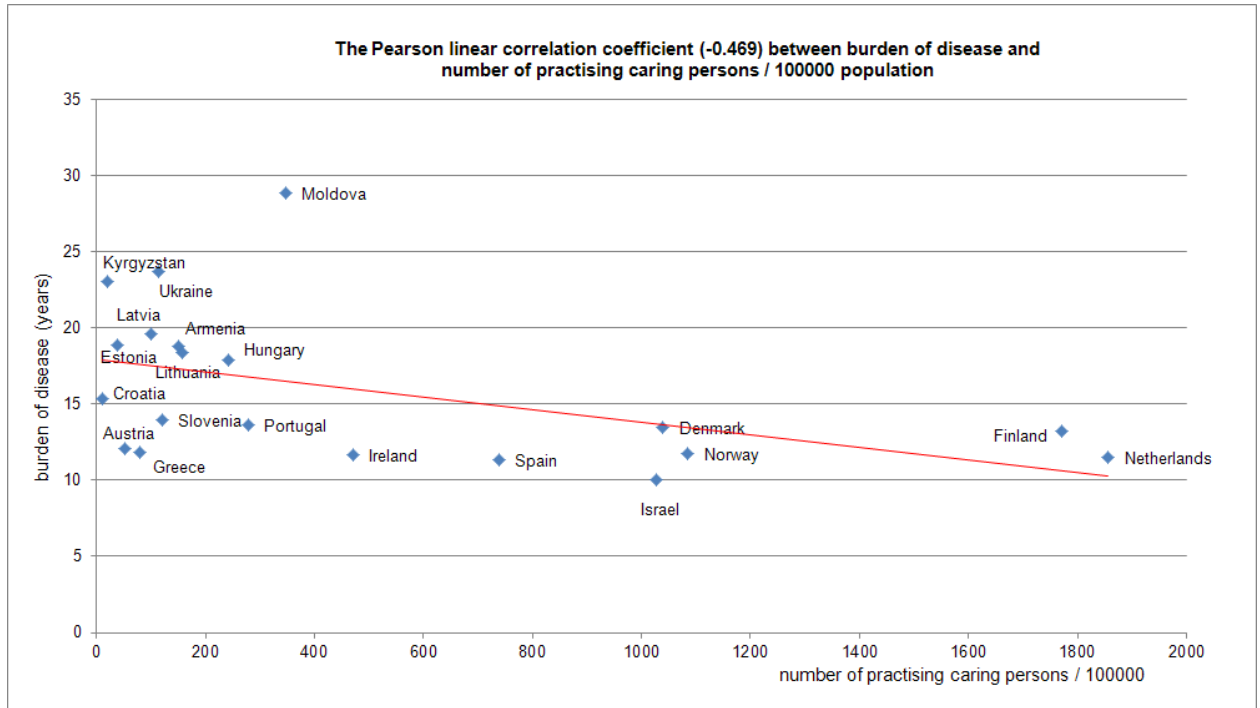
Figure 5. Correlation Between Burden of Disease and Number of Practicing Caring People

The r^2 was 0.22.

Although the set of data was quite limited, it suggests that practicing caring persons play in important role in service delivery. It is striking the variability of numbers from 12/100000 practicing caring persons in Croatia to 1855/100000 in the Netherlands.

For the variables burden of disease and practicing pharmacists / 1000000 population, there were 36 pairs, corresponding to 36 countries. The r value found was -0.506 and for this number of pairs the correlation coefficient for or $\alpha = 0.05$ was 0.335 and the correlation coefficient for or $\alpha = 0.01$ was 0.430. Hence a strong Pearson linear correlation was found. This is illustrated in Figure 6 below:
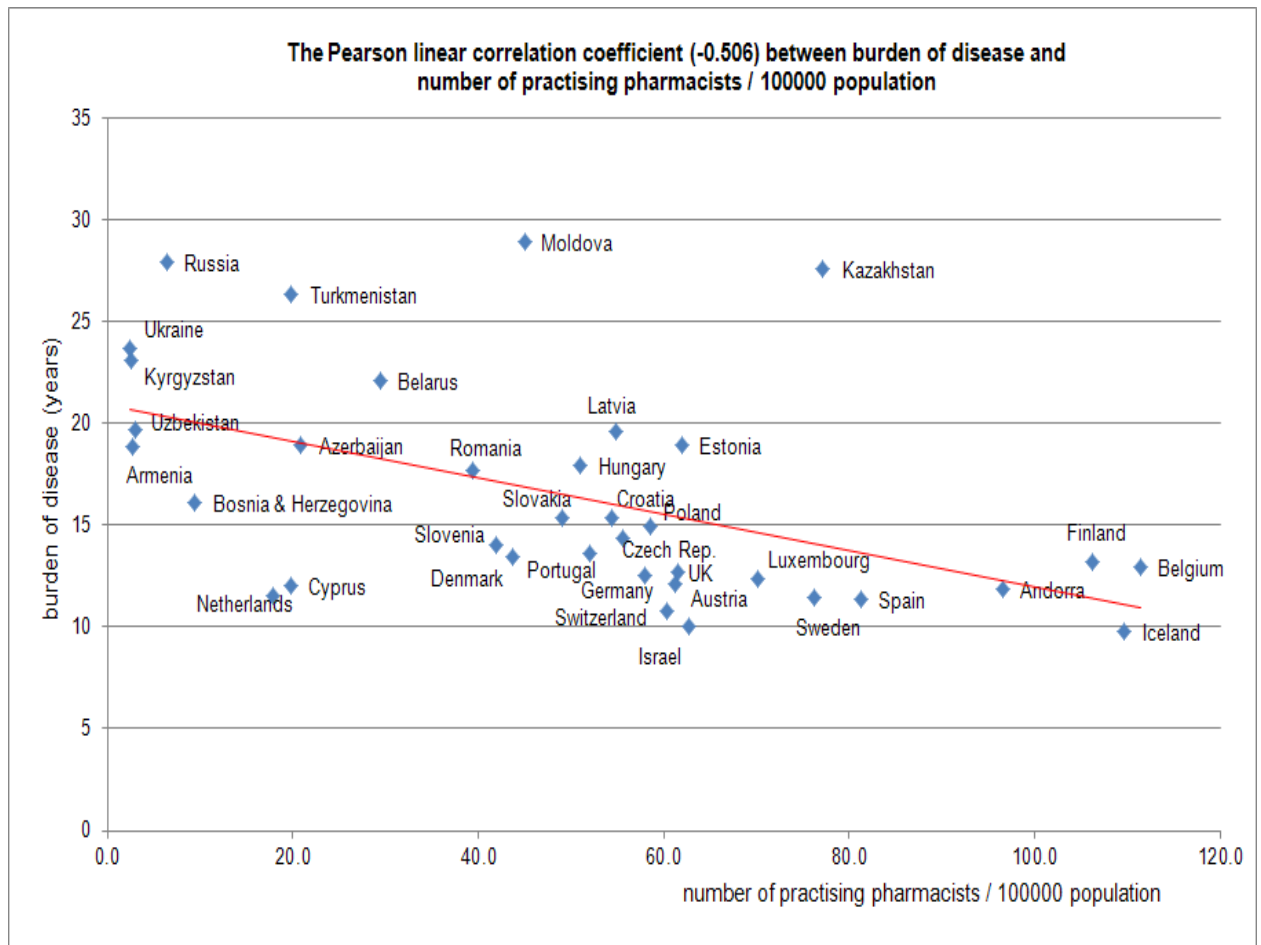
Figure 6. Correlation Between Burden of Disease and Number of Practicing Pharmacists

The r^2 was 0.26.

This strong correlation shows that pharmaceuticals play a strong role (26%) in reducing the burden of disease. More pharmacists means better access to medication and more effective care. There is though a large variability of this indicator for roughly the same burden of disease. For example Belgium has more than 5 times the number of pharmacists than Netherlands for roughly the same burden of disease. This shows that the number of pharmacists is not an absolute factor in reducing the burden of disease and itself is influenced by the pharmaceutical market conditions in the respective country.

For the variables burden of disease and physicians employed by hospital / 100000 population, there were 35 pairs, corresponding to 35 countries. The r value found was -0.352 and for this number of pairs the correlation coefficient for or $\alpha = 0.05$ was 0.335 and the correlation coefficient for or $\alpha = 0.01$ was 0.430. Hence a Pearson linear correlation was found. This is illustrated in Figure 7 below:

Figure 7. Correlation Between Burden of Disease and Number of Physicians Employed by Hospital

The r^2 was 0.12.

This correlation shows that it is important not only to have hospitals but also to have the qualified manpower to deliver services within these facilities. However this factor contributes only with 12% to the reducing of burden of disease. For the variables burden of disease and nurses and midwives employed by hospital / 100000 population, there were 19 pairs, corresponding to 19 countries. The r value found was -0.418 and for this number of pairs the correlation coefficient for or $\alpha = 0.05$ was 0.456 and the correlation coefficient for or $\alpha = 0.01$ was 0.575. Hence no Pearson linear correlation was found. This is illustrated in Figure 8 below:
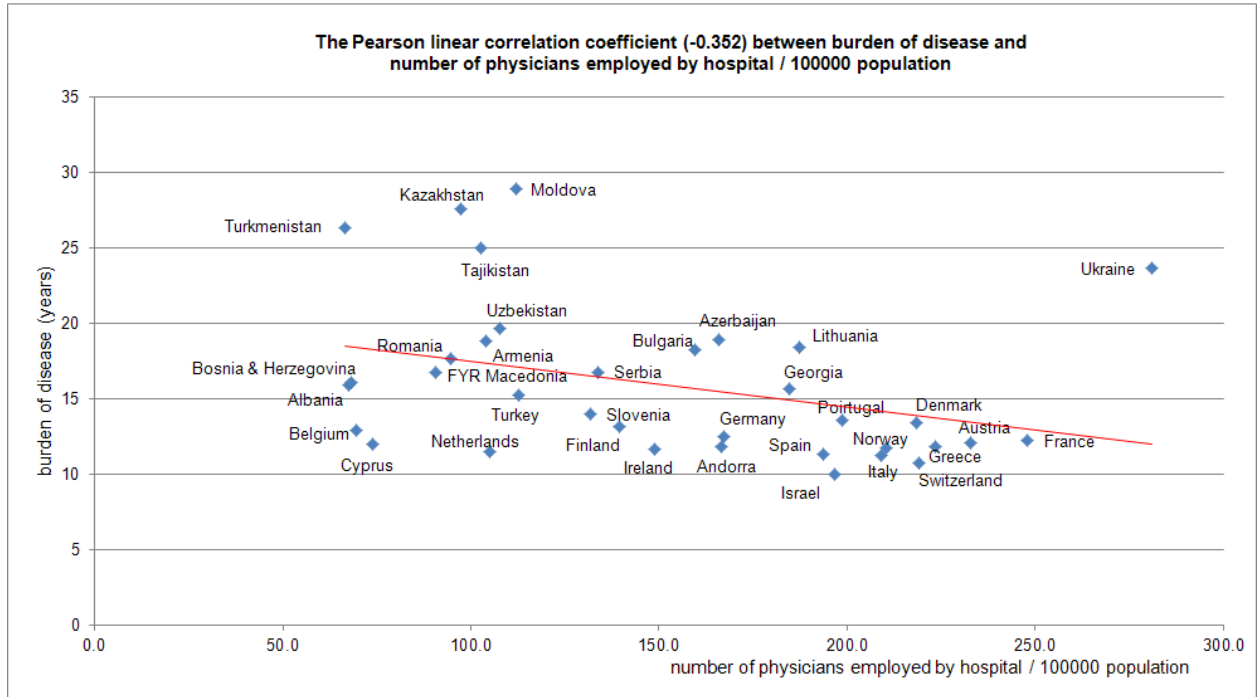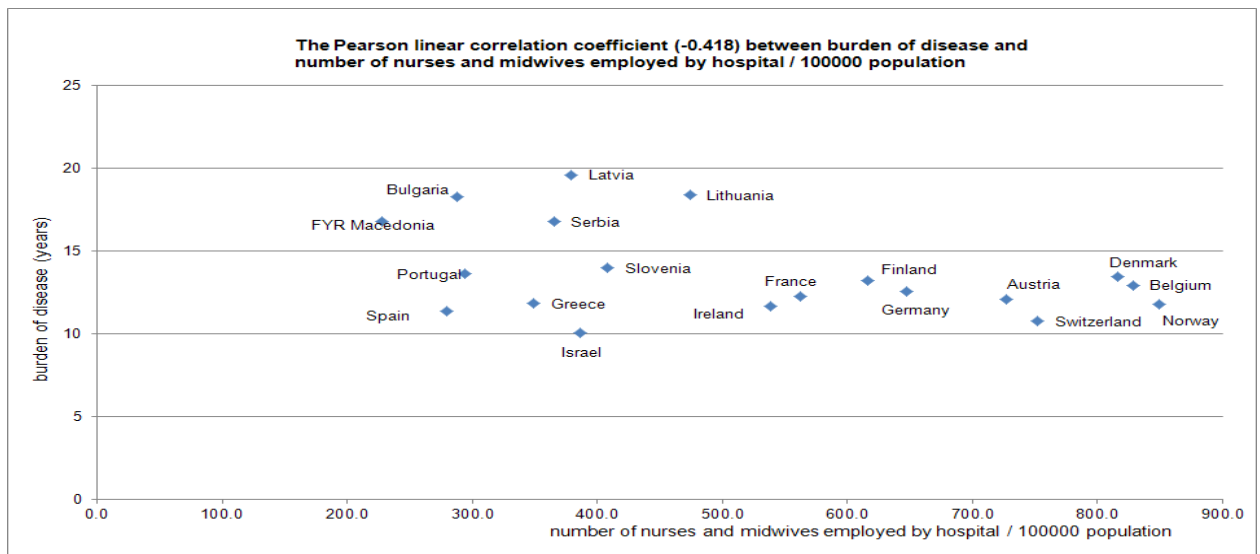

Figure 8. Correlation Between Burden of Disease and Number of Nurses and Midwives Employed by Hospital

The set of data was not large and no linear correlation was found, however we can see patterns of organizing the health services. For roughly the same burden of disease Mediterranean countries (Spain Portugal and Greece) employ less number of nurses in hospitals than Scandinavian and Central European countries.

