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Informing patients and access information websites of referral clinical centers in the territory of the former Yugoslav countries

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Abstract

Introduction: At the present time it is impossible to imagine life without the Internet. Internet as a concept was first mentioned in 1962 by JCR Licklider of the Massachusetts Institute of Technology (MIT). Former Yugoslav regions after the reform of the health system, the transition from a socialist to a democratic faced the new challenge. The question is how the web site maintained that providing information to patients, the level of information given to the public of this technology on which they are based.

Materials and Methods: The study was designed as a descriptive epidemiological study with data from 7 countries of the former Yugoslav republics: Slovenia, Croatia, Serbia, Bosnia and Herzegovina, Montenegro, Macedonia and Kosovo. Variables that have been observed are: (1) design and technical characteristics of the website, (2) update the Web site, (3) information and guides for patients (4) the functionality of web pages on mobile devices.

Results: Total Analyzes university clinical centers from 7 countries of the former Yugoslavia. All web sites 18 (100%) had active service information regarding delivery, received patients in the emergency centers etc. Guides for patients and links to other web sites types ministries of health, social policy and so on. had 17 (94.4%), web sites, while 1 (5.6%) websites did not have that information. Technological score websites minimum amounted to 39 (5.6%) while the highest was 67 (5.6%) of the estimated web pages.

Conclusion: The study showed that the majority of clinical centers have developed websites that are up to date with modern technology development. The problem presented by some clinical centers whose web pages are invisible to Google, Bing and Yahoo search engines Mostly on the website of benefit checks guides, telephone directories, the list of services and signs and clinical centers.

Keywords: website, patients, information availability.

Introduction

Nowadays, life is impossible without the Internet. Internet as a concept was first mentioned in 1962 by JCR Licklider of the Massachusetts Institute of Technology (MIT). About ideas in internet communication discussed in the paper titled "Galactic Network concept." Among other things he wrote and opportunities of the global earth connecting all the computers in the country in a single unit which can quickly access and share information. (1)

Research conducted by the Royal College of Surgeons has shown that people who search the Internet, including doctors, measurable largest group of Internet users. A quarter of the material on the Internet is associated with health, while a third of users asking for links related to the diagnosis and the symptoms of various diseases. In addition, the Internet can be used for educational purposes students of Faculty of medicine and medical branches. (2-4)

Yugoslav yu domain was registered before the start of the war events in Yugoslavia in 1989 by the Federative Republic of Slovenia. Slovenia registrated si domain in 1993. Croatia s domain hr was registrated in 1993. Bosnia and Herzegovina received the domain ba in 1996. Domain yu remained the official domain of the Republic of Serbia until 2010, when it shut down and replaced with rs domain. Montenegro registered domain me in 1994. Macedonia s domain mk was registered in 1993. Kosovo still has no domain, but uses Albanian domain.

It is well known that the Internet reaches out to all branches of society as a whole. The information in the cloud (Cloud), the quality of Internet service QoS, integration etc. are one of the indicators that the Internet has reached its adulthood. (5, 6) The use of the Internet for medical purposes has increased a lot in recent times. Monitoring of the patient, control of HIV treatment, measurement of blood sugar level as well as multiple applications in systems for archiving and consultation is present medicine. Use of the Internet in surgery is one of the goals of medicine in the future.

Countries of the former Yugoslavia after the reforms of health systems, the transition from a socialist to a democratic system to go with a new challenge. The modernization and digitalization of the health system was started 10 years ago. Nowadays medical health care institutions have their own personal online presentation (web site). The question is how the web site maintained that the information provided to patients, the level of information provided to the public and the technology on which they are based.

Web sites that offer users/patients should contain information related to health issues, signs, phone numbers, different guides for the disease. (7) They need to be regularly updated and changed. On the other hand, the technology that lies behind these sites should follow the latest trends, to be safe, and that allows everyday modern communication between institutions and patients. (8)

Materials and Methods

The study was designed as a descriptive epidemiological study with data from 7 countries of the former Yugoslavia: Slovenia, Croatia, Serbia, Bosnia and Herzegovina, Montenegro, Macedonia and Kosovo. All data are searched from the official server referral clinical centers in the mentioned period.

The variables that are observed are: (1) Design and specifications website, (2) update sites, (3) information and guides for patients (4) the functionality of websites on portable devices.

Data were analyzed in the period January-February 2017. The design and technical characteristics of the website are analyzed by software tools Build and W3 Techs tool. Updating the website was carried out by visual inspection as well as information for patients, as well as W3 Techs tool and Google analytical tool. Functionality and properly display Web pages was conducted via Mac OS 10.9.2, Mac OS 10.8.2 and Mac OS 10.5.2 system, Windows 7-64 bit system, Windows XP, as well as iOS and Android mobile systems.

All data is stored in a MySQL database and analyzed by IBM SPSS Statistics 22.0 for MacOS programs.

Results

Total analyzed university clinical centers from 7 countries of the former Yugoslavia. Data related to the design of the website, its adaptation to the screen size and device screen showed the following results: actively adjusting the conditions of the use amounted to 17 (94.4%) of sites, while inflexible website was 1 (5.6%).

Provided the following data for Content management system (CMS): Typo3 1 (5.6%) websites, PHP programming language 1 (5.6%) websites, Wordpress 7 (38.9%) of web sites, Drupal 2 (11.1%) websites, Asp.net 2 (11.1%), websites, Flash / Java 2 (11.1%) of websites, Joomla 3 (16.7%) websites. Of the total number of web sites, Apache was present in 11 (61.1%) of web sites, Apache was present in 5 (27.8%) of web sites, IIS in 2 (11.1%) websites.

Plugin has installed 18 (100%) websites. Widgets for social media (Facebook, Twitter, etc.) has 10 (55.6%) of web sites, while 8 (44.4%) of web sites do not have or are not operational. The mobile version of websites has a total of 18 (100%). Regular updating of web sites, there are 17 (94.4%), web sites, and 1 (5.6%) websites does not update. Information news for the website has 13 (72.2%) of sites, while 5 (27.8%) does not have information about news on web pages.

Technological score websites gave the following results: 1 Web site had a rating 39 (5.6%), one website had a rating of 50 (5.6%), 1 web site had a rating 51 (5.6%) two web sites had a rating 53 (11.1%), one web site is a grade 54 (5.6%), one web site is a grade 55 (5.6%), three websites had a rating 58 (16.7%), one web site is a grade 59 (5.6%), two web sites had a rating of 60 (11.1%), one website had a rating of 64 (5.6%), one web

site had a rating of 65 (5.6%), two web sites had a rating of 66 (11.1%), and one website had a rating of 67 (5.6%).

All websites 18 (100%) had active service information regarding the number of births, admissions to emergency centers and so on. The guides for patients and links to other websites type ministries of health, social policy, etc., had 17 (94.4%) web sites, and 1 (5.6%) websites did not have that information. Languages for possible review sites were as follows: 1 language had 7 (38.9%) of web sites, two languages had eight (44.4%) of web sites, with 3 languages 31 (5.6%) web sites, with 4 languages 1 (5.6%), web sites, and with 7 languages 1 (5.6%) websites.

Hospital contacts with important phone numbers, information, etc. had 17 (94.4%) of web sites, while 1 (5.6%) Web site did not have information about phone numbers. Roadmap for navigating within clinical centers on the website had 17 (94.4%) of web sites, while 1 (5.6%) websites did not have a clue. Price list had two (11.1%) websites, while 16 (88.9%) websites did not have a price list of services. The list of services provided had 17 (94.4%) of web sites, while 1 (5.6%) websites did not have a list of services.

Discussion

The total number of pages that have been adapted to the device to be used for review was 17, with the exception of one site, Clinical Center of Kosovo who had no adjustment device. The problem is the name and purpose of the website which analysis tools are not able to register. The inability to find adequate sites Clinical Center was another problem that they faced the researchers for this study.

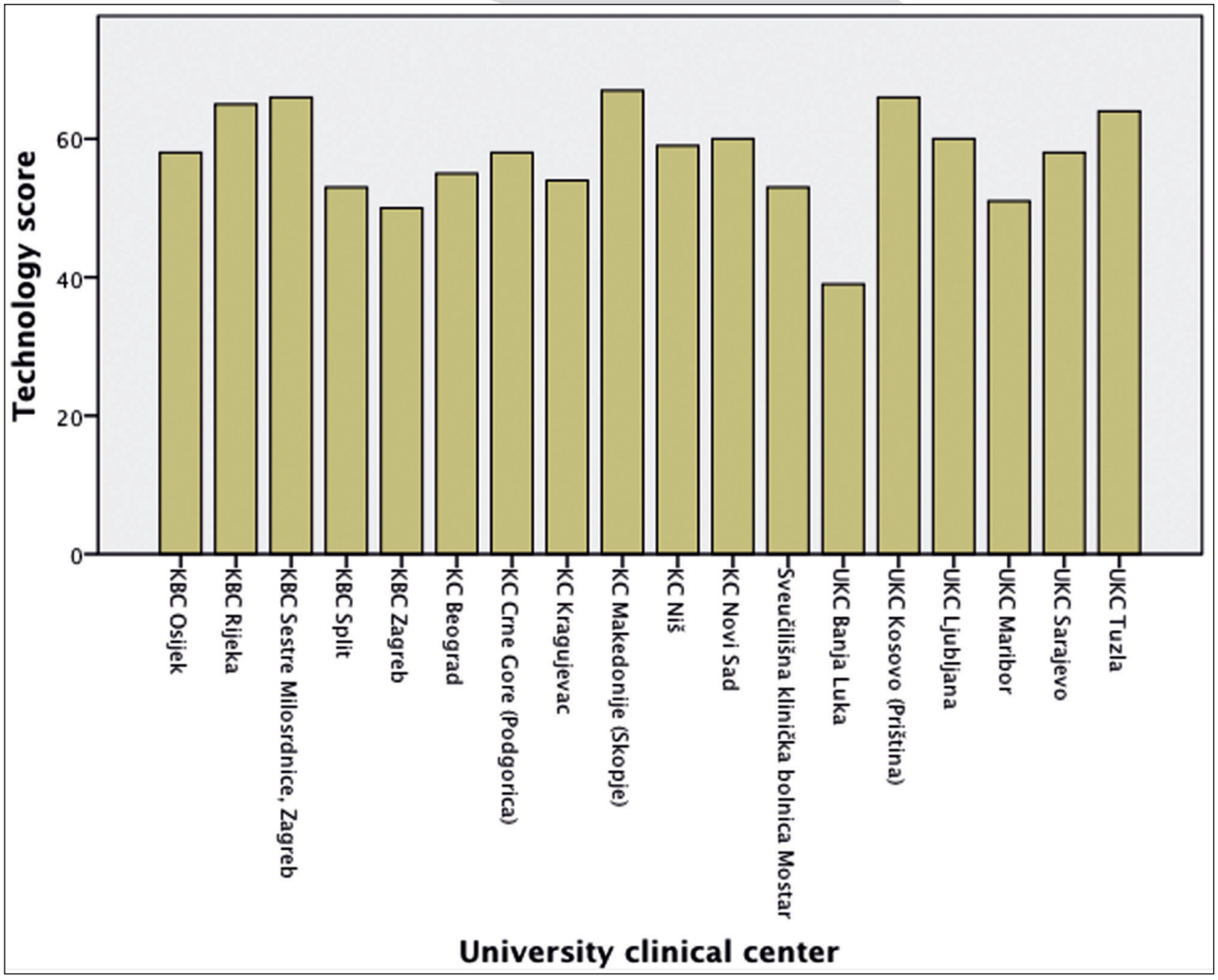

Figure 1. Rating overall technologies that have been applied in the development of websites

Table 1. Technical characteristics of the web page

University clinical center	Social media	links	guides	Updating of web page	news feed	languages	hospital directory	gadepost	tariffs
Slovenia									
UKC Maribor	+	+	+	+	+	4	+	+	+
UKC Ljubljana	+	+	+	+	+	2	+	+	+
Croatia									
KBC Zagreb	+	+	+	+	-	1	+	+	-
KBC Sisters of mercy, Zagreb	-	+	+	+	-	1	+	+	-
KBC Rijeka	-	+	+	+	-	1	+	+	-
KBC Split	+	+	+	+	-	1	+	+	-
KBC Osijek	+	+	+	+	+	1	+	+	-
BiH									
UKC Sarajevo	+	+	+	+	+	2	+	+	-
UKC Tuzla	+	+	+	+	+	2	+	+	-
University Clinical Hospital Mostar	-	+	+	+	+	2	+	+	-
UKC Banja Luka	-	+	+	+	+	2	+	+	-
Serbia									
KC Beograd	+	+	+	+	+	1	+	+	-
KC Nis	-	+	+	+	+	2	+	+	-
KC Kragujevac	+	+	+	+	+	3	+	+	-
KC Novi Sad	-	+	+	+	+	7	+	+	-
Montenegro									
KC Montenegro (Podgorica)	-	+	+	+	+	2	+	+	-
Macedonia									
KC Macedonia (Skopje)	+	+	+	+	+	2	+	+	-
Kosovo									
UKC Kosovo (Pristina)	-	-	-	-	-	1	-	-	-

Social media (+ to - not), links (+ to - not), guides (+ to - not), update the website (+ to - not), news feed (+ to - not), languages (number of languages), hospital directory (+ to - not), the sign (+ yes - no), tariffs (+ yes - no).

