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WHICH CRITERIA DETERMINE THE WINNER FOR PATIENT?

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ABSTRACT

This study aims to determine the most important hospital preference criteria to provide guidance for hospital managers who wish to differentiate their hospitals from their rivals. In this context, preference criteria importance weights are determined by Kano Model and criteria priority orders are computed by Stochastic Multi-criteria Acceptability Analysis-2 (SMAA-2) method. The research is performed in three big private hospitals in Turkey. "Hospital Evaluation Survey" was performed to 350 patients based on volunteerism for one week by the researchers in June 2016. As a result of this study, it is identified that the criteria which have the highest impact on the hospital preferences are the "waiting time for the examination", "taking accurate information from the front desk", "the politeness level of the doctors" and "finding the doctors trustable".

INTRODUCTION

The hospital sector gained a much more competitive structure today (Lee at al., 2008). The supply of the health services does not have linear relation with the demand and it is highly difficult to increase the supply of the market in short term. This indicates the importance of increasing the effectiveness of the health system in order to increase the efficiency of the hospital management (Mahapatra, 2013). The hospitals have changed their point of views which used to be almost oblivious to the market and patient needs (Grönroos, 1990). Lane and Lindquist (1988), Taylor and Capella (1996), Bowling et al. (2012) emphasized of being cognizant of the relative importance patients' preference criteria of the hospitals and their measurements. The development of a method which will review the relations between the hospitals and the patients are very important as regards to establish a competitive advantage (Lee at al., 2008). The patients have great contribution to the improvement of the health services defining the quality standards of the hospitals (Donabedian, 1992). However at this point, the determination of the relative importance levels of the different parts of the health services is crucially important. This information is of great importance to define

the priorities of patients in order to provide health services to satisfy their demands for the hospitals. This may enable the hospitals to focus upon the points which are more important for the patients than the others. This makes the hospitals to obviate the dissatisfaction of the health services which may save them great time and money. The integration of the views of the patients with the health service system and process is also of paramount importance (Craig, 2007). Core or peripheral attributes of service which are seen very important by managers are not determined very important by patients (Jacoby and Olson, 1985). Also, there is no linear relationship between perceived service quality and satisfaction of patients (Kano et al., 1984; Day, 1993; Matzler & Hinterhuber, 1998; Huiskonen & Pirttila, 1998; Shen et al., 2000; Tan & Pawitra, 2001; Shahin, 2004 and Riviere et al., 2006).

In spite of this fact, the studies to take the opinions of the patients when defining the priorities are very limited in the literature (Wensing et al. 1998). Lauterbach and Luengen (2003) stated that although there are qualitative and quantitative studies related to the patient's choices of hospitals, there is no study which ranks the hospitals by sorting the selection criteria from the most important one to the least important one in the literature. In this limited studies mentioned above, either the patients are asked to evaluate the criteria which play the role in their choices (Harris 2003; Cheng & Song 2004; Fung et al. 2005) or the qualitative comparative evaluations of the hospitals according to the patients' choices obtained by the interviews or the focus group studies (Katelaar, 2014). Also the results obtained to define the relative importance weights of the criteria which effect the decisions of the patients have limited applicability (Lilien & Rangaswamy 2003). It is difficult to decompose the differences between the selection criteria of the hospitals.

This study aims to determine the most important hospital preference criteria to provide guidance for hospital managers who wish to differentiate their hospitals from their rivals. The Stochastic Multicriteria Acceptability Analysis-2 (SMAA-2) method is used in this research to determine the impacts and priorities of the attributes of hospital service according to patients' preferences. SMAA-2; evaluates attributes for service providers, determines the most important attributes for patients, the impacts of attributes on decision, the ranking of the attributes, the probabilities according to the ranking of attributes. Wang and Cheng (2011) points out that since it is not possible to measure the relative importance of the hospital selection criteria of the patients in definite terms, the best way is to determine and compare the expectation levels of these criteria. Similarly, KANO Model is an effective means which marks the features that products should have, by classifying the expectations of customers related to these products.