The above sets of data were all related to human resources. This data shows that in few cases there is no correlation between the variables and but for the majority of the indicators there is a correlation between the number of human resources employed (especially highly skilled), and the reduction of the burden of disease. It is worth mentioning though that the correlation was week except with the number of pharmacists. Beyond the skills employed, large numbers of doctors and pharmacists mean a better access to care.

For the pairs between burden of disease and the 4 technical resources indicators, the findings of this study are the following:

For the variables burden of disease and total hospital beds / 100000 population, there were 47 pairs, corresponding to 47 countries. The r value found was 0.393 and for this number of pairs the correlation coefficient for or $\alpha = 0.05$ was 0.294 and the correlation coefficient for or $\alpha = 0.01$ was 0.378. Hence a strong Pearson linear correlation was found. This is illustrated in Figure 9 below:

Figure 9. Correlation Between Burden of Disease and Total Hospital Beds

The r^2 was 0.15.

The positivity of this linear correlation can be explained by different health policies. The burden of disease is well known in every country, but some countries are prone to consider that good care is provided only in hospitals, so the reaction to tackle health issues is by investing in hospitals, creating an access problem.

For the variables burden of disease and CTs / 100000 population, there were 24 pairs, corresponding to 24 countries. The r value found was -0.577 and for this number of pairs the correlation coefficient for or $\alpha = 0.05$ was

0.444 and the correlation coefficient for or α = 0.01 was 0.561 Hence a strong Pearson linear correlation was found. This is illustrated in Figure 10 below:

Figure 10. Correlation Between Burden of Disease and CTs

The r^2 was 0.33.

This strong linear correlation shows that countries with good diagnostic capabilities can reduce their burden of disease by having earlier and more precise diagnostics. It is obvious a cluster of former soviet republics with low number of CTs and high burden of disease. This factor contributes with 33% to the reducing of burden of disease.

For the variables burden of disease and MRIs / 100000 population, there were 22 pairs, corresponding to 22 countries. The r value found was -0.568 and for this number of pairs the correlation coefficient for or α = 0.05 was 0.444 and the correlation coefficient for or α = 0.01 was 0.561. Hence a strong Pearson linear correlation was found. This is illustrated in Figure 11 below:
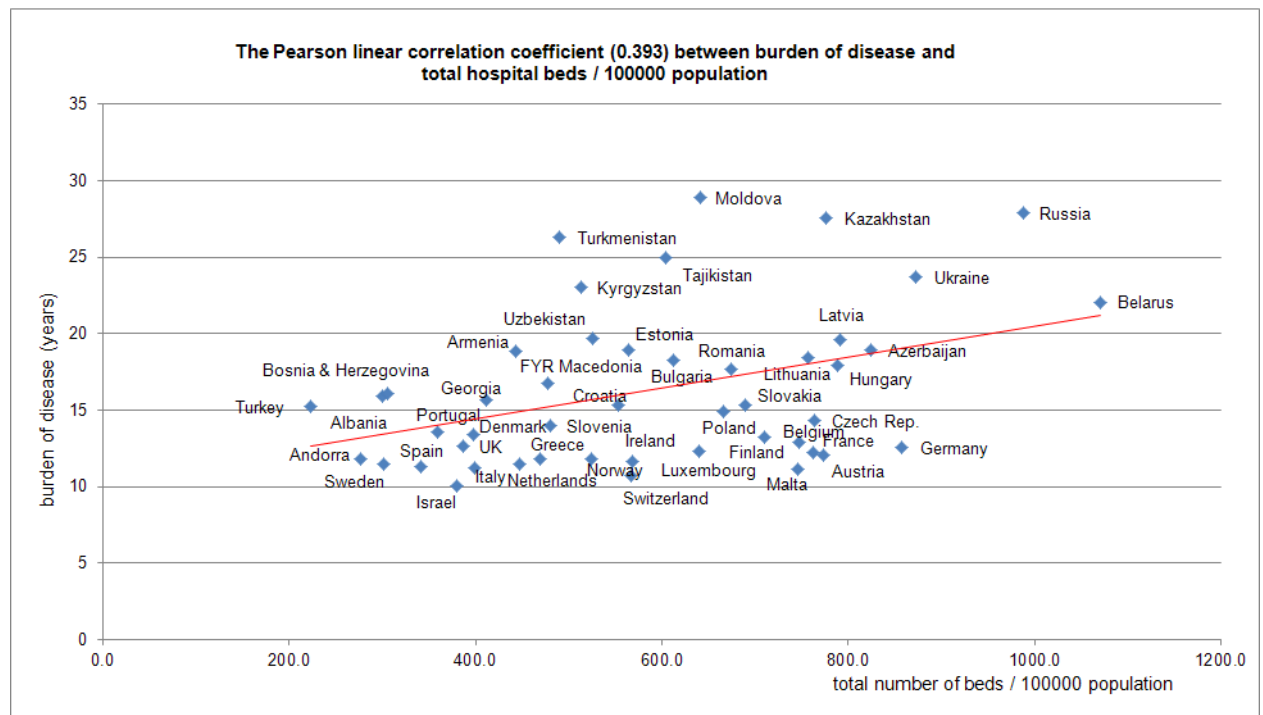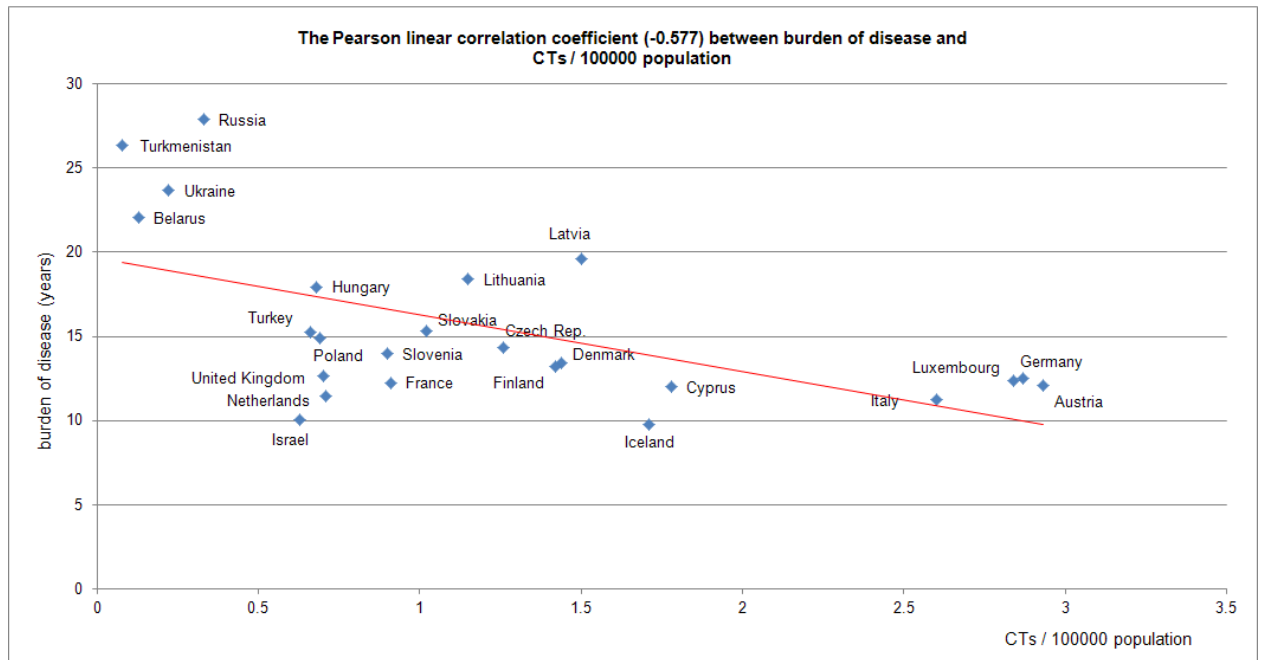
Figure 11. Correlation Between Burden of Disease and MRIs

The r^2 was 0.32.

This is another example of strong correlation between the number of units of diagnostic equipment (MRI) and burden of disease. This factor contributes with 32% in reducing the burden of disease. Although strong the negative correlation is a little weaker than CT / burden of disease correlation. Maybe because MRIs are more seldom and they are used predominantly to diseases creating less burden.

For the variables burden of disease and radiation therapy equipment / 100000 population, there were 17 pairs, corresponding to 17 countries. The r value found was -0.349 and for this number of pairs the correlation coefficient for or α = 0.05 was 0.482 and the correlation coefficient for or α = 0.01 was 0.606. Hence no Pearson linear correlation was found. This is illustrated in Figure 12 below:

Figure 12. Correlation Between Burden of Disease and Radiation Therapy Equipment

The lack of correlation might be explained by the difference in disease prevalence in various countries, the radiation therapy equipment being specific only to certain types of cancer treatment, or by scarce data.

For the 3 of the 4 technical resource indicators we found strong linear correlations emphasizing the importance of these types of resources. However these can be biased due to the fact that only rich countries can afford this kind of equipment in large numbers and usually the inhabitants of rich countries are also less prone to become ill, or they have access to better treatments..

For the pairs between burden of disease and the 2 infrastructure resources indicators, the findings of this study are the following:

For the variables burden of disease and % of population connected to water supply system, there were 50 pairs, corresponding to 50 countries. The r value found was -0.626 and for this number of pairs the correlation coefficient for or $\alpha = 0.05$ was 0.279 and the correlation coefficient for or $\alpha = 0.01$ was 0.361. Hence a very strong Pearson linear correlation was found. This is illustrated in Figure 13 below:
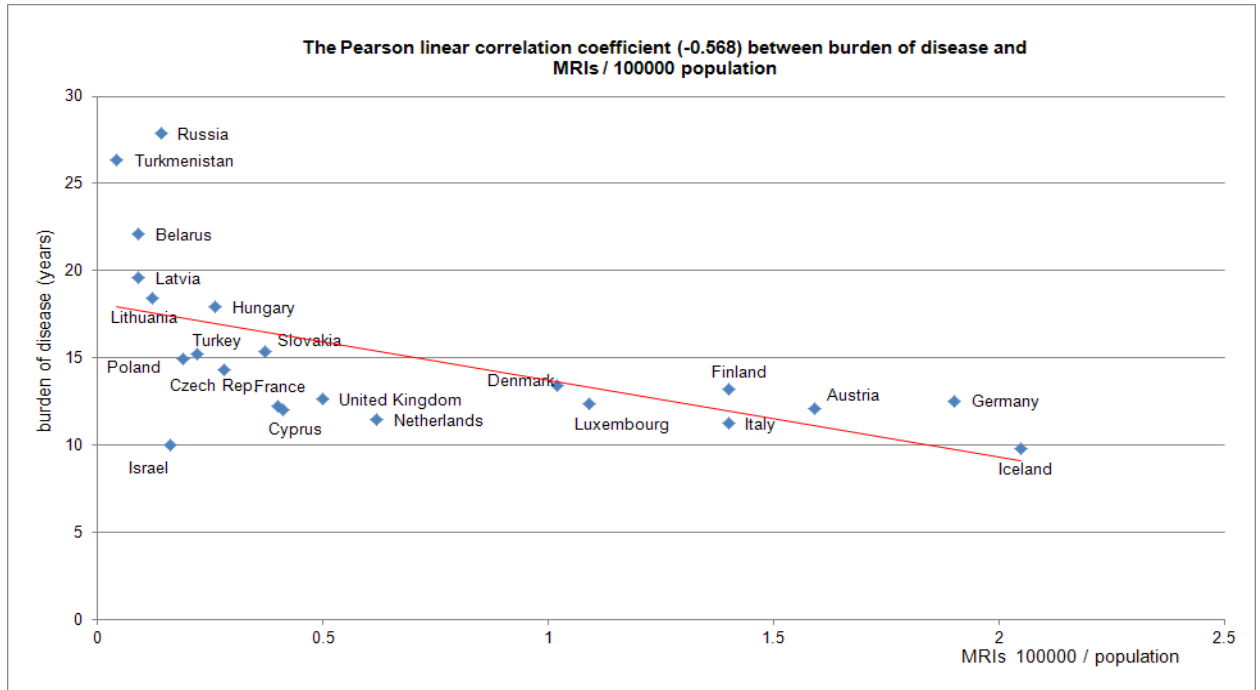
Figure 13. Correlation Between Burden of Disease and % of Population Connected to Water Supply System

The r^2 was 0.39.