Leonardi and colleagues in the study showed that since 2007 intensively growing interest of patients for Web-based medical information. They are particularly interested in patients who have an indication for surgery, and they are more often interested in the surgical process and procedures. (8)

There are several tools (some of them are free) which can be used for creating reports for the website, and providing information for the operating system, web server and the technology behind the Web sites you use. The most commonly used are: Netcraft, Build, W3 Techs, Wappalyzer, Similar Tech, Allora and What CMS. The investigation used the Build and W3 Techs, that are searching the Internet proved to be the most suitable for this type of research.

Content management system (CMS) is a computer tool that supports the creation and maintenance of digital content (web pages). (9)

Wordpress as a CMS system was present in 7 (38.9%) websites. Research shows that the most commonly used Wordpress CMS system in the world by 27.4% during 2016, according to research conducted by Google analytics. Joomla has been used in 3 (16.7%) of the web site, and is the second most widely used CMS system. After global research Joomla is in second place and occupies 3.4% of the world's Web sites. (9) Drupal as a CMS was present in 2 (11.1%) websites, which coincides with the global studies of 2,2% of world web sites. (2, 10)

The most commonly used server was Apache with 11 (61.1%) of web sites, which is in line with

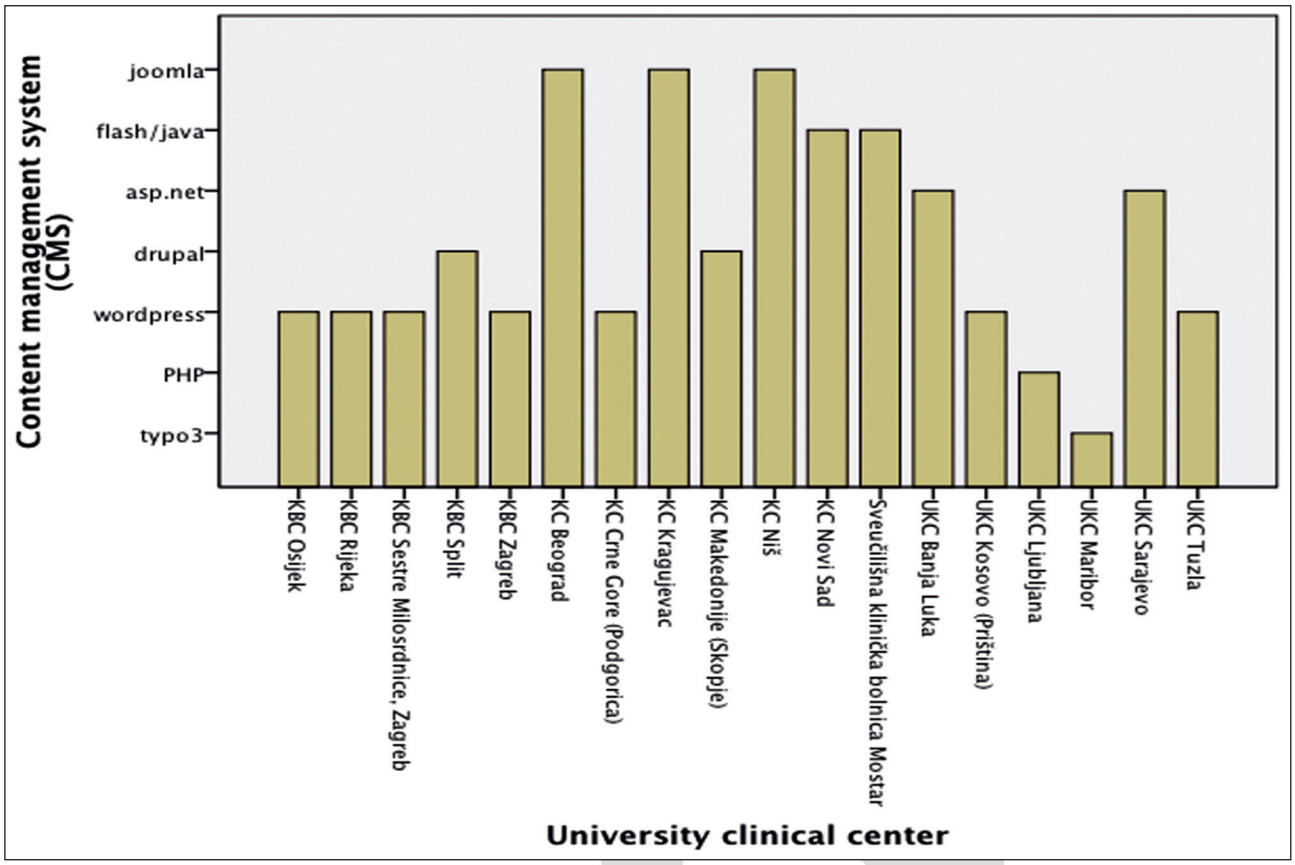

Figure 2. Representation of specific solutions for web development

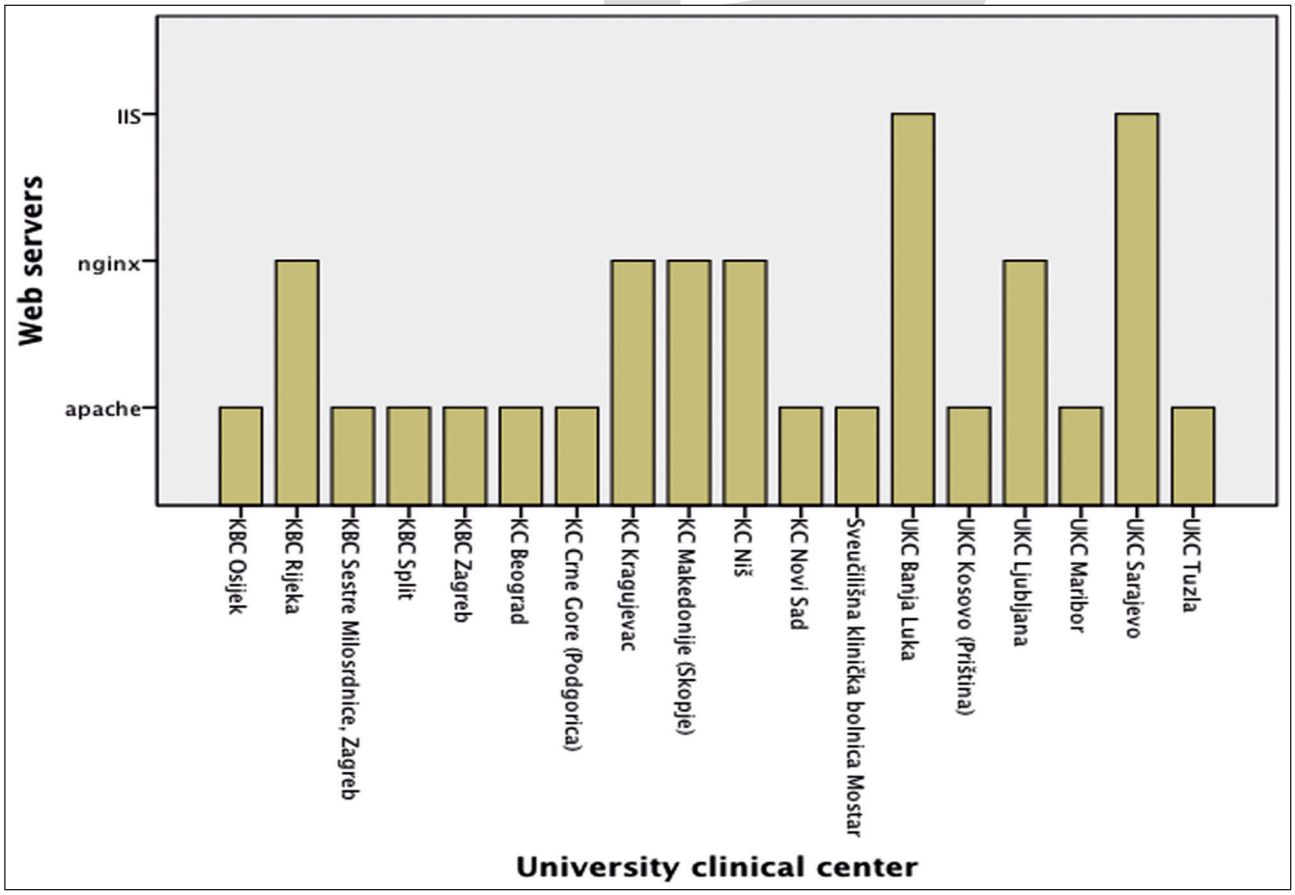

Figure 3. Presence of certain web servers to store Web pages

the global statistics of the 50.8% of the world's Web sites. Nginx is represented according to a study in 5 (27.8%) Web site, which is in line with the global data of 32.3% of the world's websites in 2016. Various plug-ins and widgets have installed almost all websites. Widgets for Facebook, Twitter and other social network has 10 (55.6%) studied websites, which coincides with the global studies of 13.2% of websites with the integration of Facebook and 10.1% of websites with the integration of Twitter. (9, 11)

The mobile version of websites has a total of 18 (100%) websites. Most of the websites in its CMS contains a plugin for mobile display. These data are in line with global data. Studies have shown that most users websites views on mobile platforms.

Regular updating of web sites, there are 17 (94.4%), web sites, and 1 (5.6%) websites does not update. The problem is reflected in the inability of software to locate the website Clinical Center of Kosovo at any given time.

Information news for the website has 13 (72.2%) of sites, while 5 (27.8%) does not have information about news on web pages. At the time of starting the program for analysis as well as a standard page views were not showing information on some websites.

All websites 18 (100%) had active service information regarding the number of births, admissions to emergency centers and so on. The guides for patients and links to other web sites had 17 (94.4%) of web sites, while 1 (5 , 6%) websites did not have that information. Studies have shown that users of web sites usually ask for information related to the service information.

Languages for possible review sites were similar eater: 1 language had 7 (38.9%) of web sites, two languages had eight (44.4%) of web sites, with 3 languages 31 (5.6%) web sites, with 4 languages 1 (5.6%) websites, and with 7 languages 1 (5.6%) websites. Web site with 7 languages represents the integration of the website with Google Translate and thus allowing translation of content in all languages. (9)

Hospital contacts with important telephones clinics, information, etc. Had 17 (94.4%) of web sites, while 1 (5.6%) Web site did not have information about the phones. Roadmap for navigating within clinical centers on the website had 17 (94.4%) of web sites, while 1 (5.6%) websites did not have a clue.

Price list had two (11.1%) websites, while 16 (88.9%) websites did not have a price list of services. The list of services provided had 17 (94.4%) of web sites, while 1 (5.6%) websites did not have a list of services. Price list was present during the investigation only at clinical centers in Maribor and Ljubljana. As their health system is organized so that it knows the exact price every time / service, only in contrast to other clinical centers in the region contained a price list.

Technological score websites minimum amounted to 39 (5.6%) while the highest was 67 (5.6%) of the estimated websites.

Technological score assesses the technology on which it is based a particular Web site. It can be from 0 to 100 points. It consists of a number of points as some technology used, web site traffic, and the number of points versions of technology solutions from which the Web site was created. You will be scored, and the mistakes that you notice on the website. (9)

The highest score of the website is a Clinical Centre Skopje, while the lowest was Clinical Center of Banja Luka. Due to problems with exact localization server, problems with SSL certificate and interference of private clinics in the analytical program I can not say that this result is entirely correct, but partially true.

Conclusion

Research has shown that most of the clinical centers have developed websites that are up to date with modern technology development. Problem represent some clinical centers whose web pages are invisible to Google, Bing and Yahoo search engines. The most technologically score is a clinical center in Skopje, which is 67, while the lowest was 39 at the Clinical Center of Banja Luka. Patients have available all the information required for the treatment or diagnostic. Most of the website used reviews guides, telephone directories, the list of services and signs in clinical centers.

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Evaluation of the Association of Level of Self-Efficacy of Nurses and Contribution of Inclusion of Parents in the care of patients by the nurses

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Abstract

Aim: This study is performed to evaluate the association of the level of self-efficacy of nurses and contribution of parents in the care of the patients.

Method: Sample of this descriptive study was constituted by nurses (n:451) who works at the pediatric clinics of universities and public hospitals in the Cukurova region (Mersin, Adana, Hatay, Osmaniye) and who accepted participating in the study. Independent-samples T-test, ANOVA test and Pearson Correlation coefficient were used to analyze the results.

Result: Among the 451 nurses included in the study, 93,8% were females and 6,2%, mean age of 31,83±6,61 years. Mean self-efficacy scale points and general mean family centered care survey points of the nurses was 32,36±5,14 and 61.29±7.43, respectively. A positive and statistically significant correlation was found between total points of GSES and FCCS points. In conclusion, increased self-efficacy in nursing applications improves professional practice behavior of the nurses. Therefore, it is quite important to improve self-efficacy of nurses in nursing practices.

Key words: Self-efficacy, Hospitalized Child, Participation of Parents in Care, Family Centered Care.