Referring the literature studies consisted of SMAA-2 applications are limited. SMAA-2 was performed for selection of polluted soil cleaning firms by Hokkanen et al. (2000), a port location selection by Lahdelma and Salminen (2001), garbage deposition place selection by Lahdelma et al. (2002), a socio-ecological area planning by Kangas et al. (2005), strategical forest planning by Kangas et al. (2006), elevator planning by Tervonen et al. (2008), electrical distribution system selection by Lahdelma and Salminen (2009), universities' ranking determination by Özkaya (2010), making medicines' profit–risk analysis by Tervonen et al. (2011) and disaster logistics area selection by Ağdaş et al. (2014).

Second part of the study includes SMAA-2 arithmetic's and logic. Third part includes KANO model. SMAA-2 method is explained in fourth part. Fifth part is a case study for assessment of patient hospital choice. Results and discussion are included in the sixth part.

STOCHASTIC MULTI-CRITERIA ACCEPTABILITY ANALYSIS-2 (SMAA-2) LOGIC AND SMAA-2 ARITHMETIC

In SMAA-2, the inverse space analysis is performed to identify the one of the alternatives' probability that represents rank preference or the impact of the criteria upon this rank. In inverse space analysis the weight information is used to identify most preferred alternatives. The decision problem symbolized by "m" that represents alternatives sets $\{x_1, x_2, x_3, \ldots\ x_m\}$evaluated according, "n" that represents criteria $\{g_1 g_2, g_3, \ldots, g_n\}$. The evaluation of x_i alternative according to g_j criteria is symbolized as $g_j(x_i)$. Decision Makers (DMs)' preferences are defined by the utility function "u(x_i, w)". For calculating u(x_i, w) Equations (1) and (2) are used as shown below.

$$u_{ij} = u_j(g_{ij}) \quad (1)$$

$$u(x_i, w) = \sum_{j=1}^{n} w_j u_{ij} \quad w \in W \quad (2)$$

Joint probability distributed intensity function "f(ξ)" and the density function "ξ_{ij}" are used to represent the criteria values in "X" plane. The joint intensity weight distribution function "f(w)" in suitable weight set "W" defines the DMs' unknown or the partially known preferences. The total deficiency of the total preference is represented by uniform weight distribution as shown in Equation (3).

$$f(w) = 1/vol(W) \quad (3)$$

In SMAA-2 weights of the criteria are non–negative normalized values. These are formulized as in Equation (4).

$$W = \{w \in R^n w \geq 0\ ve\ \sum_{j=1}^{n} w_j = 1\} \quad (4)$$

For insertion of stochastic criteria and distribution of weights $u(\xi_i, w)$ in utility distribution, the utility functions are used. The ranking of each alternative is emitted in Equation (5). If the ranking ρ is correct the ranking function takes value "1" and if it is wrong it takes value "0".

$$rank\ (\xi_i, w) = 1 + \sum_k \rho\big(u(\xi_k, w) > u(\xi_i, w)\big) \quad (5)$$

In SMAA-2 after the assignment of a suitable weight value for each alternative, the alternative "x_i" is ranked as "r" defined in Equation (6).

$$W_i^r(\xi) = \{w \in W : rank\ (i, \xi, w) = r\} \quad (6)$$

SMAA-2 includes three important parameters; rank acceptability index (RankAcc), k best ranks central weight vector (CWV) and k best ranks confidence factor (CF). RankAcc index shows the probability of an alternative to be ranked at any position. Any alternatives which have the maximum occurrence probability are thought to be taking this rank. RankAccs index;b_i^r are calculated by using distribution of criteria and multidimensional integration (Equation 7).

$$b_i^r = \int_{\xi \epsilon x} f_x(\xi) \int_{w \in W_i^r(\xi)} f_w(w) dw d\xi_r \quad (7)$$

The weight space corresponding to the k best ranks for an alternative can also be described by means of the k best ranks CWV; w_i^k defined as in Equation (8).

$$w_i^k = \int_X f(\xi) \sum_{r=1}^{k} \int_{W_i^r(\xi)} f(w)\, w dw d\xi / a_i^k \quad (8)$$

The k best rank CF is designed as the probability that an alternative takes the first rank in case the k best ranks CWV is chosen. k best ranks CF; ρ_i^k is calculated by Equation (9) (Lahdelma and Salminen 2001).