This very strong correlation shows how important is the safe water supply infrastructure. Not only that access to safe water reduces the incidence of contagious diseases and intoxications, but in the absence of safe water health care providers cannot function. The water supply system contributes with no less than 39% in the reduction of burden of disease

For the variables burden of disease and % of population connected to sewage system, septic tank, or other hygienic means of sewage disposal, there were 50 pairs, corresponding to 50 countries. The r value found was -0.658 and for this number of pairs the correlation coefficient for or $\alpha = 0.05$ was 0.279 and the correlation coefficient for or $\alpha = 0.01$ was0.361. Hence a very strong Pearson linear correlation was found. This is illustrated in Figure 14 below:
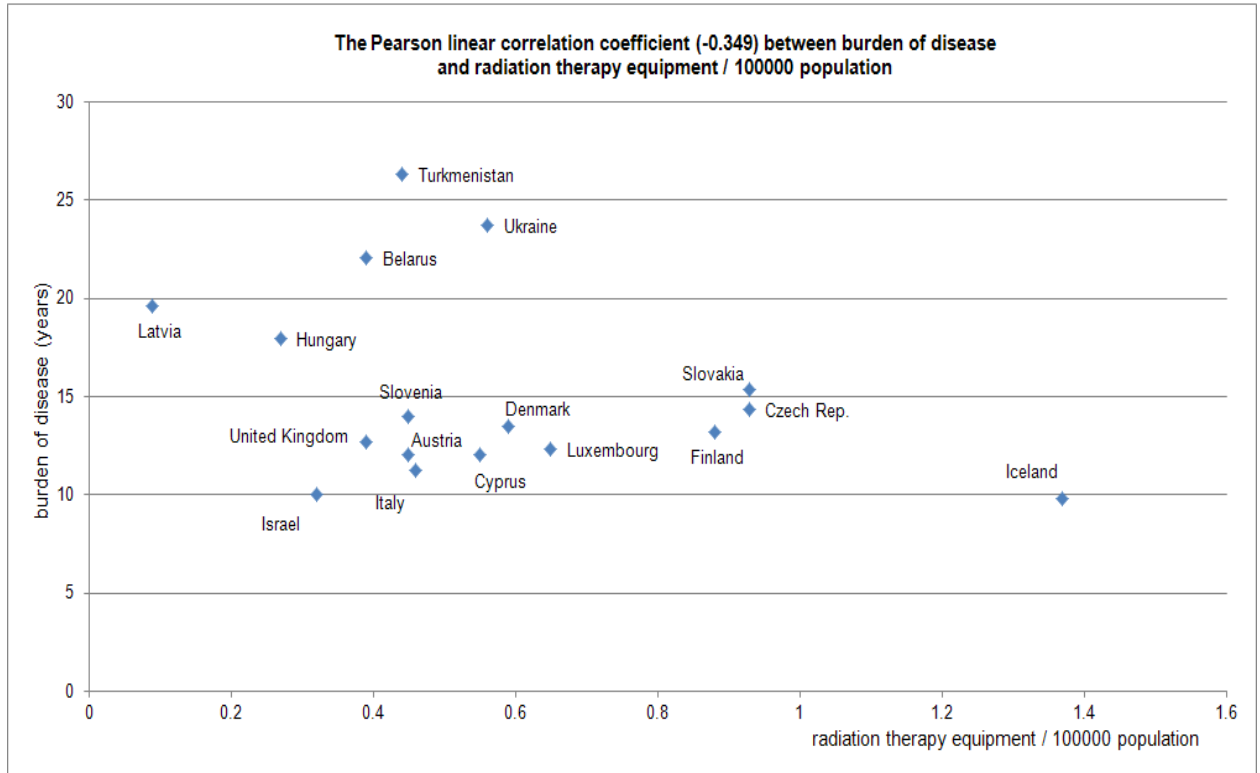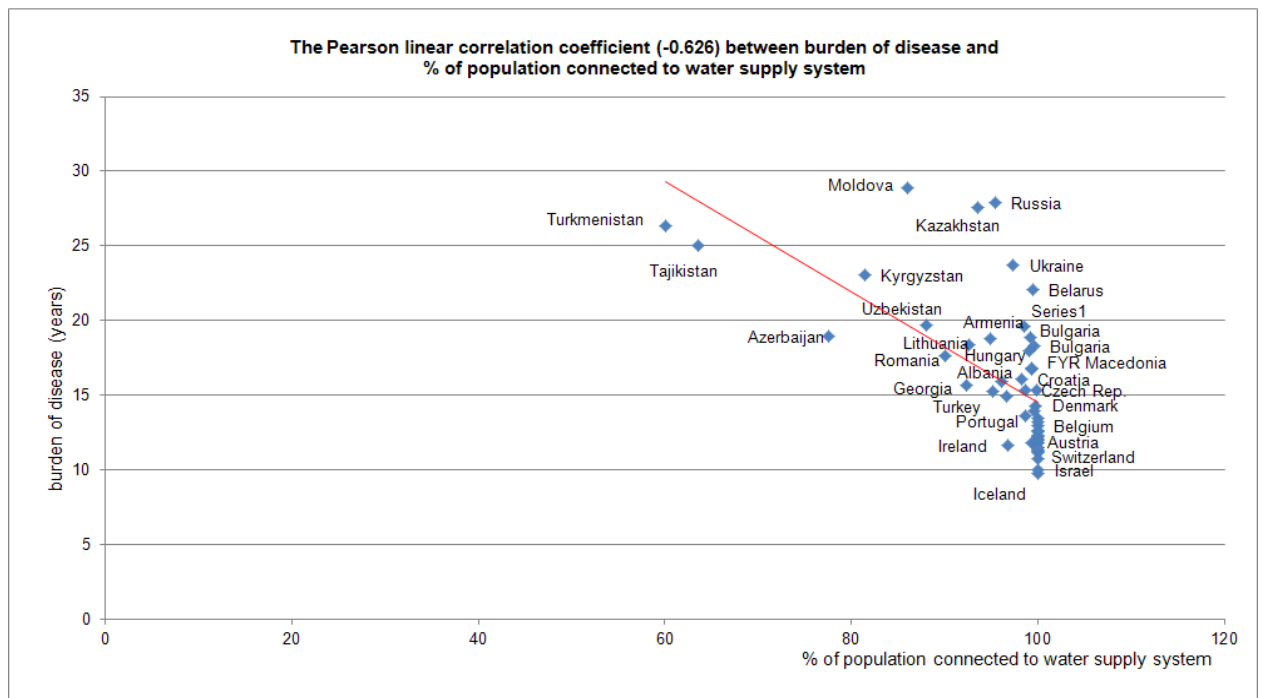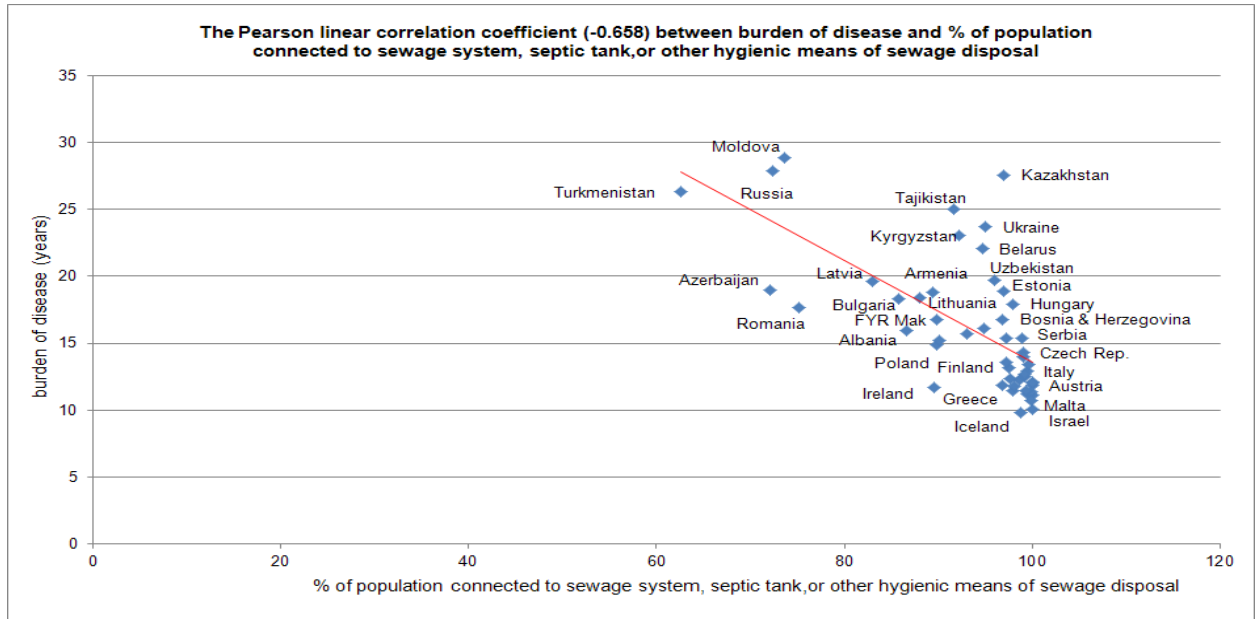
Figure 14. Correlation Between Burden of Disease and % of Population Connected to Sewage System, Septic Tank, Other Hygienic Means of Sewage of Disposal

The r^2 was 0.43.

This is another example of very strong correlation between an infrastructure indicator and burden of disease. It seems to be even more important, because in the absence of a proper sewage system, safe water sources can be contaminated. Again, lack of a proper sewage system is not compatible with the existence of a health care facility, indirectly increasing the burden of disease. The existence of this factor reduces the burden of disease with 43%

The importance of the two infrastructure factors is obvious. They count more than technological resources and human resources in reducing the burden of disease.

Conclusion

Human resources, technological resources and infrastructure resources contribute to the reduction of burden of disease in different degrees. The most important are the infrastructure resources (good sewage system and safe water). Then come the other two: technological resources and human resources. Access to these resources is vital in delivering the care. This study suggests the most effective ways of reducing the burden of disease from the point of view of policy making. This is a not only a matter of technological efficiency but more a matter of allocative efficiency. Comparisons between countries are possible and various characteristics of health systems become obvious.

The data shows that no country has reduced the burden of disease below 9.8 years. This suggests that almost 10 years if not more are lost due to factors that are not comprised within the health system or the infrastructure. There may be biological, social, environmental factors contributing to the incidence of diseases. Delaying the onset of diseases relieves the burden of disease and it can be done through prevention only.

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The Imperative Innovations in Healthcare Organizations

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Abstract

Social pressure and populism about the sense of state obligation to provide health care is an essential problem that must be solved. But, in republic state, it cannot be easy to take care of. So, it is sought for the solutions in organizational level in context of productivity, quality, reducing cost, role of health workforce. From this point, changing the method of measuring productive for any health organization to allocate the resources properly, the ways of improving quality by reducing cost, empowerment of health staff, which increases leadership and engagement to ensure improvements for more sustainable healthcare systems are new innovation areas. When considered that the funds which is financed for healthcare expenses cannot be increased because of the fact that there is global recession since 2008. So, global production has been depleting. Accordingly, the aim of this study is to investigate new imperative innovation areas in healthcare organizations for sustainable healthcaresystem.

Keywords

Imperative Innovation • Quality and Reducing Costs • The role of healthcare workers • Enhancing Leadership and Engagement

Health care is financed by social state's social security services for many countries. But, the costs of providing quality health have been increasing for years. Specially, debt of states and global economic crisis has been aggravating in this scheme. In this context health care productivity is most essential issue that we must tackle. However; aging population, changing disease form, costly technologies are most observed problems deepening this issue. After all, social pressure and populism about the sense of state obligation to provide health care is exacerbated. All of this doesn't make the sustainability of health care systems possible. Although the remedy of this problem is on health political area, there is something to do at the point of organizational level. When looked over it at the point of organizational area, good information and communication, performance management, team based problem-solving are several solution tools to innovate for new ways to log out from vicious circle. At the center of the tools, there has been management of human resources. When taken into consideration the cost of stolen services for a hospital, approximately %70 of all costs comprising of human resources. In the present case when inflations have been going up for almost country owing to economic recession, reducing the cost of human resources can be impossible for health care managers.

Purpose

The aim of this study is to investigate new imperative innovation areas in healthcare organizations for sustainable healthcare system.

Method

In this study, it is used literature review method for research concerning imperative innovations for healthcare organizations.

Results

Productivity and Measuring of Health Organizations

When looked to notion of productivity, it is seen that productivity is a ratio between inputs and outputs (inputs/outputs). Generally, it is expected that ensuring maximum output with minimum probable input. While inputs for a health organization are health work force, medical equipment, numbers of bed, outputs are number of discharged patients from inpatient services and outpatient services, performed medical operation and treatment without medical error etc. It can be seen this concept on a graphic below.

Graph 1.

Productivity
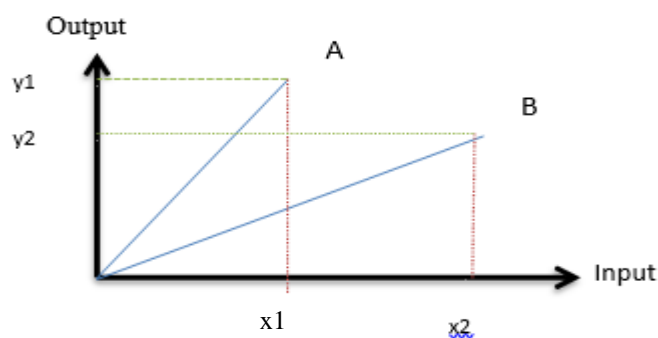
When compared with point B, point A depicts more productivity regression line via ensuring more the production with less input. In that case; as long as the regression lines erects, that is, as long as the curve increases, productivity would go up.

Measurement problem of productivity of health care services can be overcame by Atkinson's method as a new innovation. Before Atkinson, National Health Services has described sixteen different types activities to measure the outputs from inpatient practices to emergency practices according to NSH budget allocated to related practices. Atkinson's criticism on measurement of output is that there is no detailed information both costs weights, timeliness and quality of care. Because there were only two categories determining the cost weights as inpatient and day case treatment. Also, General Practitioners' consultations and their cost weights are not measured properly according to Atkinson review. To ensure this, it should be used a computerized information systems to improve output measurement. If miscounted the output, productivity ration would change wrongly. Another approach of Atkinson is that outputs should be embraced the whole course of treatment for any illness. However, generally; investigations, inpatient stays, follow-up are assessed as independent interventions for measuring output. But, they are actually part of related treatment, so we perceive that the consultations for General Practitioners increase in terms of Atkinson. Because of the error evaluation, we must appropriate funds for NHS. Besides, Atkinson suggest that measurement units like readmission rates that defines the unsuccessful treatment for any illness can be implemented for measuring output (Atkinson, 2005; Applebly, 2012). Atkinson's suggestion concerning output measurement in context of quality, there has been more developments in this area.

The Tripod of Improvement as Quality, Productivity, Innovation

The productivity problem can be solved as well as, the real problem is to ensure that with quality generating innovation for total improvement. Besides, main constraint of achieving that success is finance as known. All occurred problems are valid for any health systems. Because expectation of people using health care services, aging population, new medical technologies deepen this issue (Bevan, 2012). From this point, describing innovation concept is necessary. As it is known, innovation is a process ensuring transformation to obtain benefits like reducing cost per capita for patients and health organizations in medical industry. These can be any idea, knowledge or designing any delivery process. Funding constraints enforce thinking on the key that creates innovation. Otherwise, there have been two options on executes' table. One of them is to stop delivering some services or is to work health staff harder (Bessant et al., 2010). Although productivity completely is an economical term, in health industry maybe because of the feature of not tolerating any mistakes, a connection between productivity and quality have been postulating for a few times. When guessed that the healthcare is a process management, as output of that process for high quality requires fewer adverse events and hospital readmissions, lower mortality that reduces costs per capita (Crump & Adil, 2009). However, generating innovation that ensures quality and productivity together is more difficult than expressing what must be done. From this point, generally we have barriers which hinder generating innovation like organizational structure, methods for transformation and mindset about transformation (Kenagy, 2009).