Introduction

Bandura defined self-efficacy as one's belief in his/her self-capacity in planning and successful fulfilment of necessary actions in order to perform a behavior (1). Belief of self-efficacy is the main determinant of behaviors and behavior changes and perception of self-efficacy plays an important role in accepting a behavior, initializing a behavior and continuing a change in behavior (2, 3). Belief of self-efficacy effects the emotions, thoughts, motivation and behaviors and has a very important place in almost all fields of our lives (4, 5, 6). The term self-efficacy, used commonly in the studies performed recently is the main interest in all professions as well as in nursing in success of individuals (7). Main field of the occupation of nursing which has an important place in health care services is human and human health and well-being. Nurses have a significant role in rendering health and nursing services and present a major percentage of occupations serving in health care (3, 8, 9, 10). Original duty of nurses is to give effective care to individuals in need of all fields and levels (11). One of those fields is a child in all stages and his/her family. (12).

The child's hospitalization is a stressful situation for both the child and the parents (13, 14). The child expends a major part of his/her energy to cope with the stress and this delays healing of the child (15, 16). Hospitalization of a child also causes a significant source of stress for the family and results in unexpected alterations in family life. This affects the life style and economy of the family and family relations and roles. Increased care requirement of the child results in failure in some tasks in the daily life of a family and changes in future plans (17, 18, 19, 20). Therefore, a family centered care approach is recommended in order to decrease the stress and anxiety level of the child and individuals giving care to the child and to augment the healing process (15).

Nurses working with children have important responsibilities in the care of children (21). An easy, continuous, extensive, compatible and family centered care should be given to the children since their physical and emotional needs are unique. A nurse

giving care to pediatric patients should protect and develop the health of the child while presenting a family centered, non-traumatic and healing care using evidence based applications. Pediatric care accepts family centered care concept in order to improve the well-being of a child to a highest level (22). Family centered care which has been accepted as the fundamental assumption of pediatric nursing is a philosophy of care that accepts the role of the family as much as health professionals in order to meet the care requirements of the child. Family centered care also requires communication of the family and the nurse in planning, application and evaluation of the care; it considers the requirements of the family and includes a partnership approach (23, 24, 25, 26, 27, 28).

Family-centered care practices are provide positive result for children, families and healthcare. The presence of the mother during the hospitalization and the participation in care affects the physiological, psychological and social well-being of the child positively (29,30). Participation of the parents in the care of a hospitalized child provides him/her the feeling of control on the care of the child that he/she had lost during the hospitalization and strengthens the communication between the parent and the health professional (28). The level of anxiety has been observed to be lower in the families that are given information on the diagnosis, treatment and care of their child and that can participate in the decisions of care of the child. Staying of the parents 24 hours with their child gives the possibility to the nurses to present health education to the parents. Also, it was determined in the studies performed that the health education given to the parents was more effective when the level of participation of the parents in care of the child increased (30). A family centered care approach decreases the emotional stress of the child secondary to the trauma caused by hospitalization (29). Presence of the parents increases the level of sense of confidence of the child while decreasing the level of separation anxiety (31). Postoperative complications were seen to be decreased and postoperative healing was observed to be augmented in children when their parents stayed in hospital with them (32). Also have lesser pain and sleep problems and have lesser negative behaviors following discharge to home (13). In addition, this approach facilitates the adequacy of the parents in the care of the child after discharge to home (21).

Family-centered care ensures that healthcare personnel understand the difficulties and capacities of caregivers and care for their capacity, collaborative care planning, better use of health care resources and better communication with the family. It also helps to increase employee satisfaction and strengthen communication between healthcare team members (33).

When family-centered care is examined in our country, families have begun to take care of the hospitalized child in recent years. There is no national health policy that supports family-based care. Family-based care practices vary according to the perspective of the healthcare team in hospitals and services.

Nurses have taken an active role in establishment of family centered care in order to meet the care requirements of the child since they are one of the health professionals that are in close relation with the families (31, 34). Although Health personnel have the theoretical knowledge of family centered care, It does not fulfill these principles in practice and affects the personal values and beliefs of the health personnel (35). Belief of self-efficacy has been effective in independent decision making of the nurses when performing their occupation and performing successful interventions required by the nature of the profession (36). A sense of comprehension and control on the nursing applications and belief in self-capacity is important to determine the effective and appropriate type of behavior of the nurses. In summary, it is important for the nurses to believe in their own power and abilities in decision making in care giving and as care givers. Also, their self-belief in that they can achieve the result they desire is also important. Therefore, it was planned in this study to evaluate the effect of self-efficacy beliefs of the nurses working at pediatric clinics on family centered care that constitutes the baseline of pediatric care.

Method

Type of Research

This research is a descriptive study performed with the aim of evaluating the effects of self-efficacy beliefs of nurses working at pediatric clinics

on the applications directed at family centered care which constitutes the baseline of pediatric care.

Place and Time of Research

This study was performed between June 2nd, 2014 and January 30th, 2015 in the Cukurova Region (Mersin, Adana, Hatay, Osmaniye) with the nurses working at the pediatric clinics of the University and Public hospitals.

Universe and Sample of Research

Six hundred nurses working at the Health Research and Application Center of the University of Mersin, Gynecology and Obstetrics and Children's Hospital of Mersin, Research and Application Center of the Adana Cukurova University, Gynecology and Obstetrics and Children's Hospital of Adana, Health Research and Application Center of the University of Mustafa Kemal and Gynecology and Obstetrics and Children's Hospital of Osmaniye comprised the universe of the study. A sampling choice was not made in this study and all the nurses (451 nurses) who accepted to participate in the study on the date on which the data of the study was collected were included as the sampling of the study.

Data Collection Tool

The data of the study were collected using "Demographic Information Form", "General Self-Efficacy Scale-GSE" and "Family Centered Care Survey". Demographic Information Form, Questions about age, gender, marital status, level of education, hospital at which they work and duration of work at the department of the nurses participation in the study are included in this form. General Self-Efficacy Scale-GSE, General Self-Efficacy Scale was developed by Mathias Jerusalem and Ralf Schawazzer in 1979 in Germany and was adapted to Turkish society after performing a validation reliability study in patients on peritoneal dialysis by Usta Yesilbalkan (2005) (37, 38, 39). The repeated reliability and internal consistency of the test was found to be 0,80 and 0,88 as a result of the validation reliability study performed in patients on peritoneal dialysis (38). Family Centered Care Survey (FCCS, It was developed by Linda Shields and Ann Tanner (2004). Internal consistency coefficient/Cronbach of the original survey was found to be α= 0.79 (23). The validation reliability study of the survey was performed by Berna Dogan in 2009 and was found to be α = 0.78 for health professionals in the study by Dogan (2010).

Evaluation of the Data

Mean, standard deviation, minimum and maximum values test for descriptive statistics of continuous data for reliable and valid scales and ANOVA test for comparison of more than two independent groups were used. Pearson Correlation coefficient was used while analyzing the association of two continuous variables for the scales. Level of statistical significance was accepted to be p= 0,05.

Ethical Aspect of the Study

Written Ethical Board approval was obtained from the Ethics Board for Clinical Research of University of Mersin (dated March 6th, 2014 and issued 2014/45) and official institutional approval was obtained from each hospital before the start of the study. In addition, verbal consents were obtained from the nurses participating in the study.

Findings

Mean age of the 451 nurses was 31.83±6.61. Among those, 93.8% were women and 69.8% were married. The level of education of the nurses was high school, upper secondary education, bachelor's degree and postgraduate education in 11.5%, 24.4%, 59.9% and 4.2%, respectively. Some 41.9%, 6.9%, 17.1% and 34.1% of the nurses were found to work at general pediatric clinics, surgical clinics, pediatric intensive care and newborn intensive care units, respectively. Duration of occupational experience of the nurses was found to be less than 1 year, 1-2 years, 3-4 years, 5-10 years and 10 years and more in 8.9%, 10.9%, 9.5%, 31.3% and 39.5%, respectively. When the duties of the nurses at their workplaces were evaluated they were found to act as clinical nurse in 92.9% and responsible nurse in 7.1%. Among the nurses, 91.6% reported that in-service education programs were in place in the institution they worked at and 86.3% reported that they participated at scientific programs related with nursing.

Mean points obtained from the general self-efficacy scale of the nurses participated in the study are given in Table 2. Mean self-efficacy scale of

Table 1. Distribution of Nurses According to their Individual Properties and Working Environment

Groups	Number *(n)*	Percentage *(%)*
Age (years)		
18-22	34	7.5
23-27	94	20.8
28-32	111	24.6
33-37	117	25.9
38-42	75	16.6
43 and higher	20	4.4
Gender		
Female	423	93.8
Male	48	6.2
Marital Status		
Married	315	69.8
Single	136	30.2
Level of Education		
High School	52	11.5
Upper secondary education	110	24.4
Bachelor's degree	270	59.9
Postgraduate Degree	19	24.4
Clinic of Work		
Pediatric Internal Clinics	189	41.9
Pediatric Surgery	31	6.9
Pediatric Intensive Care	77	17.1
Neonatal Intensive Care	154	34.1
Years of professional experience		
1-11 months	40	8.9
1-2 years	49	10.9
3-4 years	43	9.5
5-10 years	141	31.3
10 years and more	178	39.5
Duty at the Hospital		
Clinical Nurse	419	92.9
Responsible Nurse	32	7.1
Status of Organization of In-service Education		
Yes	413	91.6
No	38	8.4
Status of Participation in Scientific Activities		
I participate	389	86.3
I don't participate	62	13.7
Total	451	100

Table 2. Mean general self-efficacy scale of the nurses

Scale	N	X	SD	Min-Max
General self-efficacy scale	451	32.36	5.14	10-40

Table 3. Mean points of Family Centered Care Survey and Subgroups of Nurses

FCCS and Subgroups	N	X	SD	Min-Max
FCCS-Respect	451	18.10	2.77	10.00-24.00
FCCS-Cooperation	451	27.70	3.59	9.00-36.00
FCCS-Support	451	15.49	2.60	8.00-20.00
FCCS-Total	451	61.29	7.43	28.00-80.00

the nurses was found to be 32,36±5,14. Correlation of the age of the nurses and general self-efficacy was evaluated. A statistically significant correlation was found between the age and general self-efficacy variable of the nurses *(p< .05)*.

Relations between the level of education, occupational experience, duration of work at the present clinic and general self-efficacy were observed and significant differences were found *(p<0,05)*. Mean self-efficacy scale points of nurses with postgraduate education, professional experience of 10 or more years, professional experience in the present clinic of 10 or more years and nurses who work as responsible nurses were higher compared to the nurses working as clinical nurse.

Family Centered Care Survey (FCCS) and mean points of subgroups such as respect, cooperation and support are given in Table 3. Mean general points of nurses of family centered care survey, FCCS respect subgroup, cooperation subgroup and support subgroup was calculated to be 61.29±7.43, 18.10 ± 2.77, 27,70± 3.59 and 15.49±2.60, respectively.

Relations between individual properties and properties associated with working environment of the nurses, and FCCS and subgroup points were analyzed and no significant relations between the marital status of the nurses, hospital they work, occupational experience, duration of work at pediatric clinics and duty at the clinic, and FCCS and subgroup points were observed (p>0,05). FCCS and subgroup points were analyzed according to the gender, level of education, clinic of work, organization of in-service education and participation in scientific activities and significant differences were observed (p<0,05). When the status of significance was analyzed, mean FCCS and subgroup points were higher in women compared

Table 4. Comparison of Nurses' Self-Efficiency Score Average for Individual and Working Environment

Individual and Working Environment		General Self-Efficacy Scale				
		N	X	SD	Min-Max	P
Gender	Female	423	32,39	5,14	10,00-40,00	0,594
	Male	28	31,85	5,20	20,00-40,00	
Marital Status	Married	315	32,40	5,39	10,00-40,00	0,766
	Single	136	33,25	4,52	18,00-40,00	
Level of Education	High School	52	31,26	5,49	20,00-40,00	0,001
	Upper secondary education	110	33,85	3,91	21,00-40,00	
	Bachelor's degree	270	31,84	5,36	10,00-40,00	
	Postgraduate Degree	19	34,05	5,21	21,00-40,00	
Working Clinic	Pediatric Internal Clinics	189	32,54	5,33	10,00-40,00	0,796
	Pediatric Surgery	31	31,61	5,27	16,00-39,00	
	Pediatric Intensive Care	77	32,15	4,94	19,00-40,00	
	Neonatal Intensive Care	154	32,38	5,00	10,00-40,00	
Years of Professional experience	0-11 month	40	29,50	4,83	17,00-40,00	0,0001
	1-2 years	49	32,24	4,79	17,00-40,00	
	3- 4 years	43	32,06	5,04	20,00-40,00	
	5-10 years	141	31,48	5,66	10,00-40,00	
	10 years and more	178	33,80	4,44	18,00-40,00	
Duration of Work at Pediatric Clinics	0-11 months	74	30,59	5,27	17,00-40,00	0,028
	1-2 years	103	32,66	4,45	17,00-40,00	
	3- 4 years	96	32,48	4,81	16,00-40,00	
	5-10 years	131	32,80	5,47	10,00-40,00	
	10 years and more	47	33,00	5,64	14,00-40,00	
Duty at the Hospital	Clinical Nurse	419	32,20	5,15	10,00-40,00	0,021
	Responsible Nurse	32	34,37	4,58	10,00-40,00	
Status of Organization of In-service Education	Yes	413	32,39	5,17	10,00-40,00	0,676
	No	38	32,02	4,84	17,00-40,00	