$$\rho_i^k = \int_{\xi \in X:\mathrm{rank}(\xi_i, w_i^k) \le k} f(\xi) \mathrm{d}\xi \quad (9)$$

KANO MODEL

KANO model is an approach to weight and grade the consumers' expectations enlightening how important each expectation is. There are three main product satisfaction attributes related to the consumer satisfaction. These are must be (M), one dimensional (O) and attractive (A) attributes (Kano et al., 1984). There are three dissatisfying features defined alongside with these three satisfying ones as well as namely indifferent (I), reverse (R) and questionable (Q) attributes (Chen et al., 2011). The data needed to classify the attributes in accordance with the consumer expectations are obtained by a pair of functional (positive) and dysfunctional (negative) questions. After the classification of the consumer needs then the Consumer Satisfaction Coefficient (CSC) is computed. The satisfaction is measured by the addition of the frequencies of the attractive and must-be groups and divided with the summation of the frequencies of the attractive, must-be and indifferent groups (Matzler and Hinterhuber 1998). Dissatisfaction is measured by combining the frequencies of must-be and one dimensional groups and dividing it with the summation of the frequencies of attractive, must-be and indifferent groups. This value is multiplied by "-1" in order to express the dissatisfaction. The satisfaction and the dissatisfaction dimensions of CSC are calculated by the use of Equations (10) and (11).

$$CSC(satisfaction\ (S)) = \frac{A+O}{A+O+I+M} \quad (10)$$

$$CSC(dissatisfaction\ (D)) = \frac{O+M}{(-1)*A+O+I+M} \quad (11)$$

After the calculation of CMS the weight of the expectation of each consumer classified (w_i) was calculated by the approach of Sireli et al. (2007). According to this approach the importance weight of the criteria is equal to the highest absolute value of the satisfaction and dissatisfaction (Equation 12).

$$w_i = Max\ (\frac{S_i}{\sum_{i=1}^{m} S_i}, \frac{D_i}{\sum_{i=1}^{m} D_i}) \quad (12)$$

THE PROPOSED PROCEDURE STEPS

Identification of alternatives and decision criteria (DC) is the first step of procedure. The choices compared to select the best one represent alternatives and the features used in alternatives' comparisons form the DC (Stewart, 1992). Determining the criteria are perceived as the most crucial step in selection process of best alternative (Stewart, 1992). Identification of decision

makers (DMs) forms second step. DMs have great importance in selection process. The DMs are the group which able to evaluate alternatives according to DC to find the best alternative. The definition of the criteria values is involved in the third step. There is flexibility for evaluation of criteria values in terms of data groups in SMAA-2. SMAA-2 can be implemented with seven data group called, exact, interval, gauss, lognormal, logitnormal, beta and discrete distribution. In the fourth step, preference information of the DMs is determined. These informations represent the weights or priorities of the DC. Determination of the RankAcc indexes (b_i^r) of the alternatives are achieved in the fifth step. Testing the ranks of the alternatives according to CWV (w_i^c) and CF (p_i^c) is made in the sixth step. The seventh step includes the determination of the impact levels of the criteria placed at the first rank based on the RankAcc indexes, CWV and CF previously determined. Also in this step, the best alternative is selected.

CASE STUDY FOR ASSESSMENT OF PATIENTS' HOSPITAL CHOICE

In the alternatives and DC selection step, the hospitals rendering alternatives are identified. In this case study, the hospitals evaluated are the pioneers and the biggest three private hospitals. They acquire emergency services giving 24 hours, specialized branches like checkup, oncoloji and fertility centers, intensive and neoplanatal intensive care units. Besides, they offer supplementary services for patients such as catering services, companions' services. The competition in this hospital oligopol market is intense because of the high revenues and value added structure. Hospitals emphasize and are aware of the importance of differentiating their health service from rivals and having a reliable brand.