According to Baker's suggestions, the framework of innovation includes three types as process, service, and strategy. Relative framework examples are seen below table (Baker, 2002).

Table 1.
Examples of Innovations Types

Process Innovation	Service Innovation	Strategic Innovation
Redesigning the appointment process in the General Practitioner	Creating new specialist services in the community, e.g., intravenous therapy, deep vein thrombosis, complex wound clinics	Transforming the paradigm of urgent and emergency care across the community
Reinventing the triage process in Accident and Emergency	Introducing hyper acute stroke services across the city	Designing radical new integrated models of health and social care for people with long term conditions
Making it easier for patients to order repeat prescriptions	Creating a 'virtual' induction for all newly appointed clinical staff	Shifting power: patients, families and communities as co-creators and producers of health (Doherty and Mendenhall, 2006)
Redesigning the job application process within recruitment and selection	Radical redesign of the clinical pathway for people who break their hips	Transforming the paradigm of urgent and emergency care across the community (Bevan, 2013)

Source: Baker, K, A. (2002). Innovation. http://www.au.af.mil/au/awc/awcgate/doe/benchmark/ch14.pdf, Accessed Date: 20.01.2017

According examples of innovation types; while process innovation generally points out improvement of service process by making some changes to facilitate the transactions of patients, service innovation points out the introducing new serves, specialist or any new application out and out. When compared, although quality and productivity achievements of service innovation is especially more than process innovation, it is seen that services innovation have risky more than process innovation. Because, services innovation requires more coordination between all of organizational functions (Bevan, 2012). So that being successful in context of output of service innovation, there are some features according to Parker's review; integration, substitution, segmentation, simplification as shown in the table below (Parker, 2006).

Table 2.
The features of service innovations

Integration	Generating connection between healthcare and social care creating flawless integrated care

Substitution
  i.   **Location Substitution**
  ii. **Skill Substitution**
  iii. **Technological Substitution**
  iv. **Clinical Substitution**
  v. **Organizational Substitution**
	Delivering higher value healthcare, lower cost for patients
	  i. Creating high technical environment for patients
	  ii. Empowering health staff; enabling nurses to prescribe drugs, a role that was previously carried out by doctors
	  iii. Benefiting from health technologies facilitating process for both patients and health staff; using self-services applications online for appointment or screening medical imaging
	  iv. Shifting from medical care model to community care or family or self-care model
	  v. Ensuring contributions of voluntary and community groups or social enterprises to the healthcare and social care apart from traditional medical organizations

Segmentation	Grouping the patients by their specific requirements and designing discrete services for them by ensuring them to get these services whenever they want and need.

Simplification	a. Counterbalancing the risk of creating extra structures and extra complexity
	b. Ensuring adds value for patients in exchange for each innovation step
	c. Minimizing potential additional costs as a result of innovation
	d. Cutting-out any activity, application or process which are not necessary and does not include the value for patients

Source: Parker, H. (2006). Making the Shift: a Review of NHS Experience. *Coventry: NHS Institute for Innovation and Improvement*

Strategic innovation commonly emphasizes an approach which creates new models for delivering health services for near future. From this point, health managers must think on it by considering available source like human resource, financing constrain, the changing needs of those who use health services due to for example aging population.

Another issue on innovation is the process from generating to implementation of it. On this point, the NHS Institute for Innovation and Improvement presents five stage process which enable NHS frontline staff and leaders to assess and stimulate service innovations for quality and productivity improvement. First step is to assess the new potential innovative idea by health staff in context of the performance. Main search topic in this stage is whether it would create quality and cost improvement. Second step is to benchmark the idea in other health organizations across the world. The third step is to assess the magnitude of the idea which would generate in the organization. Main search topic in this stage is to compare the idea to the past application, process or service type. In fourth stage, extra solution recommendations are sought in the framework of this idea to make it perfect for obtaining more benefit. In the final stage, summary statement is developed to begin for implementation of the innovative idea (Maher et al., 2008).

When taken into consideration the notion innovation to gain improvement for patients and health staff, innovativeness is everyone's responsibilities from frontline health staff to community groups or social enterprises and requires organizational culture which all organization members know that innovativeness is imperative approach in condition of environmental change (Bevan, 2012).

Raising Quality and Reducing Cost

Although cost saving motivate health manager and policy-makers, this interest is limited to them. Because, main focal point in healthcare is avoiding from adverse events like malpractice. Thus, quality in healthcare comes to the forefront. But, it is suspected that quality increases the costs of healthcare. But, it is seen that quality is misunderstood. In this respect, quality improvements, in other words value improvements which raises quality and reduces cost simultaneously must be realized for sustainability. In addition to personnel shortage, demographic changes, more expensive treatments, health technologies, increasing demand for healthcare deepen that problem (Øvretveit, 2012). In literature, there are two type costs. One of them is the cost of poor quality. Hospital-acquired infections, adverse drug events and misuse or misuse of healthcare have been generating the cost of poor quality (Øvretveit, 2009). For example, it is estimated that, adverse drug events related to the cost approximately £1.9bn a year (The Guardian, 2008) in National Health Serves' hospitals in UK. Also, it is known that patients with chronic diseases' avoidable emergency admissions are high. Besides, implementation of quality improvements can be costly, especially in services with little experience or infrastructure to support improvements (Øvretveit, 2009). But, some improvements by raising

quality have ensured reducing cost. For example, 5 million dollars saved in Hospital of the University of Pennsylvania in Philadelphia in exchange for $85,607 investment which supported improvement team working on raising quality (Martin et al, 2009).

Although cutting back on some healthcare services is seemed simple-solution, in the countries where social pressure and populism about the sense of state obligation to provide health care have been is real hard. From this point, health managers and other stakeholders have been seeking solutions which provide both quality and reducing health cost. Secondary and tertiary healthcare services consumes majority of financing sources. Therefore, many improvement areas focus on these services. Within the scope, the study of Marshall and Øvretveit gives us some possible examples that reduce the costs without compromising from the quality of healthcare (Marshall & Øvretveit, 2011).

Table 3.
The areas which requires improvement with their examples

Category	Specific areas	Examples, where available, claimed value of interventions or examples of possible savings
Improved commissioning	Better prioritization of what will be purchased and improved selection of patient for interventions Reduced unplanned admissions Promoting self-care and case management	5-7% reduction in NHS spend in 2013/2014 in comparison with 2008/2009

Better organizational business processes	Better use of estates	%20 reduction in estate costs, realizing approximately £500 m/year
	Sharing of business services to reduce support costs	20-30% lower costs for same level of service
	Better procurement	There is a 100% variation between the highest and lowest prices paid for common items
	Staff productivity	Nurses in the UK spend about half as much time in direct patient contact as their US counterparts

	Sickness absence	Up to 40% reductions in sickness absence have been achieved by some organizations
	Skill mix	Costs could be reduced by 8% by adjusting skill mix of service line staff
Better clinical business process	Implementation of NHS Institute's productive ward series	£1300m saving
	Reduced length of stay	£1230m saving
	Reduced new to follow-up ratios for outpatients	£249m saving
	Reduced Did Not Arrive rates	£207m saving
	Reduced readmission rates	£108 m saving
	Better management of leg ulcers	£1050 m saving
Improved quality of patient care	Reduced Health Care Acquired Infections	£1000 m saving
	Reduced drug errors	£750 m saving
	Implementation of NICE guidelines	£600 m saving
	Improved nutritional care	£130 m saving
	Better management of patients with diabetes when in hospital	£105 m saving

Source: Marshall, M., & Øvretveit, J. (2011). Can We Save Money by Improving Quality?. *BMJ Quality & Safety*, BJM-2010.

As seen in the table above, remaining be healthy seem exact solution to reduce the costs. In addition, long length stay and Health Care Acquired Infections are interrelated in context of both services quality and reducing costs. Because, when an inpatient stayed long time in any hospital, the risk of Health Care Acquired Infections increases. So, while treatment costs increases, quality of patient care decreases because of it. Eradication of Health Care Acquired Infections in any hospital is quite difficult and costly. We must take into consideration that realizing expenses to get quality improvements (spending cost) doesn't always present desired results in context of increasing cost. Also, desired results wouldn't get in near future. Because quality improvements require investments moneywise. Therefore, it is important to invest in the right areas which ensure both quality improvement and reducing costs for the future in this regard. As it is known that the providers are responsible for ensuring it. From this point, there are some overall steps to initiate the change which ensures reducing costs by improving quality. So, generally all successful changes need selecting accurate solution, implementation accurate method and attention to people aspects. Accordingly, relative overall steps are as the following (Øvretveit, 2012);

1. Selecting accurate solutions which have been proven when compared with similar services.
2. Staying in touch with health staff neutrally to determine the negative and positive sides of the solution for the implementers
3. Verifying the solution by comparing poor quality cost and the spending cost financially before the implementation
4. Adapting the solution using the accurate methods and others' expertise and experience
5. Measuring and monitoring progress after the implementation
6. Taking support from others for removing external obstacles to build improvement capacity

The most important step maybe is selecting the appropriate solution. For this, some suggestions which specify quality deficiencies from both patients and health staff side should be listed. These patient complaints or health staff report related to their work is used for determining how the problem affects to the stakeholders as severity. Then, according to the prepared list, other list is generated by determining the wasted time and resources as money because of them. Even though some problems might be critical; most affected to stakeholders and costly, there is another step to accurate solution. That is, poor quality cost and the spending cost must be compared financially. From this point, it is analyzed whether the spending cost is worth for quality improvement related to the solution.

In literature, it is named as cost-effectiveness analyze. So, another list is generated from this respective and an attachment which shows what resources as personnel, money, equipment needed is added to the last list (Øvretveit, 2012).

With all that, there are some obstacles stalling the improvements. Although they may be categorized under some subject headings, can be summarized shortly. Lacks of service information to specify and prioritize, of information about effectiveness in context of economic analyses to enable quality work are some arising information. Also, uncertainty and skepticism about spending time and source in context to the success diminish level of motivation for improvement generating the innovation (Øvretveit, 2012).

Although there are some negative factors stopping the improvements, there are also some positive factors which can enable the change for innovation. One of those is strong leadership that has awareness of the importance of the gains that would get. At the same time, it is important that the existence of senior management which knows the difficulties of change and steers their team for implementation. Other important point is to train health staff about quality and improvement tools which would raise consciousness to the change. Also, it is necessary to reconcile the conflicts among healthcare services (Walley et al, 2006).

The Role of Healthcare Workers on Innovation

The most important role in creating innovation surely is on healthcare workers/health staff. Specially, frontline health workers who communicate with patients firstly when they come to any healthcare organization are critical for transmitting a lot of information which can be used for determining innovation aspects. Because, they generally take responsibility many main jobs of the organization. In this respect, having creativity of health staff is facilitator for both the patients and themselves.

Commonly, it is seen that creativity is described as generating original and unique ideas or solutions on behalf of both patients and health organizations (To et al, 2012). As known, whereas creativity is the generation of novel and useful ideas, innovation is the implementation of the ideas (Man, 2001). Besides, generated ideas must be useful. But, notion of usefulness cause the conflict of interest between different stakeholders of the organization. For example; while any generated ideas or solutions from top management of a for-profit hospital to increase profitability might be so useful in context of creativeness for innovation, it can might a burden for frontline health worker or patients (George, 2007). In this respect, enforcing health staff to be creative can be possible when they feel and know that it is necessary for both themselves in terms of their economic or carrier gains and the organization' success. When generally examined, it is known that job complexity, relationship with supervisors and co-workers, rewards, time deadlines and goals, spatial configuration of work settings are determinative factors for creativity resulting in innovation (Shall et al, 2004). For example, according to a study which carried out by Aiello et al; individuals working in low spatial density areas exhibited higher performance on a creativity task than individuals in higher density areas (Aiello et al, 1977). Similarly, according to a study conducted by Tierney et al; even if workers have ability to be creative at work, they need to encourage from their supervisors by assigning to appropriate jobs for innovation (Tierney et al, 1999). The communication between health workers and their supervisors matter in defining the true worker to true job for innovation. From this point, trait activation theory presents more expositional approach in context of creative for innovation. According to trait activation, individual' predispositions towards their jobs affect revealing the creativity with organization structure simultaneously. (To et al, 2012) Thus, health staff needs to declare their propensities' freely. So, receiving positive feedback from their supervisors or co-workers which creates social appreciation and having flexibility on the work reinforce affirmative organization structure (Zhou & Goerge, 2001). Another factor affecting the workers' creativity is to reward. In literature, it is generally defined as extrinsic rewards. It is commonly accepted that when workers have autonomy, extrinsic rewards can enhance the intrinsic motivation ensuring for innovations (Malik et al, 2015). Creativity in the nursing care having pivot role in delivering healthcare for credibility of any healthcare organization can have more effective results. It is seen that nurses' creative activities ensure improvements in quality of care (Isfahani et al, 2015a). In this respect, even though behavioral treats and collective mindset may be obstacle to creativity for innovation, leadership and technology which can be never substituted instead of nurses may be helpful tools for it (Hughes, 2006).

The real problem is generating the environment which gives a chance in creating new ideas for realizing innovations in health organizations. It can be benchmarked from Total Quality Management System for solving that problem in particular from Toyota Experiences. Toyota Company developed quick feedback system for all its workers to get original ideas which can be harnessed. Ideas were collected through supervisory channels, 'scratch sheet' on walls or quality control circles. The name of the feedback system which stimulates the 'feeling of involvement' was 'Individual Quality and Productivity Program'. In compliance with this program, all workers had a quota and a date to fill their slot on the board to express their ideas. Also, all workers must implement their idea and specify the gains from it in context of saving, impacts on external or internal customers. Many ideas don't require money to implement (Godfrey, 2003). Similarly, Toyota Company was aware that the idea which was handy for company wouldn't come up with itself. Thus, training the workers for creativity took an important place. Within this scope, the seminars had been conducted

to teach some techniques which was known as quality tools like brainstorming to workers for revealing their creativity (Godfrey, 2003). As seen, Toyota Company has established the essential environment to the creativity of worker for innovation.