Table 5. Comparison of Nurses' Characteristics Related to Individual and Working Environment, Family Centered Care Survey and Subgroup Score Averages

	Family Centered Care Survey and Subgroups							
	FCCS Total		Respect		Cooperation		Support	
	X±SD	Min-Max	X±SD	Min-Max	X±SD	Min-Max	X±SD	Min-Max
Gender								
Female	61,59±7,17	40,00-80,00	18,18±2,75	11,00-24,00	27,85±3,41	18,00-36,00	15,55±2,56	8,00-20,00
Male	56,82±9,79	2 28,00-70,00	16,89±2,92	10,00-22,00	25,39±5,20	9,00-32,00	14,53±2,91	8,00-19,00
p*	0,001		0,017		0,020		0,044	
Marital Status								
Married	61,57±7,52	35,00-80,00	18,10±2,85	10,00-24,00	27,89±3,56	17,00-36,00	15,58±2,60	8,00-20,00
Single	60,65±7,21	28,00-76,00	18,10±2,61	10,00-24,00	27,25±3,63	9,00-34,00	15,29±2,58	8,00-20,00
p*	0,228		0,996		0,085		0,283	
Level of Education								
High School	58,94±8,17	28,00-71,00	17,8±2,86	10,00-40,00	26,28±3,88	9,00-32,00	14,78±2,76	8,00-20,00
Upper secondary education	63,10±6,62	49,00-76,00	18,8± 8,57	12,00-24,00	28,27±3,31	22,00-36,00	15,98±2,38	11,00 20,00
Bachelor's degree	60,88±7,48	35,00- 80,00	17,79±2,84	10,00-24,00	27,67±3,57	16,00-36,00	15,41±2,57	8,00- 20,00
Postgraduate Degree	63,21±6,98	49,00-79,00	18,84±1,83	15,00- 23,00	28,63±3,72	23,00- 36,00	15,73±3,24	8,00-20,00
p*	0,003		0,005		0,007		0,043	
Years of Professional experience								
0-11 months	60,57±7,80	28,00-76,00	17,77±2,55	10,00-23,00	27,42±4,27	9,00- 36,00	15,37±2,13	9,00-20,00
1-2 year	61,30±6,51	48,00-74,00	18,14±2,71	12,00-24,00	27,85±3,33	19,00-34,00	15,30±2,47	8,00-20,00
3- 4 year	60,95±7,25	41,00-74,00	18,00±2,24	13,00-23,00	27,32±3,71	16,00-35,00	15,62±2,95	8,00-20,00
5-10 year	60,85±7,27	35,00-79,00	17,71±2,65	10,00-24,00	27,53±3,47	17,00-36,00	15,59±2,63	8,00-20,00
10 yıear and more	61,89±7,78	40,00-80,00	18,49±3,02	11,00-24,00	27,93±3,58	18,00-36,00	15,46±2,63	8,00-20,00
P*	0,715		0,142		0,763		0,952	
Status of Organization of In-service Education								
Yes	61,63±7,25	40,00-80,00	18,21±2,73	11,00-24,00	27,85±3,50	16,00-36,00	15,56±2,57	8,00-20,00
No	57,60±8,52	28,00-73,00	16,86±2,98	10,00-23,00	26,00±4,14	9,00-32,00	14,73±2,73	8,00-20,00
p*	0,001		0,004		0,002		0,060	
Status of Participation in Scientific Activities								
Particapate	61,66±7,43	28,00-80,00	18,22±2,75	10,00-24,00	27,82±3,64	9,00-36,00	15,60±2,55	8,00-20,00
Idon't particapate	59,01±7,06	43,00-72,00	17,33±2,81	11,00-24,00	26,90±3,20	21,00-34,00	14,77±2,79	8,00-20,00
p*	0,009		0,020		0,060		0,014	

to men; FCCS and respect, cooperation and support subgroup points were significantly higher in nurses with upper secondary education, bachelor's degree and postgraduate education compared to nurses with high school education and mean FCCS and respect, cooperation and support subgroup points of nurses were found to significantly high with increased level of education of the nurses. Mean FCCS and respect subgroup points was significantly higher in nurses working at medical clinics compared to nurses working at other clinics. Mean FCCS and respect and cooperation subgroup points were found to be higher in nurses receiving regular in-service education compared to nurses not receiving regular in-service education. Mean FCCS and respect and support points of nurses who participate in scientific activities (Seminars, Congresses, etc.) was found to be significantly higher compared to nurses who do not participate in scientific activities.

Correlations between General Self-Efficacy Scale and FCCS and subgroups were evaluated and demonstrated in Table 4. Spearman's correlation analysis was used to evaluate the correlation between GSES and FCCS and subgroups. A positive and statistically significant correlation was found between the GSE scale total points and FCCS points (r=362). According to this, FCCS points increased with increased self-efficacy of the nurses.

Discussion

Self-efficacy of nurses is important in terms of their performance at the clinic (41). Mean self-efficacy scale points of the nurses participating in this present study were higher than the average. Mean self-efficacy points of nurses working in a clinical environment in Iran in a study which was performed by Soudagar et al (2015) and evaluated the factors related with self-efficacy of the nurses was also similar. According to Bandura, the source of cumulative self-efficacy is the previous successful experiences of the individual. The individual gains more experience with increasing age and his/her self-efficacy belief is affected positively. Thus, increase in self-efficacy with increasing age as seen in this present study is a desired result. In a study by Baysal (2010) a statistically significant relation was found between age groups and self-efficacy scale points and self-efficacy points of nurses at 36 years and higher was found to be significantly higher. Also, in a study by Akgul (2008) general self-efficacy level was found to be higher in the age group of 39-48 years and level of self-efficacy was found to increase with increasing age.

Efficiency in the occupation of nursing is associated with the level of education of the administrators and practitioners of this profession and the service standards (3,43).

A significant association was found between the level of education and self-efficacy of the nurses included in this present study. Mean self-efficacy points of the nurses with a postgraduate degree were found to be higher compared to nurses with a high school degree and degree of upper secondary education. In a study by Pekmezci (2010), self-efficacy level of the nurses graduated from medical vocational high school was found to be significantly lower compared to the nurses with a Bachelor's degree and nurses with postgraduate education. Increased level of education was found to affect the level of self-efficacy positively as seen in the studies by Yigitbas and Yetkin (2003), Sergek and Sertbas (2006), Otacioglu (2008), Kocoglu (2009), Ugur (2010) and Uyaniker (2014).

The most important source of the self-efficacy of an individual is his/her experience and it increases self-efficacy (48). The relation of professional experience and general self-efficacy of the nurses was evaluated in this present study and a statistically significant association was found between the two parameters. Mean self-efficacy points of the nurses

Table 6. Relation of General Self-Efficacy Scale and Family Centered Care Survey and Subgroups

	Family Centered Care Survey and Subgroups							
General Self-Efficacy Scale	**Respect**		**Cooperation**		**Support**		**FCCS Total**	
	r	p	r	p	r	p	r	p
	0.276	0.001	0.251	0.0001	0.278	0.0001	0.322	0.0001

r: Spearman's Correlation Analysis p<0,05

with a 10 years or higher professional experience was found to be higher compared to nurses with lesser professional experience. In a study by Baysal (2010), self-efficacy points of nurses with a professional experience of more than 16 years was found to be statistically significantly higher. Soudagar et al (2015) evaluated self-efficacy and related elements of nurses working at clinical environments in Iran and self-efficacy points of nurses with a professional experience of more than 16 years was found to be higher. Belief in self-efficacy of the nurses might be effective in independent decision making and performing successfully the professionally necessary interventions. Smith et al (2011) found a positive association between professional experience and self-efficacy belief and autonomy level of the nurses in their study on the autonomy, attitudes, beliefs, perceived control and self-efficacy belief of the nurses. As a result of the study, perceived self-efficacy of the nurses with advanced age and adequate professional experience was found to be higher in interventional applications requiring sterile working such as placing a port needle and they were found to behave more autonomously.

The relation between the duties of the nurses at the clinic and general self-efficacy was evaluated in this present study and a significant association was found between the two parameters. Mean self-efficacy points of the nurses working as responsible nurse of the clinic were found to be higher compared to the clinically practicing nurses. Similarly, a significant difference was found between the duty of the nurses in the hospital and general self-efficacy points in the studies by Pekmezci (2010) and Uyaniker (2014).

Nurses are in a key point in the hospitals in creating a variance and difference based on family centered care. In this present study, mean points of Family Centered Care Survey (FCCS) and subgroups (respect, cooperation and support) and standard deviations were evaluated and it was found that mean general points of family centered care survey was found to be higher than average level and demonstrated similarities with the studies of Dogan (2010) and Gill et al (2014).

A statistically significant association was found between the gender properties of the nurses and points of FCCS and its subgroups in this present study. Also, mean points of FCCS and its subgroups of women was found to be higher compared to the points of men. These results were parallel to the results of the study performed by Dogan (2010). A significant difference was found in the level of education of the nurses by FCCS sub dimensions in this present study. As a result of the test, mean points of FCCS and respect, cooperation and support subgroups of nurses with a degree of upper secondary education, Bachelor's degree and postgraduate degree were found to be significantly higher compared to the respect levels of the nurses with a high school degree. Mean points of FCCS and respect, cooperation and support subgroups of nurses increased with increased level of education. Bruce et al (2002) found that the level of education of the workers affected from the family centered care perceptions in a study that they had performed on the perception and application of family centered care by health professionals. Petersen et al (2004), in their study that was performed to determine the perception and application status of family centered care and its components by nurses working at neonatal intensive care and pediatric intensive care found a statistically significant association between the level of education of nurses and family centered perception and application.

No significant relation was found in this present study between the professional experience of the nurses and mean FCCS and subgroup points; however, FCCS and subgroup points were seen to increase with increase in the professional experience of the nurses. Studies have been published in the literature demonstrating an association between family centered care and professional experience. No significant association was found between the professional experience of the nurses and mean FCCS points in a study by Dogan (2010); however, nurses with a professional experience between one and five years were found to have increased mean FCCS points but the mean points were found to decrease in nurses with a professional experience of more than 5 years. Petersen et al (2004) in their study emphasized that the points of perception and application of family centered care was statistically significantly higher in nurses with 10 years or higher professional experience.

In-service education provides development of positive behaviors of nurses associated with work and their feeling of self-adequacy (52). A statisti-

cally significant relation was found between the mean FCCS and respect, cooperation and support subgroups of the nurses and their status of regular in-service education in this present study. Mean FCCS and respect and cooperation subgroup points of nurses who received regular in-service education was found to be higher compared to the nurses who did not receive educations. Also, a statistically significant relation was found between mean family centered care survey and subgroup points of nurses and their status of participating in scientific activities. Mean FCCS and respect and support subgroup points of nurses participating in scientific activities were found to be significantly higher compared to the nurses not participating in such activities. There are also studies in the literature reporting the necessity of in-service educations and family centered care. Axelin et al (2014), in their study, education programs were found to motivate the nurses for a positive change in terms of family centered care. Those education programs altered their behaviors and care applications of the nurses and provided a successful application of family centered care. Similarly, a significant association was found between education and perception and application of family centered care in a study by Asai (2011) performed in Japan to determine the markers of family centered care applications of nurses working at newborn intensive care units. The importance of continuous education for nurses with lesser experience was emphasized in order to increase organizational support, level of knowledge, care, and technique of newborn procedures. Also, it was reported that education provided important contribution to the awareness of the difference between the perceived and current application of family centered care and necessary components in the study by Bruce and Riche (1997) related with the perception and application of family centered care by nurses. Also, In the study by Petersen et al (2004) the necessity of appropriate education related with family centered care concept and continuation of the education was emphasized. Also, Bruce et al (2002), in their study reported that nurses continuously participating in related education programs reflected family centered care more appropriately in the daily practice compared to nurses who do not participate in such activities.

Self-efficacy effects the performance of nurses significantly and is an important factor determining the behavior of a nurse. Elevation of the level of self-efficacy develops nursing performance and increases the quality of care (56,57). A positive and statistically significant correlation was found between GSES scale total points and FCCS points in this present study. According to this, FCCS points increased by increased self-efficacy of the nurses. A significant association was found between GSES and FCCS respect, cooperation and support sub dimensions. In the literature, Asai (2011) in his study found a significant correlation between family centered care practices and self-efficacy of the nurses and self-efficacy of the nurses was demonstrated to be the most important marker of application of family centered care. In addition to self-efficacy of the nurses, newborns care experience, principles of family centered care and 24-hour visit of parents were determined as significant markers of FCC pratices. Also, newborns care experience, nursing support in providing the participation of family in the care of the child and visit of siblings were found to be associated with the self-efficacy of the nurses.

Suggestions

Increased self-efficacy in nursing practices promotes the professional practicing behavior of the nurses and increases the quality of care that nurses provide (58). Therefore, addition of lessons directed to the development of perception of self-efficacy in the nursing curriculums, support and motivation of nurses for postgraduate education, organization of in-service educations in order to strengthen the self-efficacy beliefs of the nurses, providing in-service educations directed to increase the self-efficacy of newly graduated and young nurses, performing further investigations directed to determining the factors affecting the self-efficacy level, inclusion of family centered care in the nursing curriculum and support of this with in-service educations, organization of in-service education programs in hospitals in order to develop family centered care concept, updating the professional knowledge of the nurses and support of them in participating in scientific activities, establishment of family centered care in pediatric clinics and performing further studies to determine the effect of self-efficacy of nurses on the practice of family centered care can be suggested.