Generally, the mostly emphasized selection criteria are determined as "in formativeness", "humaneness" and "competence", "patients' involvement in decisions", "time for care", "other aspects of accessibility", "exploring patients' needs", "other aspects of relation and communication" and "availability of special services" (Wensing et al., 1998). The hospital selection criteria of the patients mentioned in the literature are listed at Table 1

Table 1. Dimensions examined in literature related patients' hospital selection criteria

Authors	Dimensions
Al-Bashir and Armstrong (1991)	Easy to talk to, personal attention and sees things from patients' point of view
Allen et al. (1991)	İnformativeness
Bartholomew and Schneiderman (1982)	To feel physician is competent, to like your physician, for physician to know you as a person, to see same physician each time
Bendtsen and Bjurulf (1993)	Good reception by staff, good professional knowledge, good ability to inform about RA, good ability to show empathy
Boscarino and Stelber (1982)	Near to home, doctor uses, specialist doctors, better equipment, quality of facility, familiar staff, past experience with staff, less expensive, size and religious affiliation
Bostan et al. (2007)	The right to receive information, Joining the decisions concerning one-self and using choice right, Medical services, Management services

Buckley et al. (1990)	Understanding medication, how to communicate with your doctor, how arthritis would affect your future, effect of your illness on your energy level
Cymbalist and Wolf (1988)	Treats you as an individual, understanding, can answer your questions
Dijs-Elsinga et al. (2010)	Hospital's good reputation and friendly hospital atmosphere, Waiting time for surgery, sufficient and comprehensible information given during hospital stay
Drury et al. (1988)	Every time the same general practitioner, competency and continuing education of the general practitioner, individualized approach, attention, willingness to listen, effective treatment, discussion about treatment
Elstad (1994)	Makes patients feel secure and comfortable, concerned about patients emotions, invites patient participation in deciding treatment, interested in patient's total life situation
Ende et al. (1989)	involvement in decision-making, being informed
Fennema et al. (1990)	Humaneness, comprehensiveness, availability, competence, continuity
Fishman and Wenkart (1987)	Annual check-ups, receptionists/nurses were expected to be friendly, attending to needs promptly, practices should be near to public transport, free parking places, special arrangements for the elderly and the very sick, continuing interest after referral to the consultant or hospital
Fletcher et al. (1983)	Continuity, comprehensiveness, availability, compassion, telephone accessibility, organization of day and night availability, privacy of patient information, individualized approach, take care that the patient feels comfortable, understandable, non-medical language, general practitioner keeps appointments, information about organizations referred to, discussion of treatment options, accuracy in professional behavior, clear about advantages and disadvantages of a treatment
Gandhi et al. (1997)	Accessibility, attitudinal problems
Goldstein and Fyock (2001)	Getting the care they need quickly, having access to specialists, and communicating well with doctors
Greene et al. (1980)	Mutual responsibility, convenience
Groen et al. (1991)	Patient autonomy, patient information, patient Professional interaction, social dimensions, support, treatment
Groot et al. (2012)	Report card regarding physician's expertise, waiting time for outpatient clinic appointment, waiting time for 'positive judgment about physician communication
Hagman and RehnstroÈm (1985)	Access to doctor without delay, doctor is understanding and easy to talk to
Hares et al. (1992)	Explaining diabetes and complications, complete and clear information, consistent information, treating each patient as an individual, attending a good clinic, having professionals involved in care