The example of Toyota gives us that revealing the creativity of workers is possible. We can adopt similar methods in order to reflect the creativity of works on innovation. One who knows the doing best is the one who carry out. So, the improvement areas would be determined by surely health workers easily. For example, even though it is useless, supporting a nurse creating a robot for pulling the patient's legs during the orthopedic surgery by encouraging might create many health workers having patent (Isfahani et al, 2015b).

Enhancing Leadership and Engagement for Organizational Performance

The term of employee engagement have been studying for years. When considered in context of fulfilling of health works role on innovation, engagement becomes surely very important issue. It is possible to describe the employee engagement. According to Perrin, employee engagement is a model which consists of 'Think', 'Feel' and 'Act' sectors. Think sector points out that rational understanding of the organization's strategic goals, values and their 'fit' within it. Feel sector also points out that an emotional approach or an attitude of the worker to them. Finally, act sector points out that a willingness of the worker to do more than the minimum effort in their role. It has a motivational feature. Besides, employee engagement has impact on financial performance of the organizations. According to a study involved fifty multinational companies, companies with high levels of employee engagement outperformed those with less engaged employees in operating income, net income growth and earnings per share as financial performance. At the same time, it is known that there is a correlation between improvements in employee engagement and customer satisfaction (Perrin, 2009).

Employee engagement has effects on many dimensions of organizations. When engagement begins to decline, it seen that a remarkable drop in productivity, lower customer services and more absenteeism and turnover are observed. Therefore; sustainable engagement is required. From this point there are some suggestions in different areas for enhancing employee engagement (Watson, 2012).

Table 4.
Priority Areas of Focus on Behaviors and Actions that Matter to Employees

Leadership	Stress, balance and workload
Is effective at growing the business **Shows sincere interest in employees' well-being Behaves consistently with the organization's core values** **Earns employees' trust and confidence**	Manageable stress levels at work A healthy balance between work and personal life Enough employees in the group to do the job right Flexible work arrangements
Goals and objectives	**Supervisors**
Employees understand **The organization's business goals** **Steps they need to take to reach those goals How their job contributes to achieving goals**	Assign tasks suited to employees' skills Act in ways consistent with their words Coach employees to improve performance Treat employees with respect
Organization's Image	
Highly regarded by the general public **Displays honesty and integrity in business activities**	

Source: Watson, T. (2012). Global Workforce Study. *Engagement at Risk: Driving Strong Performance in a Volatile Global Environment.*

The level of employee engagement in healthcare organization has been measuring through some developed scales like Cornerstone survey. Generally, Cronbach Alfa Coefficient values can vary from 0,70 to 0,93 (Spurgeon, 2012; Cornerstone OnDemand, 2014). For example, according to Cornerstone OnDemand's research, it is dawned on that 49% of health workers aren't fully engaged and the change is a treat for it. Also, workload is an obstacle for employee engagement (Cornerstone OnDemand, 2014). But, it is possible to increase level of engagement in health organizations. Everything for engagement starts with senior management's leadership. When tackled the notion of employee engagement in context of leadership, it is seen that there is a connection between leadership and employee engagement. It is known that when a leader demonstrates emotional support and recognition for employee suggestions to the organization contribute to employee engagement (Moss, 2009). For example, according to a study conducted in Tilburg University, it is confirmed that there is a correlation between transformational leadership and innovative work behavior of workers statistically. We can see some examples of leadership in the field; MD, Chair of the Department of Medicine at the Hospital of the University of Pennsylvania in Philadelphia Richard Shannon, got ahead improvements in hospital-acquired infections which saved 57 lives by supporting physicians, pharmacists, nurses systematically (Martin et al, 2009). Also, perceived organizational support effects innovative work behavior with self-efficacy according to the study (Kroes, 2015). Then, developing mutual trust and respect health staff and managers is next step. From this point, sincere and transparent communication for overcoming some problems related to the change. The next is also encouraging health staff to take the responsibility which they may specify. Later on, empowerment of health staff gains importance (Atkinson, 2011). Specially, coming together within the scope of the common purposes among health staff, realized empowerment through training for the issues which they don't know well would enhance the communication and awareness of being a team in context of adoption the organization. Thus, possible conflict of interest among healthcare services could be minimized. The team spirit would also create organizational image towards the stakeholders outside the health organization. In this way, organization's core values could be adopted easily. Charging a health worker who adopts the core values of organization would get easy within the scope of a project. We know that healthcare organizations work on project basis. Each project is any patient receiving healthcare. For example, the health workers who meet up in the operating room from different branch of medicine to execute an operation bring about a team for the patient (a project). But, the team could change based on any patient who require different treatment. From this point, empowered health workers could warn each other to hinder undesired medical errors unfortunately in this way. Specially, doctors are natural leaders among health staff. Because, the progress of treatment and examination are shaped by doctors' medical decisions and other health workers act in accordance with them. To show effective leadership doctors need to train in order to obtain information which is outside medicine. Accordingly, the American Hospital Association (AHA) published a skillsets developing leadership of doctors. Relative training areas are as follows (Combes & Arespacochaga, 2012):

Table 5.
Training areas for doctors

Leadership training
Systems theory and analysis
Use of information technology
Cross-disciplinary training/multidisciplinary teams
Understanding and respecting the skills of other practitioners
Additional education around Population health management Palliative care/end-of-life
Resource management/medical economics Health policy and regulation
Interpersonal and communication skills
Less 'captain of the ship' and more 'member/leader of the team'
Empathy/customer service
Time management
Conflict management/performance feedback Understanding of cultural and economic diversity Emotional intelligence

Source: Combes J.R. and Arespacochaga E., (2012). *Lifelong Learning Physician Competency Development*. American Hospital Association's Physician Leadership Forum, Chicago, IL

Conclusion

As seen, there are many areas which need to be improved for both patients and health organizations' performance. When it is considered that future healthcare organization can put these improvements which ensure innovation would create more quality services and solution oriented healthcare organizations for sustainability.

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Project on Commissioning for Secondary and Primary Health Care in Turkey

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Abstract

The commissioning of health services is emphasis of primary care led national health services through primary care groups. Commissioning includes assessing need, setting priorities, allocating resources, and influencing providers, involving patients and public Clinical commissioning groups (CCGs) are responsible for the majority of the National Health Service (NHS) budget, controlling around £69 billion in 2015. NHS England is responsible for commissioning primary care and specialized health care services in secondary care. The aim of this study is identifying knowledge of physicians, nurses and health manager of primary and secondary health care setting about clinical health commissioning in Turkey. Family practice centers and secondary care centers were chosen randomly in Edirne province. Qualitative and quantitative method were used. The results indicate that providers believe CCGs have the potential to improve quality in primary care. There is statistically difference between health professionals and their CCGs knowledge. Physicians have higher scale points than others.

Keywords

Clinical Commissioning Gropus • Clinical Health Commissioning• Primary Healthcare • Secondary Healthcare • Health Professional

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Beginning of the 1990s, public policy analysts have been drawing attention to the rise of the 'contract state' or 'contractual governance'. These terms are new in the literature of public management. This is a management technique from the private into the public sector by using market forces such as competition and contract as a way of increasing efficiency and choice in the delivery of public services. The introduction of 'managerialism' in healthcare sector and hospitals began in the early 1980s. This was followed in the early 1990s by the introduction of the 'quasi' or 'internal' market between purchaser and provider. Markets rather than bureaucracies are more likely is needed in order achieve efficiency, re organization and sustainability of health services. The new hospital management system shares realignment between management and medicine. The way of this, it is not challenging with the doctors' rights in order to control them. It is creating a space for management rather then. The formal organizational structure involves a "physician leader" and "hospital manager" with equal and overlapping responsibilities for the functioning of treatment center. Medical leadership is top management support for widespread organizational change. The power of consultants in the hospital and their ability to promote or inhibit change in health care is important (Moran et al., 2017).

The commissioning of health services is emphasis of primary care led national health services through primary care groups. Commissioning includes assessing need, setting priorities, allocating resources, and influencing providers, involving patients and public. The commissioning of health services is Health Commissioning Project in United Kingdom is about getting the best possible health outcomes for the health of local population managed by primary care centers (GP surgery), by assessing local needs, deciding priorities and strategies, and then buying services on behalf of the population from providers such as hospitals, clinics, community health bodies, etc (Cafaggi, 2005; NHS, 2014).

The organizations commissioning health services in England has changed during April 2013. Clinical commissioning groups (CCGs) are responsible for the majority of the National Health Service (NHS) budget, controlling around £69 billion in 2015/16. NHS England is responsible for commissioning primary care (£12 billion) and specialized health care services in secondary care (£15 billion). As of April 2015, in most parts of the country NHS England shares primary and secondary health care responsibilities with CCGs through commissioning arrangements. Commissioning support units provide a range of services to CCGs and NHS England to help to manage health care and health cost together. CCGs must work with the new local authority Health and Wellbeing Boards and Strategic Clinical Networks that were established in 2012 in order to give efficient, locally sensitive and customer-focused service to CCGs (NHS Commissioning Board, 2012; McDermott et al, 2016).

Beginning of the spring 2013, NHS is in in new comprehensive system of Clinical Commissioning Groups (CCG), called NHS Commissioning Board. These groups are responsible for commissioning of primary health services. Every local GP practices have joined up with other health professionals in a Clinical Commissioning Group, which is responsible for "commissioning" - planning, designing and paying for NHS services. This system includes planned and emergency hospital care, rehabilitation, primary care, and mental health and learning disability services. Figure 1 (Wistow & Callaghan, 2011; NHS Kingston Clinical Commissioning Group).

Figure 1
Accountable Health Care Organizations via CCG

First, Accountable Health Care Organizations by using CCG are ready to organize a whole system of health care for a large population via clinical health commissioning. Taken fully, this effectively means that the CCG becomes a monitoring panel that judges the achievement of health care outcomes. Second, according new demands of young generation the need to 'transform' systems of health care have led to frustration for health staff and patients. General practitioners (GPs) nowadays are managers of primary and secondary health care demands of patients. The health needs of a community is detected, the responsibility is taken for providing that suitable services are available which meet these needs, and the engagement for the connected health outcomes is founded. Currently, primarily non-clinical managers in primary care trusts (PCTs) with little clinical data performed commissioning activities such as planning (assessment and evaluation), purchasing (identifying and negotiating) and monitoring health services. In response to that, the recent reform transferred commissioning duties over to GPs, nurses and other healthcare professionals who represent a range of both provider and purchasing relation. The range of the health staff involved as well as the difficulty of the tasks demands a composite approach to commissioning than produce earlier. GP leaders are seen as network leaders within their healthcare service environment with CCGs being the core of change activity. Illustration upon this theory, we were able to obtain single insights of the emerging leadership activities of GPs and their efforts to set up best practices as well as to develop new health clinical services ordered to the needs of their population. We believe that this approach will disseminate light on the emerging forms and functions of improving commissioning presence and will offer a fresh feeling on clinical leadership in healthcare networks (National Voices, 2017; Graham et al., 2015).

Method

Integration of family practice centers to secondary care hospitals could help to manage primary and secondary care by a cost effective way. This study aimed to identify knowledge of physicians, nurses and health manager of primary and secondary health care setting about clinical health commissioning.

Family practice centers and secondary care hospitals were chosen randomly from the national health care system database of Edirne. The first and second phases of survey visit was conducted between 2016 June and March. The interviews were audio recorded and were less than one hour in duration. Results from both phases of the survey were organized into a database for analysis.

The study has been also used qualitative data collection techniques by semi-structured interviews. Two groups consisted of six health professionals that were made for collecting qualitative data. The respondents were consisting of health professionals like physician, manager, and nurse. A phenomenological theoretical structure was used to empower the determination of experience and it is meaning in a specific time and place. We looked at the personal experience - the meaning and decisions of the participating trainees when coordinating their load. The data was gathered via semi-structured in-depth interviews.

A phenomenological theoretical framework was used enabling the determination of experience and its meaning in a specific time and place. This method was chosen for its inductive nature, providing valuable insight into various perspectives of the study participants. The data was gathered via semi-structured in-depth interviews.

The following research question was asked:

1. "What does mean Clinical Health Commissioning"?

2. "Did you hear about CCGs"?

3. "Is it Possible to do it in Turkey"

4. "Please explain why is possible or not possible to do it"

Hypotheses

In summary, we can generate two hypotheses regarding the conditions, under which the different measures.

H1: There is difference between Clinical Health Commissioning knowledge and socio demographics variables.

H0: There is not difference between Clinical Health Commissioning knowledge and socio demographics variables.

H2: There is difference between Clinical Health Commissioning knowledge and health professionals
H0: There is not difference between Clinical Health Commissioning knowledge and health professionals

Results

Barriers to integration were unawareness about health commissioning business models and lack of coordination across secondary and primary care health services, uncertainty about the adequacy of new health care transition systems that could be managed by effective health commissioning services. Main outcome measures awareness of clinical health commissioning members and health care stakeholders from their healthcare network; clarifying the role of primary care by analyzing strengths and areas for development of collaborative management of relationship between primary and secondary care. One hundred twenty-three codes were identified in the first analysis, which were then reduced and gathered

by similarities into codes of higher rank and then grouped into 9 themes and into 3 categories. The identified themes were the following: types of commissioning, hear about health commissioning, consequences of health commissioning.

A: No, I think it's all down to the strength of the GPs who are involved in primary care. CCG health care is clear yet. But I think it has not got, you know, any potential.

B: So, in theory CCG is not possible to in Turkey. Nobody believes in referral chain in Turkey. ...Even patients and public consensus.

C: Well CCG is a different relationship, I think if I speak in general terms, management and modernization of public health. CCGs effectively works in partnership, and it helps in the development of local policy and strategy.

D: We do not have a lot of time building up local relationships in the localities, and bringing people in from elsewhere just isn't the same.

E: we need a performance system they don't have the ability to interpret what that intelligence says,

The 10-item sustainable development Clinical Health Commissioning Index fared much better, with N = 83. Chronbach α values is 0.90 for both and relatively good average item-total correlations of 0.76 and 0.89. Average item-total correlations of 0.73.Pearson Product-Moment Correlations among Clinical as shown table 1.