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The relationship between obesity and thyroid nodule in healthy Korean adults

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Abstract

Background: Thyroid nodules are common disease in Korean population and their presentations are important in the public health aspects. Previous studies have provided an evidence for the association between thyroid cancer and obesity, but little is known about the relationship between thyroid nodules and obesity. We investigated the relation of thyroid nodules and obesity in healthy Korean adults.

Methods: We obtained data from 2922 subjects (Male: 1883, Female: 1039) who underwent a routine health checkup at the health promotion center. We reviewed their height, weight, obesity indices (Body mass index: BMI, Total body fat: TBF), and thyroid ultrasonography results. Obesity indices are divided into four groups.

Results: Both men and women who have a higher BMI had an increased prevalence of thyroid nodules ($p = 0.004$ in men, $p < 0.001$ in women). In addition, thyroid nodules increased significantly with higher TBF in men and women ($p = 0.001$ in men, $p < 0.001$ in women).

Conclusions: We observed positive relationship between obesity indices (BMI, TBF) and thyroid nodules in both men and women. Our results suggest that obesity might be important in the prevalence of thyroid nodules as well as thyroid cancer.

Key words: Obesity, Thyroid nodule, Relationship, Healthy adult.

Introduction

The thyroid gland is one of the largest endocrine organ. It stimulates carbohydrate, fat, and protein metabolism and increases basal metabolic rate (BMR). Furthermore, the thyroid gland plays various roles from stimulating cardiac and gastrointestinal motility to influencing on brain development of fetus and growth of child (1, 2). Thyroid nodule is an independent lesion which exists in the thyroid parenchyma (3). Thyroid nodules can be detected by ultrasonography in 30~76 %.(4).

Although many thyroid nodules are benign, some of them (approximately 8~16%) can be diagnosed with a cancer and require treatments such as a surgery (4-11). There are several high-risk situations in which thyroid nodule can be indicated as malignancy (3, 12). History of prior radiation exposure is an important risk factor for thyroid cancer. Other risk factors include preexisting benign thyroid disease, irregular menstruation, bilateral oophorectomy, family history of thyroid malignancy, certain inherited syndromes, and residence in endemic goiter areas. Moreover, growth of a thyroid nodule, fixation to surrounding structures and presence of palpable lymph nodes in the neck are also highly suggestive of malignancy (3, 12).

Since 1990s, thyroid cancer has been increasing in Western society such as the US, Canada, and Denmark (13-17). Also, the incidence rate of thyroid cancer has been rapidly increased in Korea (12,18,19). This increase in thyroid cancer rates is more likely to associate with distinct characteristics of the Korean medical circumstances that they are easily accessible to thyroid ultrasonography when having a medical check-up or visiting outpatient clinics (18,20).

Many literatures have studied the relation between obesity and thyroid cancer (13,17,21,22). Several studies have suggested the strong relationship between thyroid cancer and obesity (23-26). However, these studies have shown inconsistent results according to gender, extent of obesity, and type of thyroid cancer (27-29). There is a few research on the relation between obesity and thyroid nodule in Korea. Therefore, this study aimed to investigate the connection between obesity and thyroid nodule in Korean adults.

Materials and methods

Study subjects

This retrospective cross-sectional study was performed for the following subjects: a total of 2,922 adults, who are over 18 years old, visited to the health promotion center of Inje University Sanggye Paik Hospital for medical check-up .Out of the 2,922 subjects, the number of the male was 1,883 and female was 1,039. Among them, 27 patients were excluded from the study because of the following reasons: 1) at that time of the medical check-up, patients received a surgery or treatment associated with thyroid diseases; and 2) prior to the study, taking medications, which can influence on thyroid function (e.g., amiodarone, iodine, and steroid hormone). The final analysis included 2,895 (male 1,873 and female 1,022). Before the study was initiated, it had reviewed and approved by the institutional review board or ethics committee (IRB/EC) of Inje University Sanggye Paik Hospital.

Anthropometric measurements

Subjects had fasted for at least 8 hours prior to the medical check-up. Their height and body weight were measured using DS-103 (Dong sahn JENIX Co. Ltd. Seoul, Korea) while taking off shoes and wearing light clothes. Height and Weight were measured by a unit of 0.1 cm and a unit of 0.1kg, respectively. Body mass index (BMI) was calculated as the weight in kilograms divided by the height in meters squared (kg/m^2). Body fat percentage was also measured by Bioelectrical Impedance Analysis (BIA). For the study, the body composition analysis InBody 720 (Biospace, Seoul, Korea) using tetra polar 8-point tactile electrodes method was used. This test was performed the following sequence: 1) steeping on the foot electrode in barefoot: 2) grasping the hand electrode; and 3) outstretching arms, then pressing the thumb electrode button gently. This study was performed under observation by skilled nurses.

Identification of thyroid nodules

In relation to ultrasonography for thyroid and cervical lymph nodes in the neck, an experienced radiologist conducted the test using 5~13 MHz linear array probe of Acuson Sequoia 512 system (Siemens Medical Solutions, Mountain view, CA, USA) and 5-12 MHz linear array probe of iU22 (Philips, Seattle, WA, USA).

Ultrasonography features used to describe the thyroid nodules were recorded including internal component, homogeneity of echogenicity, margin, calcification, vascularity and shape. Except for simple cyst and multiple simple cysts, other test results were all analyzed.

Statistical analysis

The characteristics of the subjects by gender were displayed as 'mean ± S.D.' and the comparison of the means were conducted by t-test. BMI and body fat percentage divided into four groups using interquartile range, respectively. The prevalence of thyroid nodules was shown as a percentage per each group. In the trend analysis classified by the interquartile range, linear by linear association method was used. The statistical analysis was conducted with SAS ver. 8.11 (SAS Institute, Cary, NC, USA) and the level of significance was 0.05.

Results

As shown in Table 1, the study subjects were total 2,895 adults, divided into 1,876 males (64.7%) and 1,022 women (35.5%). The average age of the study subjects was 45.3 years old (range: 18~78 years). The mean BMI and body fat percentage in men were 24.26 kg/m^2 and 22.95 %: the mean BMI and body fat percentage in women were 22.75 kg/m^2 and 29.65 %, respectively.

The prevalence of thyroid nodules based on gender, it was significantly higher in women than in men ($P < 0.001$). A comparison of variables between thyroid nodule group and non-thyroid group are summarized by each gender in Table 2. As for the age and weight, thyroid nodule group were significantly older and heavier than non-thyroid nodule group in both men and women. Furthermore, BMI and body fat percentage were also significantly higher in thyroid nodule group than non-thyroid group in both men and women.

Figure 1 and 2 are showed that the prevalence of thyroid nodules and the extent of obesity, which BMIs and body fat percentages were divided by the interquartile range. Higher BMI indicated significant greater prevalence of thyroid nodules in both men and women ($P = 0.004$ in men, $P < 0.001$

Table 1. The basic characteristics of the subjects by gender.

Variables	Male (n=1873)	Female (n=1022)	P value
Age (years)	45.40 ± 7.63	45.30 ± 10.58	0.722
Height (cm)	171.22 ± 5.89	158.14 ± 5.57	< 0.001
Weight (kg)	71.24 ± 9.14	56.81 ± 7.95	< 0.001
BMI (kg/m^2)	24.26 ± 2.57	22.75 ± 3.21	< 0.001
Total body Fat (%)	22.95 ± 4.25	29.65 ± 4.80	< 0.001
Thyroid nodule prevalence (%)*	649 (34.67%)	521 (50.98%)	< 0.001

BMI: Body mass index. Continuous data are expressed as mean ± SD. Categorical data are presented as numbers and percentages. Thyroid nodule was diagnosed by ultrasonography.

Table 2. Comparison of variables between thyroid nodule group and non-thyroid nodule group by gender

Variables	Male (n=1873)			Female (n=1022)		
	Thyroid nodule (+) (n= 649)	Thyroid nodule (-) (n=1224)	P value	Thyroid nodule (+) (n=521)	Thyroid nodule (-) (n=501)	P value
Age (years)	47.27 ± 7.57	44.40 ± 7.48	< 0.001	46.87 ± 10.67	43.58 ± 10.23	< 0.001
Height (cm)	171.11 ± 5.89	171.27 ± 5.89	0.577	157.85 ± 5.74	158.45 ± 5.37	0.083
Body weight (kg)	71.82 ± 8.98	70.92 ± 9.22	0.043	57.55 ± 8.29	56.03 ± 7.52	0.002
BMI (kg/ m²)	24.51 ± 2.56	24.14 ± 2.57	0.004	23.12 ± 3.29	22.37 ± 3.08	< 0.001
Total Body fat (%)	23.46 ± 4.09	22.67 ± 4.31	< 0.001	30.30 ± 4.82	28.96 ± 4.68	< 0.001

BMI: Body mass index.
P values by t test (Thyroid nodule (+) vs Thyroid nodule (-)).
Thyroid nodule was diagnosed by ultrasonography.

in women). The body fat percentage was higher, the prevalence of thyroid nodules also significantly increased in both men and women (P = 0.001 in men, P < 0.001 in women).

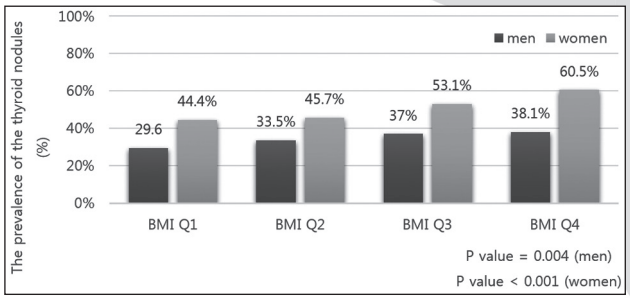

Figure 1. The prevalence of the thyroid nodules according to Body Mass Index (BMI, kg/m^2) quartile (BMI Q1 (<22.5), Q2(22.5-24.0), Q3(24.1–25.7), Q4(≥25.8) in men and BMI Q1(<20.5), Q2(20.5-22.2), Q3(22.3–24.4), Q4 (≥24.5) in women).

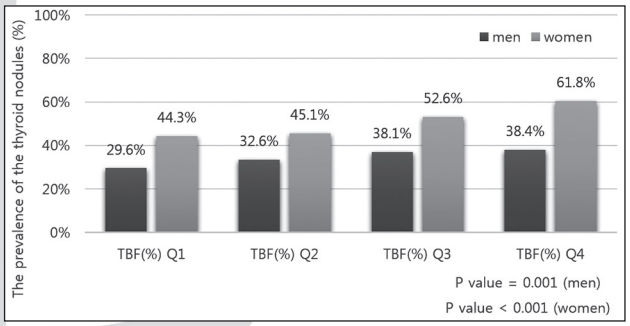

Figure 2. The prevalence of the thyroid nodules according to total body fat (TBF,%) quartile (BF Q1 (<20.3), Q2(20.3–23.2), Q3(23.3-25.7), Q4 (≥25.8) in men and TBF Q1 (<26.5), Q2 (26.5–29.7), Q3(29.8-32.7), Q4 (≥32.8) in women).

Discussion

This study investigated the relation between obesity and thyroid nodules in healthy Korean adults. It showed that higher BMI and body fat percentage were associated with increasing prevalence of thyroid nodules in both men and women.

Previously, several researches have been examined about the relationship between obesity and thyroid nodules. To be specifically, Zheng et al. studying Chinese women reported that a group with thyroid nodules had higher waist hip ratio (WHR) and BMI than a group without thyroid nodules (30). Kim et al. reported that no significant relationship between BMI and the prevalence of thyroid nodules in adults with having a medical check-up. However, in female subjects, they found the relation between body surface area and prevalence of thyroid nodules (5).

Furthermore, Kim and Guo et al. performed an analysis on the relationship between the prevalence of thyroid nodules and BMI, based on the World Health Organization (WHO) diagnostic criteria for obesity (5, 31). Whereas this study showed that the higher BMI was related to the higher prevalence of thyroid nodules, Kim and Guo et al. suggested that the prevalence of thyroid nodule was higher in a normal weight group ($18.5 \leq BMI < 25$) or an overweight group ($25 \leq BMI < 29.9$), compared to that of an underweight group ($18.5 < BMI$) and an obese group ($BMI \geq 30$). In Kim and Guo et al., the number of study subjects in the underweight and obese groups was small because of applying to the WHO diagnostic criteria of obesity. However, the present study was based on the Asia-Pacific obesity classification, and analyzed after dividing BMI and body fat percentage into 4 groups.

Thyroid nodule is a distinctive lesion, which can be distinguished from the regional and normal thyroid tissues and be detected by palpation or ultrasonography. Assessment of thyroid nodule is clinically significant because 8~16 % thyroid nodules can be diagnosed with thyroid cancer (4-11). In addition, it causes abnormality of thyroid function and sensation of being compressed (4-11).

The increased occurrence of thyroid cancer correlates with the exposure to high levels of radiation and radioactive iodine, harmful effects of endocrine disruptors, and having a personal or family history of thyroid cancer (13). Moreover, recently, results of epidemiologic studies released the result that obesity is independently involved in the prevalence of thyroid cancer (21, 22, 24). In addition, many research have been performed to identify the relationship between obesity and thyroid cancer (22, 24).