Health Link (2004)	access ranging from how to get to the hospital, waiting times for the procedure, quality covering performance such as mortality rates and cancelled operations as well as information about the environment, staff, policy, subjective and attitude
Hopton and Dlugolecka (1995)	Regular health checks, help/advice about heart disease, help/advice about coping with stress, help/advice about healthy eating, opportunity to talk through a problem at length, help/advice about taking exercise, longer surgery opening hours, help/advice about losing weight, help/advice about backache
Javalgi, Rao, and Thomas (1991)	Located near home/convenient, specialist doctors, reputation, modern equipment/technology, courteous employees, cost of care, doctor's recommendation, friend's/relative's recommendation, and type of hospital.
Lang et al. (2004)	Ease of access, reputation of hospital, quality of care, waiting time
Lee et al. (2008)	Cost/fee of medical care, good surrounding, courtesy of care, reputation, modern equipment/technology, experience with hospital/physician/staff, near to home, medical staff's quality, specialist doctors, privacy, quality of medical care, religious affiliation, doctor/friend/family's recommendation, acceptance of insurance, full service range, convenient procedure
Leister Stausberg (2007)	Experience, referral by general practitioner, certified quality management system, positive press coverage, recommendation by relatives and acquaintances and distance to the hospital.
Longman et al. (1992)	Use safe techniques, being able to carry out physicians' orders; relieve anxiety by explanation, receive treatment on time, honesty concerning medical condition, information in understandable language, respect, be cheerful, pleasant, friendly, listen to me
Lupton et al. (1991)	Professionalism, empathy, confidentiality, comfort with discussing sexual matters
Malsch and Blaauwbroek (1994)	Trusting your physician, enough time for the patient, providing information to the patient, physician is open about ideas, mutual respect, physician shows attention for the individual, patient can give his/her priorities, shared-decision making
McBride et al. (1994)	Diagnosing and treating illness, communication with patient
Mold et al. (1994)	Avoid unnecessary pain/suffering, make own decisions
Ramsaran-Fowdar (2008)	Reliability, and fair and equitable treatment
Rao et al. (2006)	Availability of medicine, medical information, staff behavior and doctor behavior waiting time
Satcher et al. (1980)	Accurate record keeping and informing other care providers in case of absence, inform people about available health services and respect each patient as an individual
Shannon et al. (1979)	Working style and organization on special services
Sixma et al. (1994)	Open about diagnosis, being taken seriously, time for the patient during the consultation hour, GPs knows most recent medical developments, GP tells what you can expect concerning the disease, clear about advantages and

	disadvantages of a treatment, being able to have the same GP, GP follows continuing medical education, GP uses understandable language
Smith and Armstrong (1989)	The doctor listens and sorts out problems, usually the same doctor is seen, health checks for adults, appointment within two days
Starr et al. (1979)	Physical examination each year, dental examination each year, yearly eye examination, once visit for nonemergency illness, yearly blood tests, chest X-ray each year
Taylor and Capella (1996)	Quality of care, cleanliness of the facility, attitude/courtesy of hospital staff, reputation of hospital, range of specialized service, appearance and decor, quality of emergency care, quality of nursing care, equipment/technology of facility, know/like hospital staff, cost of care, convenient location/located near home, physician uses/recommends, past experience with hospital, recommendation of family/friends
Van der Voort et al. (1995)	Patients' involvement in decisions, quickly ask for additional tests
Victoor et al. (2012a; 2012b)	Health care quality, health care process and health care outcomes
Wolinsky and Kurz (1984)	Knowledge (prior use of the hospital, new facilities, condition-specific reputation and nearness to home), cost (cost of care), quality (quality of medical care, and courtesy of care), and recommendation (doctor's recommendation, and friend's recommendation)
Yaffe and Stewart (1986)	Physicians should ask them about personal and nonmedical events, that occurred in their lives, Focus on organization of services
Yu Cheng et. al. (2007)	Comfort, convenience, capacity, modernized system of treatment, medical ethics and commitment to the patient, professional technology, quality of drug, quality of doctors, expense rationality, community relations and contribution to the public activities. patients' loyalty status and patients' complaints
Yavaş and Shemwell (2001)	attractiveness of interior/exterior, acceptance of insurance, availability of specialists, quality of emergency care, range of service, fees, up-to-date medical equipment, nurses' competency, physician's competency, latest medical procedure, clarity of admission/dismissal procedure, visitation policies, accessibility, privacy, and personal attention
Zarei et al. (2012)	Professional, timely, and proper services

For identifying hospital selection criteria, a focus group is rendered with 11 patients who had health services from all of these three hospitals, not having chronic illness and have private health insurance and have his/her own salary. 55.1% of focus group participant patients were female and 44.9% male. Fourty percent of patients were between 30 and 45 years old, twenty percent of patients were 46 and 61 years old and the other are between 62 and more years old. Focus group patients answer the question of "the properties which drive you to choose a hospital for health service demand".

This case study DC are extracted from the focus group patients opinions regarding hospital preference criteria and literature review about these criteria identified above in Table 1 by health

services receivers by a team consisted of hospital managers and researchers. Researchers are experienced and successful on SMCDM researches and services marketing issues.