Table 1
 Health Commissioning Index socio demographic variables, age, experience, profession

		Clinical Health Commissioning Index
Age (year)		r: 0.91 ; p=0.000
Experience (year)		r: 0.85 ; p=0.001
Profession	Physician	28 ±1.5
	Nurse	24 ±1.2
	Manager	29±2.1

There is statistically difference between health professionals and their CCGs knowledge. Physicians are CCGs knowledge's points are 28 ±1.5; nurses CCGs knowledge's points are 24 ±1.2. Manager's points are 29 ± 2.1. According to Anova test p=0.001.

Conclusion

Health commissioning services via health integration with primary and secondary care may offer a cost effective and safe form of care for chronic disease management to family medical physicians. Interventions are needed to reduce uncertainty about the implementation commissioning processes and to ensure integrated health service models of primary care. This study provides evidence about the attitudes and beliefs of those currently undertaking formal roles within CCGs.

Responders clearly shared clinical knowledge to improve health commissioning. They also believed that CCGs have the potential to improve quality in primary care, although this will depend crucially on the ability of CCGs to engage their members. There is no a priori reason as to why CCGs should be better than PCTs at engaging the public with the need to close services, and it is at least plausible that those with detailed knowledge of patients' wishes are less likely to take the risk of engaging in difficult service reconfigurations.

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Lavender Phytopreprate for Local Analgesia Through Healthy or Damaged Skin

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Abstract

The purpose of this research is the creation and experimental study of a new locally-anesthetized aromotherapeutic phytoprotect "LMKsolutio" for analgesia through healthy or damaged skin. As a simple and objectively measurable and tamper-resistant local pain stimulus, we used a straight-line low-voltage electrical current with standardized parameters, from a "Galvanostat" device, giving 0 to 50 mA. When applied by spreading or spraying without dressings on healthy or damaged skin of the "LMKsolutio" at a dose of 0.02ml / cm2, the increase in the threshold of irritability (sensitivity) as an objective indicator for somatic (skin and mucous membrane) analgesia and deep somatic (in the muscles, tendons, periosteum or joint capsules) pain is a rapid onset (3-5 minutes), between 15 and 40 minutes the irritability threshold is 18 - 36 - 44 times higher and up to 50 minutes is kept up to 12-20 times higher. After 24-48 hours, a slight transient local allergic reaction to the Lavender oil that can be prevented by premedication is possible.

Keywords:

Analgesia, Aromatherapy, Phytopreparate, Skin

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Pain is "an unpleasant sensory and/or emotional experience associated with actual or potential tissue damage or an inconvenient condition described by the terms of this disability" (Атанасов et al., 2007). In a medical aspect, pain is a subjective expression of the action of stimuli, which by force, site of action and interaction are capable of damaging the tissues and/or bringing into the body a nociceptive defense Response (Olapour. et al., 2013) Pain is characterized as somatic (in skin and mucous membranes), deeply somatic (in muscles, tendons, periosteum or joint capsules) and visceral (in the internal organs) (Ochroch & Gottschalk, 2005).Pain sensing sensors are the terminal free nerve endings of the sensory nerve fiber – noci sensors associated with thin myelin or non-myelin fibers in sensory modules(Pritchard, 2009). Their density is higher in the skin and subcutaneous tissue, ligaments, fascias, joint capsules of vascular adventitia and parietal sheets of the pleura and peritoneum.

Mechanisms for the conversion of pain stimuli into receptor potential are accomplished by a sensor complex composed of a receptor coupled to one or more ion channels that generate depolarizing currents or events in response to the stimulus. Three different receptor transducers are described - mechanical (for deformation, stretching, compression), thermal (over 42^0C) and chemical (ions, salts, metabolites, etc.). The ion channels in the sensor complex are Ca2 + or Na +. Their functional capabilities, the ion flow, is determined by the channel flow rate, the duration of its active open state and its mobility, as well as the number of effluent channels in the membrane(Alaoui et al., 2017). When changing the polarity of the nerve membrane as a result of the passage of Na + and K + ions through the respective channels using a K + / Na + pump, local anesthetics inhibit Na + invasion and depolarization of the membrane by acting on the Na + channel(Schuwald et al, 2013). This brief feature of somatic and deeply somatic pain shows the importance and possible mechanisms of suppression by local anesthetics for the symptomatic treatment of minor traumas and injuries (sprains, bruises, edema); in environmental stressors with destructive effects on tissues (mechanical, physical, chemical, biological); in small surgical interventions; as well as to prevent the malignant modification of the nervous system and the possible breakdown of the vital functions of the body from the powerful distress action of the pain (van Wyk., 2008)

The advantages of local anesthetics in their use are that their anesthetic effect can be enhanced by combining them with other drugs and excipients. In addition, their use reduces the risk of the anesthetic preparation falling into the bloodstream, which is an advantage as it is possible to modify the pharmacodynamics and pharmacokinetics of both the anesthetics themselves and their interacting substances (Слюсарь, 1982).

The disadvantage of local anesthesia through undamaged or damaged skin, however, is associated with side effects, a small therapeutic latitude and systemic toxicity of the anesthetics so far used for this purpose, which, as conditions necessary for their passage through the lipophilic keratin layer of the skin and providing the action in an aqueous medium, a high concentration in the form of a lipophilic base and a high degree of ionization at physiological pH is required at the same time.

It is known (Прянишникова et al., 1969) that while the non-ionized form (base) is responsible for penetrating the anesthetic through the skin and the myelin envelope of the nerve to the site of action, its cationic form interacts with receptors in the nerve membrane. That is, the biopharmaceutical aspects (МинковЕвг et al., 1994) of Biologically Active Substances (BAS)-anesthetic dermal medications are particularly important for the penetration of BAS in the stratum corneum and the deeper layers of the epidermis of the skin and for the permeation of BAS through the skin and the possibility of percutaneous absorption(Olapour. et al., 2013).

Of the properties of BAS, their solubility (M/B), the distribution coefficient (water/skin) and the diffusion coefficient are of utmost importance. Transdermal resorption of BAS is enhanced by vasodilation, mechanical massage, including massage phyto products (through the hair follicles and sebaceous glands) and the postperpirational ability of the sweat glands, which, after activation and end of sweat, induce BAS solutions in contact with the skin.

Purpose

The aim of the current scientific and applied research is the creation and experimental study of new locally-anesthetizing aromatherapeutic phytoprotect "LMKsolutio" for analgesia through healthy or injured (traumas, cold, burns, etc.) skin in somatic (in skin and mucous membranes) and deep somatic (in the muscles, tendons, periosteum or joint capsules) pain

Method

For the experimental study of the strength and duration of the action of such a preparation, applied on a healthy skin and without occlusion afterwards, it is important to note that today it is still not possible to measure objectively the force of pain as a sensory component and as an unpleasant emotional and psychosocial reaction " (Атанасов et al., 2007). Therefore, we have decided to use as an easily and objectively measurable and tamper-resistant local pain stimulus - a straight-line, low-voltage electrical current with standardized parameters supplied by electrodes with standard desiccated wet water cushions from a Galvanostat apparatus giving 0 to 50 mA of electrical current (*Рязкова & Кирова, 2002*) . Initially, three times the individual threshold of irritation (sensitivity) about that current at a given time and place on the skin of the same person (for example, a positive electrode from the inside of the left arm or right arm, and negative - on the outside), taking into account the values of the power of the "Galvanosta" current, causing an initial sensation of irritation. After 30 minutes, a healthy skin is smeared (sprayed) on an area of 50 cm2 at the test place with "LMKsolutio" at a dose of 0.02 ml / cm2 (i.e., 1 ml). After 2 minutes during which the phyto product "absorbs", the positive electrode (anode) from the inside of the forearm and the negative (the cathode) from the outside are placed and the "Galvanostat" is switched on. From the 3rd minute to the 60th minute every minute the "Galvanostat" is turned on and off and we note the value of the incrementally increased by us 1 mA current strength (from 0 to 27 mA), which again leads to the same initial sensation of irritation ("biting").

With respect to the time-force dependence data, constant and standardized other parameters are plotted as graphical expression of the change in the threshold of irritability (sensitivity), an objective indicator of the strength and duration of the anesthetic action of the preparation.

The new locally-anesthetizing aromatherapy phytoprotect "LMKsolutio" for analgesia through healthy or injured (traumas, cold, burns, etc.) skin in somatic (in skin and mucous membranes) and deeply somatic (in muscles, tendons, periosteum or joint capsules), investigated by this method, is a suitably constructed by us composition with a predetermined mechanism of action that prevents the generation and administration of the receptor potential from pain irritants in the nerve endings manifested in the change of the threshold sensitivity, containing in certain ratios:

Ethereal Lavender Oil (EPO Monograph 1338), Carbamide, Diethylether, Ethanol, Distilled Water, and Non-ionic Mixed Surfactant (PVA) with an Appropriate HLP value

Results and Discussion

Urea O = C- (NH2) 2 has a keratolytic effect - dissolves hydrophobic compounds and is inserted between keratin molecules, where keratin is dispersed and softened, which greatly facilitates the penetration of substances through the skin (Scheinfeld, 2010; Loden, 2005).

Furthermore, urea is a chaotropic agent - a solubilizer which increases the water solubility of the non-polar groups of substances and acts along with the added nonionic surfactant. With prolonged stay in dilute aqueous solutions and in cold, from urea, active cyanate ions (NCO-) are produced capable of binding H + and cations (Ca 2+ as calcium cyanamide) (Машковский., 1974; Dawson et all., 1986)

Diethylether and Ethanol, as well as solvents and activators of resorption (Грецкий & Цагарейшвили, 1979) , also act by locally lowering the temperature of the skin by rapid evaporation of the skin causing it to contract blood vessels, which reduces the risk of anesthetics in the blood. and then evaporation, the local concentration on the skin of the dissolved in them and in the water substances, increases and changes the distribution coefficient (water/oil/skin) and their diffusion coefficient through the skin, which together with non-ionic mixed surfactant with an appropriate HLP value, improves the permeation (passage) of BAS through the skin and the possibility of their percutaneous absorption (Smith, 2009).

Lavender oil contains 27 components, some of which are: 0.8% alpha and beta pinen; 13% terpineol-4; 5% cinnol; 30-50% (19-36-47% in the Bulgarian oil) linoleacetate; camphan; miercen; lemon; amylvinylcarbinol; 25-45% (28% in the Bulgarian oil) aliphatic monoterpene - free linalool; borneol; geranyl acetate and others (Koulivand et al., 2013; Cavanagh & Wilkinson, 2012). It, through deep penetration and solubility in the lipids under the skin, after initial stimulation (irritation and redness) of the skin causes quite strong anesthesia (Woronuk et al., 2011). Lavender oil (based mostly on pine, terpineol, cyneol, and the linoleic acid containing carboxyl oxygen in the molecule), unlike any other essential oils - antioxidants, has a pro-oxidant activity (electron acceptor) that accept electrons and becomes reduced (Petrovska, 2012) .This property is particularly important in our opinion because of its anesthetic ability associated with ionic asymmetry, due to electron attraction and capture during its reduction which prevents membrane depolarization and the formation of the Na + cationic action potential, as well as the change in ionic permeability in the sensor complex by influencing the surface tension of the phospholipids of the axon biomembrane from the neutral (reduced) form of the Lavender oil (Alaoui et al., 2017).

In addition, Lavender oil has a broad antimicrobial spectrum (Bakhtshirin et al., 2015) (yeast sponges, bacteria, primers) and accelerates repair processes in damaged skin, especially in traumas and burns, and is also low in toxicity (LD50 = 0.17 g)

The charts for a two-fold experimental study of the change in the threshold of irritation (sensitivity) of healthy human skin in the event of an electric shock with force in mA, in time in minutes, after coating or spraying with "LMKsolutio" at a dose of 0.02 ml/cm^2 at an initial irritancy threshold of 0.6 mA and 1.4 mA respectively of the same person over a 16 day interval, can be seen in Figures 1 and 2.

Figure 1
Right hand

Дясна ръка

мин.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	60
Дясна ръка	0	2	1	1	1	2	2	1	1	1	2	2	1	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	1	1	1	2	1	1	1	1	1	1

Figure 2
Left hand

Лява ръка

мин.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	40	60	60
Лява ръка	0	0	0	1	1	1	2	2	2	2	3	3	2	1	2	2	2	1	1	2	1	1	1	1	1	1	1	1			1	1	1

Conclusions

When applied by spreading or spraying without dressings on healthy or damaged skin of the "LMKsolutio" at a dose of 0.02ml /cm^2, the increase in the threshold of irritability (sensitivity) as an objective indicator for somatic (skin and mucous membrane) analgesia and deep somatic (in muscles, tendons, periosteum or joint capsules) pain is of a rapid onset (3-5 minutes), between 15 and 40 minutes the threshold of irritability is 18 - 36 - 44 times higher and up to 50 minutes is kept up to 12-20 times higher. After 24-48 hours, a slight transient local allergic reaction to the Lavender oil that can be prevented by premedication is possible.

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SANITAS MAGISTERIUM

The Scale Development on Health Professionals' Perceptions About Health Sector Privatization in Turkey

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Abstract

The world has witnessed remarkable changes in healthcare since neoliberal policies came into force. Like European countries, Turkey also has implemented the liberal policies, the health transformation program launched in 2003 and paved the way to privatization activities in healthcare sector. The structure of hospitals and health services delivery will start to change with Public Private Partnership Model. This study was aimed at developing a scale on health professionals' perceptions about health sector privatization in Turkey. Based on previous studies and professional findings, twenty-five sample statements were used to evaluate the perception of health staff on privatization in the Turkish health services. Research sample consists of 325 health workers who actually work in family healthcare centers and secondary public hospitals (physicians, nurses and allied health professionals) in Edirne Province and in its' districts. The surveys were analyzed by IBM SPSS Statistic 20.0 and IBM SPSS Amos 23.0 programs via reliability, validity and factor analysis. The content validity of the scale was found as relevant for the study (CVI=>0.87). Moreover, face validity score reflected that statements could be clearly understood (90%). The Keiser- Meyer-Olkin Measure of Sampling Adequacy indicated that sample is useful and suitable for factor analysis process (0,879). Again, the Cronbach's Alpha of the F1 is 0,848 and F2 is 0,703. According to the split half method, the scale is highly reliable. CFA results show that the model does fit data adequately. (Chi Square: 168,041, CMIN/DF: 2,241, GFI: 0,927, AGFI: 0,898, CFI: 0,930, RMSEA: 0,063, PCLOSE: 0,049). To sum up, reliability and validity analysis of the privatization scale conducted by authors indicated that privatization scale could be used as a valid and reliable tool to measure the privatization perception of health staff in the health sector.