There are several potential mechanisms linking obesity with thyroid cancer (13, 17). Especially, insulin resistance may be an important role in these mechanisms. Insulin resistance may be directly caused by obesity or it is influenced by adiponectin-deficient, systemic inflammatory response, and an increase in thyroid stimulating hormone. It is known that the insulin resistance can cause the growth and proliferation of thyroid tissues through activating hyperinsulinemia and insulin-like growth factor 1 (IGF-1), thereby increasing thyroid cancer risk (32-35).

In general, obesity and thyroid cancer are more associated with women than men. Recently, in the United States, a large scale of prospective study reported that as BMI increased, the prevalence of thyroid cancer increased as well. However, this result was limited to account for only female subjects (25). Other conventional studies have also shown similar results (36,37). This study also revealed that compared to the male subjects, the connection between thyroid nodules and obesity was more significant in the female subjects. A reason for this is that several studies suggested that estrogen hormone might play a crucial role (38-41).

It is well-known that estrogen directly affects the thyroid function and growth along with proliferation, cell differentiation, and apoptosis of normal thyroid follicle cells. For example, in vitro studies in laboratories, it is confirmed that 17 beta-estradiol stimulates the growth of normal thyroid cells and follicular cells in addition to having growth stimulatory effects on thyroid follicular cells with functional estrogen receptors (38,39). Moreover, it is revealed that estrogen also simulates the growth of benign and malignant thyroid cells through mitogen, which was activated by protein kinase pathway (40). Clinically, the growth of benign thyroid nodules decrease in postmenopausal women (41). It is considered that estrogen can influence on the growth of thyroid nodules.

In this study, there are a few limitations. First of all, results of the study might have a difficulty in generalization to represent the whole population as it was limited to individuals coming in for a voluntary health check-up. Secondly, this study was unable to obtain the information of the following potential risk factors of thyroid cancer: menopausal status, past history of the exposure to

radiation, personal and family history of thyroid cancer and treatment of estrogen therapy. Furthermore, because we could not obtain the results of thyroid function tests in some of the study subjects, so these results weren't analyzed. Thirdly, as it is the retrospective cross-sectional study. It was difficult to clearly identify the causal relationship between thyroid nodules and obesity.

However, despite of these limitations, this study can be meaningful because this is the first Korean research showed that as BMI increases, the prevalence of thyroid nodules significantly increases both healthy men and women.

Conclusion

This study showed that the higher BMI and body fat percentage were linked to increasing prevalence of thyroid nodules in healthy Korean men and women. Therefore, it is considered that obesity can play an important role in the occurrence of thyroid nodules. Based on this study, further research will be needed about the relation between obesity and thyroid diseases such as thyroid cancer and thyroid nodules.

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Temperament; Differences in physicians and non-physician health staff in the departments of Emergency Medicine and Physical Therapy

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Abstract

Background: Temperament is formed in the previous characteristics of persons with exterior effects. Our aim is to identify the differences in the temperament and character between doctors and other health professionals in Department of Emergency Medicine in a Foundation University, Department of Emergency Medicine in a Educational and Research Hospital, Department of Physical Therapy in a Educational and Research Hospital.

Methods: It was achieved in October-December, 2011. The groups of study were patterned on the doctors and the other health staff in the same clinic. The Turkish Temperatory and Character Inventory consisted in 240 questions was used. It was answered in with specified age and sex without names in free time. NS (Novelty Seeking), HA (Harm Avoidance), RD (Reward Dependence), P (Persistence), SD (Self-Directedness), C (Self-Transcendence), ST (Cooperativeness) measures and submeasures were evaluated. Mann-Whitney U tests used in SPSS 20 for results.

Results: When compared the doctors and other health staff within theirselves in the same clinics, there was not observed a difference in temperatory scales in doctors and other health staff in Department of Emergency in Foundation University, Physical Therapy in Educationional and Research Hospital, while there were differences in measures of NS (Novelty Seeking), RD (Reward Dependence), P (Persistence), SD (Self-Directedness), C (Self-Transcendence) between the doctors and other health staff in the Department of Emergency in Educational and Research Hospital (respectively, p= 0.0001, 0.026, 0.003, 0.027, 0.006).

When three departments were compared; the only difference between doctors was in C2 (Empathy) (p=0.011); 4.5±1.6 in Department of Emergency in Educational and Research Hospital, 3.4±1.5 in Department of Emergency in Foundation University, 2.7±1.7 in Department of Physical Treatment in Educational and Research Hospital. When the groups of health staff except doctors were compared, there were differences in the measures of NS1 (Exploratory Excitability), RD3 (Attachment), SD (Self-directedness), SD1 (Responsibility), SD2 (Purposefulness), SD3 (Resourcefulness), SD5 (Congruent Second Nature), ST3 (Spiritual Acceptance) , (respectively, p=0.025, 0.011, 0.002, 0.014, 0.001,0.042, 0.002,0.048).

Conclusions: The temperament was different between the doctors and the other health staff in the department of emergency medicine in Educational and Research Hospital. While there was not a difference except C2 (Empathy) according to the comparison in the groups of doctors in Department of Emergency Medicine in Foundation University, Department of Emergency Medicine in Education and Research Hospital or the Department of Physical Treatment in Educational and Research Hospital, there were many variants are effective in the groups of other health staff.

Key Words: Temperament, Emergency Medicine

Background

Personality involves all features of thought, assessment, behavior and attitude. It is the whole of both conscious and unconscious attitudes that defines individuals' stance in their lives. Personality develops out of the process in which genetic inheritance of an individual takes shape due to environmental influences. Differences in temperament features are helpful in defining personality and normal psychological variation dimensions are defined (1).

The inventory of Cloninger (TCI), which evaluates temperament and character from 7 seven different dimensions, consists of 240 questions (2). Temperament and Character Inventory (TCI) defines four temperaments, including novelty seeking (NS), harm avoidance (HA), reward dependence (RD) and persistence (P) and three character traits, including self-directedness (SD), cooperativeness (C) and Self-transcendence. This inventory was translated into Turkish as MKE, by Köse and Sayar (3).

Features of the responses to neurochemical stimulus defines three personality dimensions. Dopamine was associated with Novelty Seeking, Serotonin with Harm Avoidance and norepinephrine with Persistence (4). The behavior of High Harm Avoidance is identified with unsociability, getting exhausted quickly, anxiety and pessimism. High Novelty Seeking includes being innovative, being adaptive to changes and being quick-tempered. High Persistence can be explained as having the aim of solving problems, being durable and accomplishing the goals in any conditions or situations.

Cloninger et al. showed the relation of temperament with emotions and motivation, by adding Reward Dependence measure in a study they carried out (5). It was shown that High Reward Dependence is correlated with adaptation, susceptibility and impressionability.

Our aim is to identify the differences in the temperament and character between doctors and other health professionals at the Department of Emergency Medicine at a Private University (PUEM), Department of Emergency Medicine at a Training and Research Hospital (TRHEM), Department of Physical Therapy at a Training and Research Hospital (TRHPT).

Methods

The Turkish version of Temperament and Character Inventory, consisting of 240 questions, was used (3). The English version of TCI (version 9, 240 questions) was translated into Turkish by Kose and it was translated into its original language again by Sayar, then the last version of the inventory was approved by Cloninger and published (3).

There was not any local ethics approval. The members of the study were the voluntaries in doctors and other health professionals obtained verbal consent prior in contribution of survey. TCI questionnaires were completed in October-December 2011. The questions were answered by the volunteers in their free times when they were alone and their ages and sexes were specified without their names.

Members of the Emergency Medicine Departments of two different institutions were evaluated while Physical Therapy Department was used as the control group.

NS (Novelty Seeking), HA (Harm Avoidance), RD (Reward Dependence), P (Persistence), SD (Self-Directedness), ST (Self-Transcendence), C (Cooperativeness) measures and sub-measures were evaluated. Chi-Squared, Mann Whitney U and Kruskal Wallis tests were used in SPSS 20 for results.

Results

When doctors and non-doctors were evaluated by sex; females at PUEM %22.2 (n=2), %90 (n=9) (p=0.005); at TRHEM %32.2 (n=9), %52.9 (n=27) (p=0.123); at TRHPT %55.6 (n=5), %80 (n=12) (p=0.356).

When doctors and non-doctors were evaluated by age; at PUEM 32.2±1.6, 23±4.2 (p=0.0001), at TRHEM 32.4±4.9, 31.8±8.4 (p=0.673), at TRHPT 34.6±10.7, 36±6.3 (p=0.296).

Comparison of staff in 3 clinics within themselves as doctors and non-doctors with TCI with seven dimensions of personality traits was mentioned in Table 1.

Although there was no difference of temperament between the doctors and other health professionals at PUEM and TRHPT, apparent differences were observed between the doctors and other health professionals at TRHEM in terms of NS (Novelty Seeking), RD (Reward Dependence), P

Table 1. The comparison of staff in 3 clinics within themselves as doctors and non doctors with TCI with seven dimensions of personality

		PUEM			TRHEM			TRHPT		
		N	Mean (Min- Max)±ss	P	N	Mean (Min- Max)±ss	p	n	Mean (Min- Max)±ss	P
Novelty seeking (NS)	D*	9	18,8(14-24)±3,3	0,231	28	21,8(15-37)± 5,4	0,0001	9	17(11-21)± 3,4	0,229
	NDS	10	16,9(14-20)± 2,2		51	17,3(9-28)± 4,7		15	15,3(7-21)± 3,5	
Harm avoidance (HA)	D	9	19,1(9-29)± 6,1	0,934	28	16,3(3-33)±6,7	0,291	9	15,8(8-27)± 5,5	0,399
	NDS	10	18,1(11-24)± 4,6		51	14,7(6-25)±5		15	17,9(7-28)± 6,8	
Reward dependence (RD)	D	9	12,9(9-18)± 2,9	0,381	28	13,2(8-24)±3,9	0,026	9	11,4(8-15)± 2,5	0,132
	NDS	10	13,8(12-17)± 1,8		51	14,8(5-20)±3,3		15	13,3(9-19)± 2,5	
Persistence (P)	D	9	4,6(2-8)± 1,8	0,613	28	4,7(1-8)±1,8	0,003	9	4,1(0-8)± 2,4	0,154
	NDS	10	4,8(2-7)± 1,5		51	5,8(2-8)±1,4		15	5,6(0-8)± 2,4	
Self-directedness (SD)	D	9	22,3(15-37)± 7,2	0,815	28	26,4(16-44)±7,8	0,027	9	28(13-41)± 8,7	0,589
	NDS	10	22,0(17-32)± 5,1		51	29,8(20-42)±5,3		15	29,6(13-38)± 6,7	
Cooperativeness (C)	D	9	25,8(18-37)± 7,4	0,512	28	26,0(10-42)±7	0,006	9	26,2(19-33)± 5,8	0,169
	NDS	10	27,4(21-34)± 4,4		51	30,2(17-40)±5,9		15	30,3(18-38)± 5,5	
Self-transcendence (ST)	D	9	18,4(12-27)± 4,5	0,711	28	18,0(7-32)±6	0,504	9	14,6(7-22)± 5,7	0,068
	NDS	10	19,1(13-25)± 3,7		51	18,8(7-29)±4,9		15	19,5(9-30)± 5,3	
	Total	19	18,8(12-27)± 4,0		79	18,5(7-32)±5,3		24	17,6(7-30)±5,9	

D: Doctors, NDS: Non-doctors staff*

Table 2. The comparison of doctors and the comparison of non-doctors staff in 3 clinics within subscales traits of TCI

		D			NDS		
		n	Mean(Min-Max)±ss	P	n	Mean(Min-Max)±ss	P
Novelty seeking (NS)	PUEM	9	18.78(14-24)±3,31	0.066	10	16.9(14-20)±2,18	0.465
	TRHEM	28	21.75(15-37)±5,4		51	17.27(9-28)±4,68	
	TRHPT	9	17(11-21)±3,35		15	15.33(7-21)±3,54	
Exploratory excitability (NS1)	PUEM	9	5(2-8)±2.06	0.215	10	4.40(2-9)±2,41	**0.025**
	TRHEM	28	6.39(3-10)±1,75		51	6.39(2-11)±2,01	
	TRHPT	9	5.78(4-8)±1,39		15	5.47(2-8)±1,96	
Impulsiveness (NS2)	PUEM	9	5.33(2-10)±2,18	0.076	10	4.20(2-7)±1,48	0.153
	TRHEM	28	5.36(2-10)±2,02		51	3.27(1-8)±1,71	
	TRHPT	9	3.44(1-6)±1,88		15	3.20(0-9)±2,04	
Extravagance (NS3)	PUEM	9	4.11(3-5)±0,6	0.291	10	4.10(2-7)±1,52	0.468
	TRHEM	28	4.64(1-8)±2		51	3.92(0-8)±1,75	
	TRHPT	9	3.78(2-6)±1,48		15	3.40(1-7)±1,5	
Disorderliness (NS4)	PUEM	9	4.33(3-7)±1,22	0.106	10	4.20(1-7)±1,81	0,358
	TRHEM	28	5.36(2-9)±1,62		51	3.69(0-7)±1,63	
	TRHPT	9	4(1-6)±2,12		15	3.27(1-6)±1,39	
Harm avoidance (HA)	PUEM	9	19.11(9-29)±6,07	0.336	10	18.10(11-24)±4,63	0.065
	TRHEM	28	16.29(3-33)±6,74		51	14.67(6-25)±4,99	
	TRHPT	9	15.78(8-27)±5,54		15	17.93(7-28)±6,78	
Anticipatory worry (HA1)	PUEM	9	6.22(1-9)±2,49	0.288	10	5.70(2-8)±2,11	0.126
	TRHEM	28	5(1-10)±2,76		51	4.25(1-9)±2,06	
	TRHPT	9	7(2-18)±4,61		15	4.73(1-9)±2,22	
Fear of uncertainty (HA2)	PUEM	9	4.33(3-6)±1	0.310	10	4.30(3-7±1,25	0.202
	TRHEM	28	3.50(0-7)±1,73		51	3.80(1-7)±1,44	
	TRHPT	9	3.44(1-6)±1,74		15	4.73(2-7)±1,71	