The DMs Selection: Hospital evaluation survey was distributed to 400 patients, the survey was performed by 350 respondents based on volunteerism by face to face. The actual response rate was 87.5%. The pencil and paper survey was conducted for one week in three hospitals by the researchers. For the study, it is assumed that patients have the free choice of hospital.

For determining the sample size of the survey, participants responded questionnaire were accepted as a homogenous and the phenomena occurring probability was calculated as p=0.9 and the not occurring probability was taken as q=0.1 The sample error was taken as 0.05 and the significance level was accepted to be $\alpha = 0.05$. The sample size was calculated as 138 in the condition of the population size were not known. The sample size was found to be sufficient according to the confidence level of %95. Demographic in formations are depicted in Table 2.

Table 2. Demographic characteristics of patients

Variables	Alternatives	Frequency (n)	Percentage (%)
Sex	Female	171	48.8
	Male	179	51.2
Age	Less than 21	0	0.0
	21-30	53	15.1
	31-40	49	14.0
	41-50	154	44.0
	51-60	41	11.7
	More than 60	50	15.1
Marital Status	Married	249	71.1
	Single	101	28.9
Education	Primary school	1	0.5
	High School	101	28.8
	University	149	42.5
	Postgraduate	99	28.2
Do you have children?	Yes	201	57.4
	No	149	42.6
Economic position	0-1000 TL	0	0.0
	1001-3000 TL	53	15.3
	3001-6000 TL	197	56.2
	More than 6001 TL	100	28.5
Did you receive health service from all the three hospitals mentioned	Yes	249	71.1
	No	101	28.9
Do you have private health insurance	Yes	299	85.4
	No	51	14.6
Do you have own income?	Yes	350	100
	No	0	0.0

Do you have a chronic disease	Yes	103	29.5
	No	247	70.5

The questionnaire used to identify the DMs and DC values is formed by three sections. The first part is constituted by 10 questions inquiring about the demographic properties. The second part was formed by 13 items in 1-5 Likert scale sequenced from the worst to the best asking the attitudes of the patients for three different hospitals. The third part was constituted by 13 items measuring in 1-5 Likert scale the expectations of the patients for three different hospitals. The other 4 health service properties were measured by real data received by hospital manager (see Table 3).

The numbers of questions (k) are accepted to be adequate forming the scale because of k>30. A pilot study was performed with 30 patients in these three hospitals to find that whether the questionnaire is correct and understandable. The patients participated the survey were asked further different questions for identifying the misunderstandable parts were thoroughly modified. Regarding patients in pilot study, 55% of participants were female and 45% male. 42% of patients were between 35 and 50 years old and the other are between 51 and more than 66 years old.

200 patients among the participants of the questionnaire were chosen as the DM group. It is impossible, resources wasting for the hospitals to evaluate all the needs and expectations of the patients. Therefore, it is vital for them to meet the needs and expectations of their target market and identify their priorities. The selection of the DM group was made among the patients who received health service from all three hospitals, has a private health insurance and own salary and has not a chronical disease. Entwistle et al. (2006) and West (2000) mentioned that there are differences between acute and chronic patients about hospital preference criteria. The selection criteria for the DM group based upon the literature and decided by the team including researchers and hospital managers. For evaluating the homogeneity of the survey, the reliability is calculated by using Chronbach α coefficient and it was found to be 0.861 which shows that the survey was highly reliable.

The identification of DC values: The DC values were determined by mean value of the answers given by the DMs for 13 criteria between 1-5 scores for each hospital. These points were obtained as an ordinal. Besides, the other 4 items received from hospitals are exact or interval data type of SMAA-2. As shown below, the lowest point was scored by the services offered to companion of patient (2.230) and highest point was given for the waiting time for the examination (4.255) (Table 3).