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The world is undergoing a great period of change and healthcare services are no exception to this. Healthcare services were provided to the public via taxes or public insurance structures especially after the Second World War with regards to welfare state. However, with globalization international competition was born and public resources was found grossly inadequate to meet these enormous needs. Consequently, the world experienced the much needed wave of change in economic and health policies to signal the end of the welfare state era.

In the last decade, privatization policy of health care system has become a phenomenon. In Canada for instance, the cost of quality health services was high, ,which posed serious problems in accessibility of health services (Podgorsak, 2009). Also, the second wave reform movement in 1999, saw Poland restructuring the finance mechanism of healthcare , with many hospitals passing from local government to larger administrative areas (Watson, 2005). In the U.S., which is the only country that delivers market-oriented health services set the pace with more than 40% of the total public hospitals changing their ownership between the period of 1991-2001 (Villa & Kane, 2013; Angell, 2008). Profit-based hospitals which are under a DRG payment system abound in Germany. Private hospitals in Canada's health system, -profit oriented hospital investments in Sweden as well as hospital and health care system in South Korea were adapted from the U.S. system (Himmelstein & Wooldhandler, 2008). Israel's health care system has been delivering high quality care to all their citizens, however between 1995-2009 the share of publicly financed healthcare decreased by 10%. Citizens had to purchase private insurance and spend more from their pockets for quality health services (Chernichovsky, 2013). The most important privatization process was witnessed in Macedonian healthcare system, where the low-quality public health care system triggered off the growth of private services (Munoz, 2002)

From the beginning of 2003 to date, the Turkish Universal Healthcare system has changed dramatically. Citizens are compelled to "compulsory health insurance system" which came into force on 01.01.2012. This health insurance system covers medical treatment expenditure of the nationals. Patients are allowed to choose any public and or private inpatient and outpatient health care services by using this mandatory health insurance premium. Private hospitals offer short waiting lists and much more comfortable physical conditions. Therefore, patients with this health insurance policy had to pay or co-pay for using health services in private hospitals. The second fundamental change was launched with Public Private Partnership (PPP).A new model of Health campuses was born with the managerial and human resources structure of public hospitals reorganized in Turkey. According to Turkish public perception, non-government institutions (i.e. NGOs, foundations and profit-organizations) defined as 'private' (Privatization Endevaor in Turkey) By the time government had transferred the ownership of hospitals from public to private, of which, the civil servicet health staff would refer to this changing process as 'privatization'. Privatization is therefore, a method or Term, used by governments for improving the quality of health care, and solving budget problems. The main concept of privatization is 'to transfer the ownership of institutions from the public sector to the private sector' (Albreht, 2009). There are three concepts of privatization: (i) for introduction of competitive forces, (ii) to encourage

independent management of public-based bodies (i.e. hospitals), (iii) introduction of market-oriented incentives within public institutions (Saltman, 2003)

The aim of this study was to develop a scale on perceptions of health staff about privatization, using literary review. It is pertinent to note that there is no reliable means available to measure the perceptions of the entire health staff on privatization. Therefore, the development and validation of this instrument raises serious credibility for researchers interested in health systems and analysis reform process of the health sector and privatization.

Method

Data were collected from health workers (physicians, nurses and allied health professionals) who are actually working in family healthcare centers and secondary public hospitals in Edirne Province and in its' districts. All the family healthcare centers including secondary public hospitals were included in this study. At the time of this study, the total number of healthcare workers was 3405. To save time and cost, 325 personnel were chosen randomly from the aforementioned population. The participants were briefed on the aim and objective of the study, after which their consent was obtained. 316 surveys were meticulously carried out without missing any and the results are included in this study.

Based on previous studies (Harmanci & Yıldırım, 2012), an extensive review of the literature on perception about privatization in healthcare sector and expert opinion, twenty-five statements were prepared by authors to measure the perception of health workers on privatization in healthcare services. Four-point Likert Scale was applied. 1=Strongly disagree, 2=Disagree, 3=Agree and 4=Strongly agree. Forced Likert Scale (Allen &Seaman, 2007) was used in order to prevent hesitations in answering. The participants were advised that if they thought they didn't have enough information about the privatization concept, to choose the best answer which is closest to their opinion. This is important in order to make participants feel comfortable in the applying process.

The surveys were analyzed by IBM SPSS Statistic 13.0 and IBM SPSS Amos 23.0 programs via reliability, validity and factor analysis.

. Results

Content Validity

Content validity addresses whether the content of the scale is relevant or not to the purpose of the measurement. This validity indicates how well the items were developed and adequate for the construct of the study. To design an appropriate study, the statements of the scale have been developed based on an extensive literature review and experts' opinions (Carole & Winterstein, 2008). After the scale development process, 8 purposely chosen experts were asked to evaluate each statement whether it is relevant or not to content of the study. Each expert rated each statement in terms of relevance independently based on a Likert scale which includes, 1=not relevant, 2=somewhat relevant, 3=relevant, 4= completely relevant. The Content Validity Index(CVI) which was developed by Lynn (Lynn, 1996) was used to measure the validity of the scale. The measurement rate is the proportion of experts who rated statement as "3" or "4" in total .

A statement should be rated by %87 of experts to validate it. In our study, each questionnaire was found as relevant for the study (CVI ≥ 0.87).

Face Validity

In the face validity process, all statements were evaluated in terms of clarity of words and being understandable. To measure the face validity, fifty participants were randomly chosen from the sample. Each participant rate statements based on a Likert scale (1= strongly disagree, 2=disagree, 3=agree, 4=strongly agree). Ninety percent of the participants reported that statements are clearly understood.

Exploratory Factor Analysis

To determine the factor construction of the scale, explanatory factor analysis (EFA) was performed using SPSS. The aim of EFA is to reduce the number of statements to an acceptable level and to determine the underlying constructs. The Keiser-Meyer-Olkin Measure of Sampling Adequacy was found as 0,879. This indicates that sample is useful and suitable for factor analysis process. The scree plot was used for deciding on how many factors are needed to be extracted. The scree plot is a suitable deciding method when sample is greater than 200. It provides visual results and facilitates the extraction process. It gives researchers, the importance of each factor on a graph. The number of data points which remains at the left of the inflexion point is accepted as the number of factors (Field, 2009). According to "scree plot graphics" and "total variance explained" chart, it is decided that the scale has two factors. The inflexion point is the third point. Therefore, there are two points at the left side. Two factors explain the 43 per cent of the total variance.
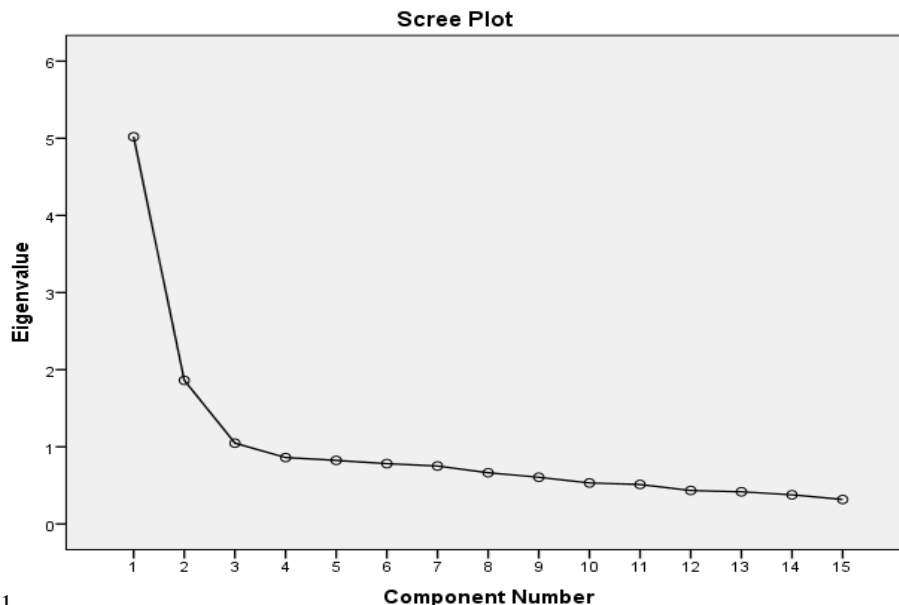
Graph 1. Scree Plot of Factor Analysis

Table 1.
Keiser Meyer Olkin Value of The Scale

Keiser- Meyer-Olkin Measure of Sampling Adequacy	,879
Sig.	,000

According to factor analysis, 10 statements (3, 4, 6, 9, 11, 13, 21, 23, 24, 25) which had factor weights under 0.40 or were under two factors both were excluded from the scale. So, after the first analysis, the scale remained with 15 statements under two factors. Factor 1 refers to positive side of the privatization while "Factor 2" to negative side. The 20th statement was expected to be under the factor 1 before the analysis. But it was seen that the spread of private insurances is perceived as a negative situation by participants. So, the statement was accepted as under "Factor 2". The loading of statements is shown in the table below.

Table 2
Factor Weights of Statements

Statements	Components		
	1	2	Alpha
10. The quality of health services rises with the privatization of public health institutions.	,770		
16. Hospitals work more efficiently with the privatization of public health institutions.	,736		
8. Health workers are paid more with the privatization of public health institutions.	,734		**0,848**
1. The privatization of public health institutions has benefits for public.	,707		
5. The number of health workers rises with the privatization of public health institutions.	,677		
7. Equity and fairness will be provided via privatization of public health institutions.	,667		
12. More people can benefit from health services with the privatization of public health institutions.	,621		
2. Public institutions work with over staff and inefficiently.	,560		
14. Poor people can't access to health services with the privatization of public health institutions.		,700	
22. Health expenses must be compensated by taxes.		,683	
18. Out of pocket payments rise with the privatization of public health institutions.		,660	
20. The privatization of public health institutions cause rising in the private health insurances.		,647	**0,703**
19. Health workers will have to work under more dangerous conditions in terms of labor health and safety with the privatization of public health institutions.		,513	
17. Public health institutions must not be transferred to the private sector completely.		,477	
15. Health expenses of a country rise with the privatization of public health institutions.		,428	

Internal Consistency Reliability of the Scale

Reliability analysis indicates the consistency level of a scale. For the scale reliability, as statements can be split into two parts, the split half method was used. Split half was performed to revised scale which includes 15 statements. According to results, the scale is reliable at the high rate as shown in the table

below. The Cronbach's Alpha of the F1 is 0,848 and F2 is 0,703. And there is a negative correlation between forms (-, 418).

Table 3
Reliability Analysis Results

Cronbach's Alpha	Part 1	,848
	Part 2	,703

Confirmatory Factor Analysis

After the EFA, "Confirmatory Factor Analysis" (CFA) was performed using IBM SPSS Amos 23.0. If the two-factor structure that was obtained from EFA has a good fit with the CFA results, then it can be said that the same structure will be confirmed. According to results, the two factor model is confirmed and fit to data. But a statement (Q17) which has lower load than 0.40 was excluded from the model. So, ultimately scale has 14 statements which distribute in two factors as; F1: 10, 16, 8, 1, 5, 7, 12, 2, F2: 14, 22,18, 20, 19, 15. According to results the model does fit data adequately (Chi Square: 168,041, CMIN/DF: 2,241, GFI: 0,927, AGFI: 0,898, CFI: 0,930, RMSEA: 0,063, PCLOSE: 0,049).

Graph 2
Confirmatory Factor Analysis
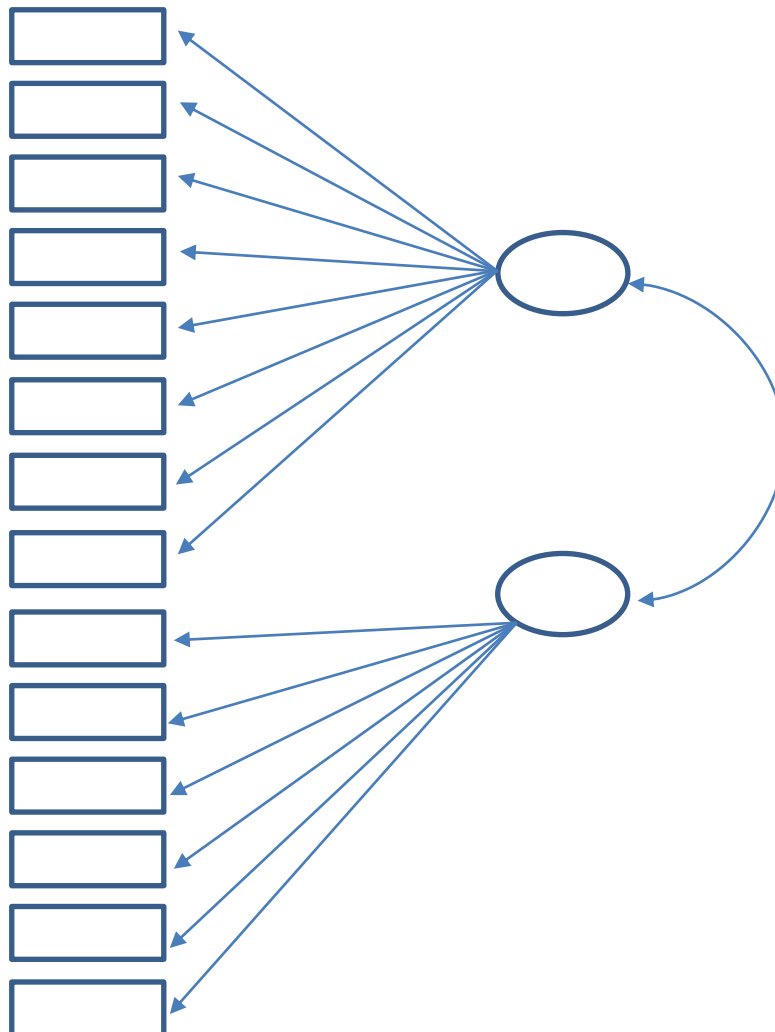
GFI (Goodness of Fit Index) and AGFI (Adjusted Goodness of Fit Index) were developed by Jöreskog and Sörbom. GFI was developed to evaluate model fit regardless of sample size. GFI indicates to what extent the model measures covariance matrix and it is considered as the sample variance explained by the model. AGFI is a kind of readjusted GFI for the number of parameter estimates (Çokluk et al, 2010). GFI and AGFI should be close to each other. Good fit values are 0.95-1 and 0.90-1 respectively. While 0.90-0.95 is acceptable for GFI, 0.85-0.90 is acceptable for AGFI (Schermelleh et al., 2010; Waltz et al., 2010)) . In the study they were found to be 0,927 and 0,898 respectively. CFI (Comparative Fit Index) represents the ratio between the discrepancy of this target model and the discrepancy of the independence model. Roughly, the CFI thus represents the extent to which the model of interest is better than the independence model. According to Wang and Wang (Wang &Wang, 2012) minimum CFI should be 0.90 to be acceptable fit and in this study it was found to be 0.93. RMSEA (Root Mean Square Error of Approximation) was developed by Steiger and Lind. It is used to determine covariance of the population in non-central x^2 distribution. Unlike GFI and AGFI, RMSEA should be close to 0, but values up to 0.08 can be accepted. In the study it was found to be 0.063 (Çokluk et al, 2010; Hooper et al., 2008). X^2 /DF was found to be 2.241 and it is acceptable between 2 and 3 (Moss, 2016).