Shyness (HA3)	PUEM	9	4.33(3-6)±1	0.310	10	4.30(3-7)±1,25	0.202
	TRHEM	28	3.50(0-7)±1,73		51	3.80(1-7)±1,44	
	TRHPT	9	3.44(1-6)±1,74		15	4.73(2-7)±1,71	
Fatigability (HA4)	PUEM	9	4.22(0-8)±2,68	0.908	10	3.80(1-7)±2,1	0.240
	TRHEM	28	4.25(0-9)±2,4		51	2.76(0-7)±2,08	
	TRHPT	9	3.78(0-7)±2,59		15	3.73(0-9)±2,4	
Reward dependence (RD)	PUEM	9	12.89(9-18)±2,93	0.496	10	13.80(12-17)±1,81	0.065
	TRHEM	28	13.18(8-24)±3,9		51	14.84(5-20)±3,35	
	TRHPT	9	11.44(8-15)±2,51		15	13.27(9-19)±2,46	
Sentimentality (RD1)	PUEM	9	6(4-8)±1,58	0.936	10	8.20(5-10)±1,48	0.094
	TRHEM	28	5.75(2-10)±2,37		51	7.20(3-10)±1,79	
	TRHPT	9	5.67(2-9)±2,29		15	6.80(5-9)±1,47	
Attachment (RD3)	PUEM	9	4.11(3-7)±1,36	0.121	10	3.50(1-5)±1,35	**0.010**
	TRHEM	28	4.64(1-8)±1,89		51	4.96(0-8)±1,81	
	TRHPT	9	3.22(1-5)±1,2		15	3.80(1-7)±1,52	
Dependence (RD4)	PUEM	9	2.78(1-4)±1,3	0.918	10	2.10(1-5)±1,2	0.209
	TRHEM	28	2.79(0-6)±1,6		51	2.69(0-6)±1,41	
	TRHPT	9	2.56(1-4)±1,01		15	2.67(1-6)±1,23	
Persistence (P)	PUEM	9	4.56(2-8)±1,81	0.690	10	4.80(2-7)±1,48	0.131
	TRHEM	28	4.71(1-8)±1,76		51	5.84(2-8)±1,43	
	TRHPT	9	4.11(0-8)±2,42		15	5.60(0-8)±2,35	
Self-directedness (SD)	PUEM	9	22.33(15-37)±7,18	0.233	10	22.00(17-32)±5,08	**0,002**
	TRHEM	28	26.36(16-44)±7,85		51	29.7820-42)±5,25	
	TRHPT	9	28(13-41)±8,7		15	29.60(13-38)±6,71	
Responsibility (SD1)	PUEM	9	3.44(0-8)±2,24	0.097	10	3.70(2-7)±1,49	**0.014**
	TRHEM	28	4.46(1-8)±2,2		51	5.25(2-8)±1,51	
	TRHPT	9	5.67(3-8)±1,73		15	5.33(3-8)±1,4	
Purposeful (SD2)	PUEM	9	4.67(2-7)±2	0.827	10	3.90(2-7)±1,79	0,001
	TRHEM	28	5(0-8)±1,98		51	6.41(2-8)±1,4	
	TRHPT	9	4.67(2-7)±1,58		15	5.53(1-8)±1,81	
Resourcefulness (SD3)	PUEM	9	2.11(0-5)±1,96	0.213	10	2.80(1-5)±1,23	**0.042**
	TRHEM	28	3.39(1-5)±1,26		51	3.61(1-5)±1,04	
	TRHPT	9	2.89(0-5)±1,76		15	3.93(1-5)±1,44	
Self-acceptance (SD4)	PUEM	9	5.11(1-8)±2,37	0.825	10	4.50(3-6)±1,35	0,896
	TRHEM	28	5.71(1-11)±2,24		51	5.04(0-11)±2,41	
	TRHPT	9	5.89(3-10)±2,62		15	5.07(1-10)±2,79	
Enlightened second nature (SD5)	PUEM	9	7(4-12)±2,78	0.222	10	7.10(4-10)±1,85	**0.002**
	TRHEM	28	7.79(4-12)±2,13		51	9.47(5-12)±1,78	
	TRHPT	9	8.89(4-12)±2,8		15	9.73(2-12)±2,74	
Cooperativeness (C)	PUEM	9	25.78(18-37)±7,45	0.911	10	27.40(21-34)±4,43	0,260
	TRHEM	28	26(10-42)±7		51	30.18(17-40)±5,85	
	TRHPT	9	26.22(19-33)±5,85		15	30.33(18-38)±5,46	
Social acceptance (C1)	PUEM	9	5(2-8)±1,94	0.582	10	5.20(2-7)±1,55	0.131
	TRHEM	28	5.29(2-8)±2,12		51	6.06(3-8)±1,48	
	TRHPT	9	6(5-7)±1		15	6.40(3-8)±1,5	
Empathy (C2)	PUEM	9	3.44(2-7)±1,51	**0.010**	10	4.10(2-6)±0,99	**0,755**
	TRHEM	28	4.46(0-7)±1,6		51	4.37(2-7)±1,37	
	TRHPT	9	2.67(0-5)±1,73		15	4.53(3-6)±1,06	

Helpfulness (C3)	PUEM	9	4.11(1-6)±1,45	0.710	10	4.70(4-6)±0,67	0.634
	TRHEM	28	4.57(1-8)±1,69		51	4.94(2-8)±1,39	
	TRHPT	9	4.67(3-7)±1,32		15	4.67(3-7)±1,11	
Compassion (C4)	PUEM	9	7.22(3-10)±2,59	0.352	10	7.50(4-10)±1,96	0,835
	TRHEM	28	5.89(2-10)±2,48		51	7.80(3-10)±2,11	
	TRHPT	9	6.67(2-9)±2,35		15	7.00(2-10)±3,16	
Pure-hearted conscience (C5)	PUEM	9	6(4-9)±,73	0.614	10	5.90(2-8)±2,13	0.060
	TRHEM	28	5.79(1-9)±1,5		51	7.00(4-9)±1,51	
	TRHPT	9	6.22(3-8)±1,56		15	7.73(6-9)±0,96	
Self-transcendence (ST)	PUEM	9	18.44(12-27)±4,48	0.395	10	19.10(13-25)±3,73	0.974
	TRHEM	28	17.96(7-32)±,97		51	18.78(7-29)±4,88	
	TRHPT	9	14.56(7-22)±5,73		15	19.47(9-30)±5,34	
Self-forgetful (ST1)	PUEM	9	7.11(4-11)±2,09	0.118	10	7.00(5-10)±1,33	0.089
	TRHEM	28	6.32(1-11)±2,14		51	5.61(2-11)±2,53	
	TRHPT	9	5(3-9)±2,24		15	5.73(3-11)±2,22	
Transpersonal identification (ST2)	PUEM	9	3.56(1-7)±2,01	0.486	10	4.60(1-7)±1,96	0.487
	TRHEM	28	4.29(0-8)±2,09		51	5.04(1-8)±1,87	
	TRHPT	9	3.56(0-7)±2,46		15	4.47(1-7)±1,85	
Spiritual acceptance (ST3)	PUEM	9	7.78(4-10)±1,99	0.355	10	7.50(2-11)±2,42	**0.048**
	TRHEM	28	7.36(1-13)±3,07		51	8.14(3-12)±2,19	
	TRHPT	9	6(3-10)±2,5		15	9.27(0-13)±3,28	
	Total	46	7.17	1	13	8.28(0-13)±2,49	

(Persistence), SD (Self-Directedness), C (Cooperativeness) (respectively, p= 0.0001, 0.026, 0.003, 0.027, 0.006).

Comparison of doctors and comparison of non-doctor staff in 3 clinics within subscales traits of TCI were mentioned in Table 2. When the three departments were compared; there was only C2 (Empathy) difference between doctors (p=0.011); doctors at TRHEM 4.5±1.6, PUEM 3.4±1.5, TRHPT 2.7±1.7.

When non-doctor health professionals in the three departments were compered; there were difference between the participants in terms of NS1 (Exploratory Excitability), RD3 (Attachment), SD (Self-directedness), SD1 (Responsibility), SD2 (Purposefulness), SD3 (Resourcefulness), SD5 (Congruent Second Nature), ST3 (Spiritual Acceptance) (respectively, p=0.025, 0.011, 0.002, 0.014, 0.001, 0.042, 0.002, 0.048).

Discussion

Only a few TCI studies have been carried out on health professionals and medical personnel. TCI not only defines temperament and character traits, but it also identifies disorders. Yet, in this study we focused only on the differences in basic traits. Thus, disorders and tendencies are not considered in our study. Also, in the Campbell study compared the remote and non-remote allied health professionals, novelty seeking (P = 0.037) and self-transcendence (P = 0.042) levels were high in remote. (6)

In a study, nurses of elderly patients with dementia showed lower Novelty-Seeking (p<0.001), and higher Self-directedness (SD) (p<0.001) and Cooperativeness (C) (p=0.002) compared to general population. (7)

When non-doctor health professionals at the tree departments were compared in our study, it was observed that NS1 (Exploratory Excitability), RD3 (Attachment), SD2 (Purposefulness) were the highest for TRHEM workers (respectively, p=0.025, 0.011, 0.001), values of SD (Self-directedness), SD1 (Responsibility), SD3 (Resourcefulness), SD5 (Congruent Second Nature), ST3 (Spiritual Acceptance) measures were similar for PUEM and TRHEM workers but higher than TRHPT. These observations can be associated with working conditions and environment in Emergency Service.

When nurses and practitioners were compared in a study, it was observed that Novelty-Seeking (NS) (p<0.003), Reward Dependence (RD)

(p<0.0029), Self-transcendence (ST) (p<0.001) were high, Self-Directedness (SD) (p<0.001) and Cooperativeness (C) (p<0.001) measures were low. (8)

It was found that, when the doctors and other health professionals working at PUEM and TRHPT were compared to each other, there were no temperament and character differences between them. However, when doctors and other health professionals working at TRHEM were compared, NS (Novelty-Seeking) was high in doctors, and RD (Reward Dependence), P (Persistence), SD (Self Directedness), C (Cooperativeness) were high in non-doctors (respectively, p= 0.0001, 0.026, 0.003, 0.027, 0.006). Some basic factors causing this may be the collaborative working hours, number and relationships of the team members. It may be associated with the differences between team members working at a TRHEM where the number of daily patients is high and members of the crowded teams change very often.

In a study, where the answers of anesthetists, intern-anesthetists, and other attending physicians were evaluated according to the society, anesthetists showed higher Cooperativeness (C) (p=0.0001), Harm Avoidance (HA) (p=0.02), and Self-Directedness (SD) (p=0.0001), but lower Reward Dependence (RD) (p=0.0001), Novelty Seeking (NS) (p=0.0001) and Persistence (P) (p=0.0001) when compared to the society. Other attending physicians showed higher Cooperativeness (C) (p=0.003) than anesthetists (9).

When practitioners working in rural and urban areas of Australia were compared, those working in rural areas showed high Novelty Seeking (NS) and low Harm Avoidance (HA) (10). On the contrary, when the medical students between the first and fourth grades were studied, those who wanted to work in urban areas showed low Harm Avoidance (HA) and high Self Directedness (SD) and Cooperativeness (C) (11). The doctors, who had worked in rural areas at least for 7 years, showed high Self Directedness (SD), Cooperativeness and Persistence (P); the doctors, who wanted to leave from the rural areas, showed high Harm Avoidance ($p < 0.01$) (12).

When the three departments were compared in the study; the only difference between doctors was in C2 (Empathy) (p=0.011); doctors at TRHEM 4.5±1.6, PUEM 3.4±1.5, TRHPT 2.7±1.7. It was an unexpected result that empathy (C2), in terms of putting oneself into someone's shoes, was high in TRHEM which is normally very busy and crowded. Empathy is a subfield of cooperativeness. It was observed that empathy and cooperativeness was high between doctors at busy emergency service where they work under difficult conditions to save patients' lives. These high results in both emergency teams can be explained with Emergency Medicine.

Although burnout syndrome was not evaluated in our study, high Harm Avoidance (HA) is said to be a reason for Burnout Syndrome in a study, where temperament and character relation was evaluated on practitioner, psychiatrist and surgeons. It was a remarkable result that this was the highest between the doctors and other health professionals working at PUEM. (13).