Table 4
CFA Results

Index	Value
Chi Square	168,041
DF	75
CMIN/DF	2,241
GFI	,927
AGFI	,898
CFI	,930
RMSEA	,063

It is observed that F1 includes the statements that refer to advantages of privatization and F2 includes the ones that refer to disadvantages of privatization at the end of the factor analysis, So, F1 can be called as "Positive Side of Privatization" and F2 as "Negative Side of Privatization".

Conclusion

According to this study, a new scale has been developed about perceptions of health staff on privatization and reliability and validity of scale been conducted through exploratory and confirmatory factor analysis.

The content validity of the scale was found as relevant for the study (CVI ≥ 0.87). Moreover, face validity score reflected that statements can be understood clearly (90%). The Keiser-Meyer-Olkin Measure of Sampling Adequacy indicates that sample is useful and suitable for factor analysis process (0,879). Two factors were obtained about scale: Factor 1- Positive side of the privatization; Factor 2- negative side of the privatization. According to split half method, the scale is reliable at high rate. Cronbach Alpha value of F1 and F2 are 0,848 and 0,703 respectively. CFA results show that the model

does fit data adequately (Chi Square: 168,041, CMIN/DF: 2,241, GFI: 0,927, AGFI: 0,898, CFI: 0,930, RMSEA: 0,063, PCLOSE: 0,049). The advantage of this study is in using of a sample which consists of all levels of health service institutions.

The results show that this scale presented high internal consistency and can be used to determine the perceptions about privatization. It will help the researchers to evaluate the perceptions of health staffs about privatization during next studies.

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Approach to Material Evidences and Protection of Material Evidences in Emergency Healthcare Services

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Abstract

One of most frequently encountered case in providing emergency health services before hospitalization is judicial cases. Approach to judicial cases are quietly important in context of protection of material evidences. 112 Emergency Health Staff take place on scene among arriving team in a short time when the case occurs. By law 112 Emergency Health, teams are responsible for protection of evidences while they furnish medical intervention to those who are ill/injured or died. Although priority of emergency health staff is to provide emergency medical interventions. They are also responsible for gathering, protecting and saving of the evidence in the scene. The evidence is good to solve the controversy, to prove the act of criminal, to reveal the details of criminal, to determine the individuals related criminal. Thus, it is very important in context of judicial cases. Although the attentive studies which are helded by emergency health staff while protecting material evidences would accelerate the judicial process in context of revealing that concrete case, damaging the material evidence of during medical intervention would make judicial process hard. In this regard, arranging course on the approach to judicial cases for active health staff would contribute to reveal.

Keywords:

Evidence, Judicial Case, 112 Emergency Aid

The point of interest of Emergency Health Services before Hospitalization is related with all kinds of life-threating cases (wounding, downfall, traffic accident etc.) where occurs out of hospital. The most important part of cases comprises of life- theating judicial cases. Judicial case can be described as woundings which ccocurs as a result of intentionally, unwary or careless behaviors to someone. 112 Emergency Health Staff may provide medical intervention to judicial cases like suicide, sexual assault, family violence, abuse, wounding, accidents, using alcohol, drug addiction, food and medicine poisoning, criminal abortion, malpractices etc. 112 Emergency teams are the first contacts for the patients, their relatives and eyewitnesses and who see the material evidences. Number of real judicial cases is not known because of keeping secret by not reporting to police. Because of fact that 112 Emergency Health Staff provides their services to patients by force of nature of the medical services, they may play an important role in context of revealing the judicial case. The obligation of reporting the crime is underlined in Turkish Penal Code. According to 280. article of Turkish Criminal Code, the health worker who does not report to competent authority or retards though encountering glimpse related the crime is punished with imprisonment up to one year. As can be understood via legal obligation, it is necessary to gather, protect, save and register the evidences. The duty of health staff who provide emergency care is not involving to different specialty areas (polis, solicitor, forensic expert), but ensuring coordination between different institutions and researching by using its specialty knowledge. Otherwise, while judicial review may be beclouded, the court may also miscall due to the laxity or careless of health staff. In this respect, it must be aimed that 112 Emergency Health Staff consist of who have experience and knowledge for judicial cases. Judicial evaluation must be known to result in a short time. Elements of judicial evaluation are to take medical history, psychical examination, to gather, describe, protect, register of evidence and to manage crisis in the scene.

Scene Management in Judicial Cases

The securities of scene and health staff are fundamental component in emergency situation. Investigation of judicial case and protection of material evidences can be discussed after ensuring security of them. Otherwise, it is likely to affect judicial and health dimensions of the services. The health staff's experiences and knowledges on scene management is quietly effective in evaluating judicial case. When compared with judicial cases, attitudes like prejudgement and the behaviors like plaguesome looking would be elements which make heavy weather of it. The attitudes and behaviors towards the case can contribute to scene management positively or negatively. Controlling the emotions, objective approach to judicial case, not intermixing professionalism and emotion in medical intervention are expected attitudes from emergency health staff. Instead of being quizzical, derogatory, othering communication type, being sincere, understanding and helpful attitudes and behavior effects in scene management and gathering evidences positively. Individuals may not want to share their special information without trusting health staff and good communication. Effective communication depends on trust and respect. While explanation of all process which would implicate laconically for individuals would facilitate all works which are undertaken by health staff, it also would enhance sense of trust of individuals. Speaking to the individual by empathizing and listing are pretty important. Fear, anxiety, shame, depression, suicide attempt, self-recrimination and behavior disorders, self-harm, using alcohol, substance-use disorders of the individual must be observed by considering the mood, protection, record, not changing the place of material evidences related the crime, generating secure way to

scene, taking precaution for secondary risks are expected behaviors of health staff in judicial cases which are resulted in death. Emergency health staff may encounter legal sanctions if they cause to delete or secret the evidences consciously or unconsciously during intervention to the judicial case. In this regard, being more disciplined and painstaking is quietly important in context of security of material evidences. The importance of recording of judicial evidences have been underlined in regulations. According to 15. article of The Ambulance and Emergency Health Vehicles with Ambulance Services Regulation: "Ambulance and emergency care technician is responsible for medical interventions practiced in emergency health vehicles which have not any physician, recording medical information concerning patients regularly, appending all medical interventions to patient file". Correct recording is as important as proper invention to judicial cases.

Taking Medical History and Reporting to Legal Authorities in Judicial Case

While taking medical history in addition to general disease history as; "what happened?", "where happened", "when happened", "how happened. Good communication and giving trust to patient would arise positive results in context of reaching correct information while listened patient complaint and given information related to case. Verbal expression of patient must be recorded without changing by no means. Experienced, trained and informed health worker which would take medical history will facilitate all process in context of protection of material evidences. Selecting clear words and asking questions which can be answered by patient easily would be useful in revealing of the judicial case. If the patient is unconscious or lose the ability of speaking, it must be tried to take information about concrete case from eyewitness in the scene. It should be communicated with police force and careful about obtaining correct information while fulfilling these acts. If the patient's contradictory expressions and suspicious behaviors are observed by emergency health staff and he/she rejects treatment or transplantation in order to whitewash the judicial case, it should be reported to legal authorities. In addition to medical intervention to judicial cases, many important process steps like protection of material evidence, reporting to legal authorities and recording have been given below:

Figure 1.
Approach to the patient in forensic case

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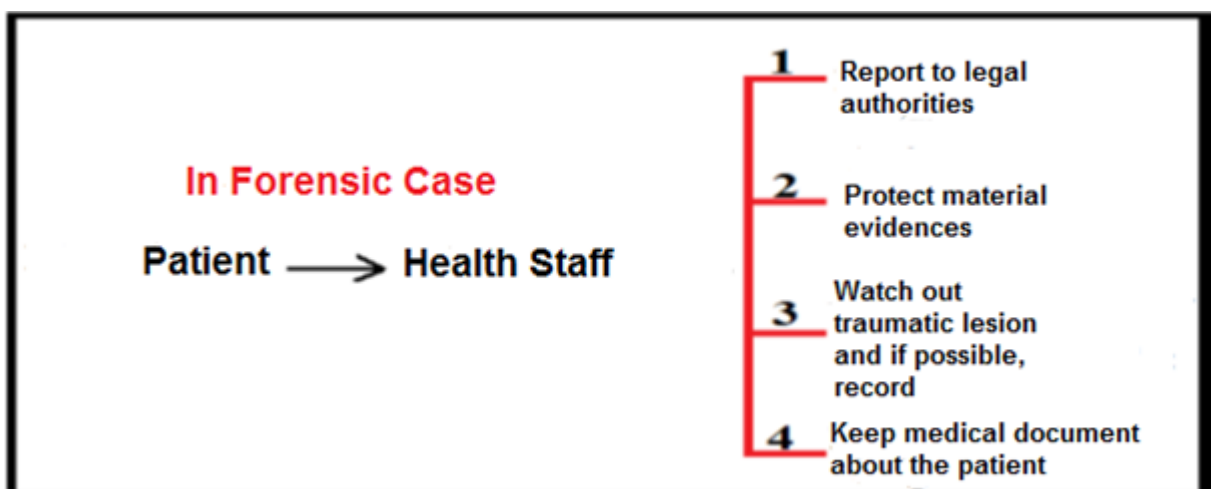
Examination and Evaluation in Judicial Case

It requires that physical examination of suspect and victim must be realized in order to check any trace out and to reach evidence related to the crime. But, physical examination before hospitalization cannot be realized in the scene to reveal the crime. One of the principal responsibilities of health staff is to protect the evidence which is found on the patient until physical examination of suspect and victim is realized. If necessary, it must be hindered to changing clothes, washing face, having bath, relieving oneself of suspect or victim. Although gathering evidences and realized examination for taking tissue sample which would reach to the doer are issues related to forensic science, protection of these evidences is related to emergency health services before hospitalization. Therefore, conducted studies within coordination between different institutions would facilitate the solution of judicial cases.

Gathering Evidences in Emergency Before Hospitalization

Everything which is used by the suspect for crime has evidential value. It is so important to benefit from any type of judicial evidences in context of illumination of concrete case. Type of judicial evidences is also;

- Psychical Evidences (guns and fireless weapons)
- Biological Evidences (blood, clay, saliva, nasal discharge, semen, bran, skin rash, nail, urine etc.)
- Chemical Evidences (soil sample, gunshot residue, bottles shards, hype etc.)
- Trace Evidences (fingerprint, track, footprint, tooth trace etc.) as classified.

Emergency health services' staff must put personal protective clothes on (gloves, bone, glasses, uniform etc.) during intervention to judicial cases for protection of the evidences. Using one way to entrance to the scene by generating security path would prevent to damage the evidences. It must be moved carefully on a determined route to not throw about evidences. Except medical equipment which is on patient, it must not to be left any material and to be taken from the scene. At the same time, emergency health staff must not eat and drink something and not move any material (pull sofa, pillow, plate, table, cupboard, chair etc.). If moving these materials is compulsory, the changing must be done as to be enough for medical intervention. Also, photographs must be taken before changing and must be reported to police.

It is taken in consideration that pathological sampling and medical examination for the suspect must be done to obtain any evidence. For example, the changing clothes, having bath, if it possible relieving oneself of the victim who is sexually abused must be prevented. Although gathering evidence is not first responsibility of health staff, it is undeniable realty that they play significant role because they can be first-rate witness in context of revealing the case. According to 278. Article of Turkish Criminal Code, health staff which arrived to the scene firstly must report the judicial case to legal authorities (polis, military police). In addition, the materials which can be evidence must be protected painstakingly by health staff. Otherwise according to 281. Article of Turkish Penal Code, it can be matter of the crime of concealing the evidence for health staff. Equipment which is used for medical intervention must be left onto patient and must be dispatched like that in judicial cases which are result in death. Invasive procedures realized during medical intervention must be marked on patient. If probable acts to conceal the evidences take place, judicial polices are responsible for preventing it as required by law. According to 168 Article of Turkish Penal Code, the judicial police preclude those who hinder the process of crime scene investigation until the end of it. Emergency health staff must not forget that there are extra tasks in addition to their priority responsibilities and must work carefully and

painstakingly during medical intervention.

Conclusion

In accordance with the nature of the occupation of 112 Emergency, health staff encounters judicial cases before hospitalization. Although it is expected condition of 112 Emergency Health Staff encounters these cases, discernment of these cases from other cases and protection of evidences by health staff are different job for expert. All of the process can be possible with having theoretical knowledge, experience, comprehension, ability for it. For this, it necessitates to be added, primarily into paramedic curriculum, the course of "Judicial Paramedic". In this way, the candidate of paramedic pupils taking course about judicial cases and reinforcing with practice would develop professional behaviors when they encounter it after graduation. It would be useful that the managers employing health staff for emergency health services before hospitalization have an attitude about supporting attendance of organized training course related to judicial cases in context of the service output. In this way, ensuring coordination between security forces and health staff would contribute to run the process fast and correctly.

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