Conclusion

While temperament and character traits of medical workers at PUEM and TRHPT showed similarity, there were apparent temperament and character trait differences between the doctors and other health professionals working at TRHEM. The reason for the fact that the only difference between the doctors of the three departments was Empathy could not be explained. But, there reasons for the fact that there were many differences between non-doctor health professionals can be explained with further research.

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Evaluating the efficiency of health resources in hospitals of China based on DEA model

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Abstract

Introduction: Hospitals are important part in China health services system, playing a vital role in improving the quality of health services. This study aims to evaluate the efficiency of health resources in China, and put forward feasible measures to improve the efficiency of health resources utilization in hospitals of China.

Methods: Data related to health resources and health services were sourced from China Health Statistics Yearbook 2016. Moreover, CCR model and BCC model out of DEA were employed to evaluate the efficiency of health resources allocation in hospitals of China.

Results: The total number of hospitals, health workers, beds in 2015 was 27,587, 6,132,793, 5,330,580, respectively. The medical treatment visits, inpatient visits in China in the year of 2015 was 3,083,640,862, 160,868,382, respectively. Furthermore, the average scores of overall efficiency, technical efficiency, and scale efficiency of 31 provinces in China were 0.911, 0.946, 0.964, respectively. All the inefficient provinces have slack values in input values or output values.

Conclusions: The health resources allocation efficiency in hospitals of the 23 provinces (74.19%) in China was low. The government, hospitals should take effective measures to improve the efficiency of health resources in hospitals of China.

Keywords: Efficiency; Health resources; Hospitals; China; DEA model.

Introduction

Hospitals are important part in China health services system, playing a vital role in improving the quality of health services. For one thing, many hospitals in China expand their scales blindly, and they have not utilized the health resources entirely. For another, some hospitals in China have not enough investment to have more health resources to improve the ability of health services. Furthermore, the health resources allocation in China is not quite balanced, the hospitals in eastern developed areas have adequate health resources while the hospitals in western developing areas have fewer resources, which limited the improvement of ability of health services in western developing areas. This study aims to evaluate the efficiency of health resources in China, and put forward feasible measures to improve the efficiency of health resources utilization in hospitals of China.

Methods

Data sources and statistical analysis

Data related to health resources and health services were sourced from China Health Statistics Yearbook 2016[1].

Microsoft Excel 2007 was used to log data and DEAP (V2.1) was employed to conduct data envelopment analysis.

Data envelopment analysis

Data envelopment analysis (DEA) is an effective methodology that has been widely employed to evaluate the relative efficiency of health resources allocation [2, 3]. The CCR model is employed calculate the overall efficiency and the slack variable of each province [4]. The BCC model is used to measure the technical efficiency and scale efficiency [5, 6]. CCR model and BCC model are important models of DEA models[7]. In this study, we employed the CCR model and BCC model out of

DEA to evaluate the relative efficiency of health resources allocation in China.

Variables selection

Based on a review of related literature[8, 9], we selected the number of hospitals, the number of health workers and the number of beds as input variables; medical treatment visits and inpatient visits were selected as outputs variables.

Results

Health resources allocation and health services utilization of hospitals in China in 2015

Tables 1 showed Health resources allocation and health services utilization of hospitals in China in 2015. The total number of hospitals, health workers, beds was 27,587, 6,132,793, 5,330,580, respectively. The medical treatment visits, inpatient visits in China in the year of 2015 was 3,083,640,862, 160,868,382, respectively.

Table 1. Health resources allocation and health services utilization of hospitals in China in 2015

Province	Hospitals	Health workers	Beds	Medical treatment visits	Inpatient visits
Beijing	631	207,209	104,644	145,857,150	2,657,627
Tianjin	402	82,955	55,556	71,512,648	1,401,793
Hebei	1,543	294,350	253,825	117,337,217	7,819,687
Shanxi	1,274	170,976	140,257	49,677,869	3,234,302
Inner Mongolia	702	124,660	105,185	44,058,120	2,495,705
Liaoning	1,020	228,870	222,644	90,125,375	5,749,850
Jilin	616	125,668	117,699	48,254,958	3,138,357
Heilongjiang	1,012	180,305	173,642	60,904,045	4,328,139
Shanghai	338	140,943	103,526	145,433,676	3,123,929
Jiangsu	1,581	371,366	328,500	241,218,306	9,980,673
Zhejiang	1,049	310,061	239,444	246,421,979	7,166,658
Anhui	1,018	217,783	202,713	93,660,838	6,535,201
Fujian	570	155,241	129,559	93,108,165	4,101,484
Jiangxi	568	146,310	134,277	58,851,866	4,503,479
Shandong	1,927	454,752	378,884	187,113,004	11,673,975
Henan	1,521	396,420	358,341	168,673,195	11,035,274
Hubei	869	264,040	243,481	119,907,309	7,816,793
Hunan	1,173	263,803	275,881	90,067,194	8,449,095
Guangdong	1,323	462,389	345,258	353,820,727	11,208,781
Guangxi	527	182,604	140,306	87,025,828	4,994,985
Hainan	202	41,910	30,251	16,552,166	854,179
Chongqing	631	130,092	123,855	60,227,014	3,900,309
Sichuan	1,942	359,394	345,771	160,082,045	10,426,999
Guizhou	1,188	145,481	148,112	49,653,451	4,716,379
Yunnan	1,101	178,411	181,269	88,151,379	5,784,632
Tibet	139	10,652	9,944	5,486,127	246,177
Shannxi	1,014	207,121	167,248	72,941,538	5,212,889
Gansu	443	83,649	94,596	39,470,923	2,739,631
Qinghai	181	28,655	28,322	11,082,996	724,548
Ningxia	168	34,613	29,566	17,139,418	875,119
Xinjiang	914	132,110	118,024	49,824,336	3,971,733
Sum	27,587	6,132,793	5,330,580	3,083,640,862	160,868,382

Efficiency evaluation

Relatively operational efficiency analysis

Relatively operational efficiency results were showed in Table 2. The average scores of overall efficiency, technical efficiency, and scale efficiency of 31 provinces in China were 0.911, 0.946, and 0.964, respectively. The overall efficiency, technical efficiency, and scale efficiency of 8 provinces were 1.000, 1.000, and 1.000, respectively, and and all the slack variables are 0, which indicates the 8 provinces were efficient in terms of health resources allocation[10]. 7 provinces had efficiency scores of 1 for technical efficiency, overall efficiency and scale efficiency scores of less than 1, a slack variable of 0, indicating the provinces were weakly efficient. 16 provinces had overall efficiency, technical efficiency, and scale efficiency scores of less than 1, and not all the slack variables are 0, indicating that the provinces were relatively inefficient. 8 provinces had CRS, and 11 provinces had DRS, while 12 provinces had IRS.

Table 2. Relatively operational efficiency results

Province	Overall efficiency	Technical efficiency	Scale efficiency	Type of scale efficiency	Relatively efficiency status
Beijing	0.992	0.994	0.998	DRS	Inefficient
Tianjin	0.916	0.974	0.941	IRS	Inefficient
Hebei	0.902	0.947	0.952	DRS	Inefficient
Shanxi	0.663	0.669	0.991	IRS	Inefficient
Inner Mongolia	0.698	0.708	0.985	IRS	Inefficient
Liaoning	0.815	0.817	0.996	DRS	Inefficient
Jilin	0.810	0.819	0.989	IRS	Inefficient
Heilongjiang	0.761	0.763	0.997	IRS	Inefficient
Shanghai	1.000	1.000	1.000	CRS	Efficient
Jiangsu	0.956	1.000	0.956	DRS	Weakly efficient
Zhejiang	0.944	0.967	0.976	DRS	Inefficient
Anhui	0.972	0.994	0.978	DRS	Inefficient
Fujian	0.960	0.962	0.998	IRS	Inefficient
Jiangxi	1.000	1.000	1.000	CRS	Efficient
Shandong	0.892	1.000	0.892	DRS	Weakly efficient
Henan	0.926	1.000	0.926	DRS	Weakly efficient
Hubei	1.000	1.000	1.000	CRS	Efficient
Hunan	1.000	1.000	1.000	CRS	Efficient
Guangdong	0.992	1.000	0.992	DRS	Weakly efficient
Guangxi	1.000	1.000	1.000	CRS	Efficient
Hainan	0.803	0.903	0.888	IRS	Inefficient
Chongqing	0.966	0.971	0.994	IRS	Inefficient
Sichuan	0.925	1.000	0.925	DRS	Weakly efficient
Guizhou	1.000	1.000	1.000	CRS	Efficient
Yunnan	1.000	1.000	1.000	CRS	Efficient
Tibet	0.787	1.000	0.787	IRS	Weakly efficient
Shannxi	0.891	0.896	0.995	DRS	Inefficient
Gansu	1.000	1.000	1.000	CRS	Efficient
Qinghai	0.793	0.958	0.828	IRS	Inefficient
Ningxia	0.887	1.000	0.887	IRS	Weakly efficient
Xinjiang	0.995	0.998	0.997	IRS	Inefficient
Average	0.911	0.946	0.964	/	/

IRS: increasing return to scale. DRS: decreasing return to scale. CRS: constant return to scale.

Table 3. Slack variable results of inefficient provinces

Province	Hospitals	Health workers	Beds	Medical treatment visits	Inpatient visits
Beijing	291	65,613	627	0	482,732
Tianjin	169	10,832	1,461	0	202,092
Hebei	667	15,623	13,472	30,861,912	0
Shanxi	871	56,639	46,463	2,300,111	0
Inner Mongolia	313	36,394	30,708	0	0
Liaoning	186	41,780	40,766	0	0
Jilin	112	22,776	21,332	0	0
Heilongjiang	314	42,678	41,101	0	0
Zhejiang	207	10,127	15,089	0	0
Anhui	115	1,405	1,308	8,117,235	0
Fujian	22	5,940	4,958	0	0
Hainan	19	8,809	2,920	0	0
Chongqing	18	3,711	3,533	0	0
Shannxi	401	21,618	17,456	15,609,032	0
Qinghai	8	1,210	3,007	2,471,698	0
Xinjiang	410	296	264	4,973,989	0
Average	258	21,591	15,279	4,020,874	42,802

Slack variable analysis

Table 3 showed the slack variable results. All the inefficient provinces have slack values in input values or output values. Aiming at achieve Pareto Optimality, the inefficient provinces have to decrease the average number of hospitals by 258, and reduce the average number of health workers by 21,591, and reduce the average number of beds by 15,279. Alternatively, the inefficient provinces have to increase the average number of medical treatment visits by 4,020,874, and increase the average number of inpatient visits by 42,802.

Discussion

The average scores of overall efficiency, technical efficiency, and scale efficiency of 31 provinces in China were 0.911, 0.946, 0.964, respectively. 25.81% of the provinces in China were relatively efficient, indicating these provinces utilized the health resources entirely. 22.58% of the provinces in China were weakly efficient, and 51.61% of the provinces in China were inefficient, which indicates the provinces did not utilized the resources entirely.

As mentioned above, 8 provinces (25.81%) had CRS, indicating that the provinces had scales that were reasonable and had to expand their scale of operation. 11 provinces (35.48%) had DRS, indicating that the provinces had scales that were too big and had to cut down their scale of operation. 12 provinces (38.71%) had IRS, indicating that the provinces had scales that were too small and needed to expand their scale of operation.

Based on the analysis above, we put forward the following advice to improve the efficiency of health resources in hospitals of China. First and foremost, the government should strengthen health integration and encourage hospitals to set up establish cooperative relationship with other hospitals to improve the efficiency of health resources in hospitals [11]. Furthermore, the hospitals need to control their scale and equip health resources reasonably to avoid the waste of health resources. Last but not least, the hospitals are supposed to improve their capacities of health services by introducing high-quality health workers and advanced medical technology to improve the outputs.

Conclusion

The health resources allocation efficiency in hospitals of the 23 provinces (74.19%) in China

was low and needs to be improved. The government, hospitals should take effective measures to improve the efficiency of health resources in hospitals of China.

Abbreviations:

DEA: Data envelopment analysis; IRS: increasing return to scale; DRS: decreasing return to scale; CRS: constant return to scale.

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Authors' contributions:

JS formulated the research concept and developed the primary framework of the study; JS contributed to the final manuscript; JS was involved in data collection. The final manuscript submitted for publication was read and approved by all authors.

Competing interests:

The authors declare that they have no competing interest.

Consent for publication:

Not applicable.

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Instructions for the authors

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Abstract

In this paper the instructions for preparing camera ready paper for the Journal are given. The recommended, but not limited text processor is Microsoft Word. Insert an abstract of 50-100 words, giving a brief account of the most relevant aspects of the paper. It is recommended to use up to 5 key words.

Key words: Camera ready paper, Journal.

Introduction

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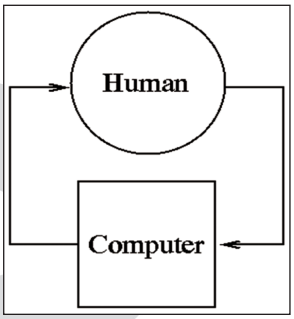

Figure 1. Text here

Conclusion

Be brief and give most important conclusion from your paper. Do not use equations and figures here.

Acknowledgements (If any)

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