Table 3. Values of DC, ranking of hospitals and data types

Criteria No	Criteria Definition	Importance weights	Hospital 1		Hospital 2				Hospital 3		
			CV*	DT**	Ra***	CV	DT	Ra	CV	DT	Ra
1	Hygiene of hospital	0,055409	3,390	O	3	3,395	O	2	3,420	O	1
2	Noise level of hospital	0,055727	3,760	O	1	3,705	O	2	3,625	O	3

3	Easiness to show test results to doctors	0,057624	3,720	O	1	3,405	O	3	3,575	O	2
4	Finding the doctors trustable	0,058944	3,780	O	1	3,530	O	3	3,650	O	2
5	Trustworthiness to treatment accuracy	0,05728	3,580	O	2	3,635	O	1	3,545	O	3
6	Satisfaction from doctors' services	0,054044	3,450	O	3	3,685	O	2	3,825	O	1
7	Time determined for patients for treatment	0,056092	3,530	O	1	3,440	O	2	3,250	O	3
8	Politeness level of the doctors	0,060406	3,340	O	2	3,210	O	3	3,395	O	1
9	Easy and rapid registration procedure	0,06020	4,005	O	3	4,060	O	2	4,210	O	1
10	Waiting time for the examination	0,05907	3,970	O	2	3,935	O	3	4,255	O	1
11	Services offered to companion of patient	0,059005	2,230	O	3	3,340	O	2	3,780	O	1
12	Courtesy of hospital staff	0,061575	2,760	O	3	2,885	O	2	3,445	O	1
13	Taking accurate information from the front desk	0,059721	3,455	O	2	3,275	O	3	3,400	O	1
14	Number of doctors (R)****	0,064628	66	E	-	115	E	-	149	E	-
15	Number of polyclinics (R)	0,060578	52	E	-	38	E	-	25	E	-
16	Fee of medical care (R)	0,059703	60-120	I	-	90-160	I	-	310-380	I	-
17	Easy accessibility (R)	0,06314	3	E	-	2	E	-	2	E	-

*CV:Criteria Value
** DT: Data Type; I: Interval, E: Exact
***Ra: Ranks of hospitals according to mean value of criteria
****(R): Real Data

The identification of the preference information: DC importance weight called the preference information is calculated. These calculations were performed by using the CVs depicted in Table 3 with the use of KANO Model. Table 3 gives the list of criteria according to the weight of importance with using KANO model. The value of which the DMs give the highest importance is "the numbers of doctor" item. The lowest point is received by "the satisfaction from doctors' services". In this study two approaches for solution is performed. İn the first approach, criteria weighting computed by Kano Model is used. In second approach criteria weightings orders are considered.

The identification of the RankAcc indexes of each alternatives: RankAcc indexes of alternatives for importance weights and rankings are depicted in Table 4. These indexes assess the relative preference of one hospital over the other.

Table 4: Rank Acceptability Indexes of Hospitals For Two Different Approaches

According to Different Criteria Importance Weights			
Alternatives	Rank 1	Rank 2	Rank 3
Hospital 1	0.04	0.33	0.63
Hospital 2	0.13	0.53	0.34
Hospital 3	0.83	0.14	0.03
According to Ranking of Criteria Importance Weights			
Hospital 1	0.00	0.01	0.93
Hospital 2	0.90	0.10	0.00
Hospital 3	0.10	0.89	0.07

* Hospitals' rankings that most likely to be preferred by patients

According to weighting approach, hospital3>hospital2>hospital 1 is found as a first rank order. In case of criteria have different weights for DMs; hospital 3 is placed in the first rank with a probability of %83. The RankAcc indexes for all of the hospitals being ranked in the first position for the ranking method are 0.00, 0.90 and 0.10 respectively. According to importance ranking, hospital2>hospital3>hospital 1 is found as a first rank order. In case of criteria have different priority order due to importance weights for DMs; hospital 2 is placed at the first rank with a probability of %90. Ranking orders of hospitals are changing between weighting and ranking approach. This implies that slightly differences in importance weights could be perceived as a significant difference when ranking hospitals in the minds of patients.

The identification of CWV and CF: The CWV values found according to two approaches mentioned above (Table 5). These values are the criteria impact levels which identify the preference ranks of hospitals. The CF of alternatives' ranking obtained according to different criteria importance weights for the DMs were calculated as 0.04, 0.13, 0.83 respectively. The confidence level of the preference at first rank of hospital 3 is %83. The criterion have equal impact for the choice of hospital 3 at the first rank and the choice of hospital 2 at the second rank and hospital 1 at the third rank by the DMs except sixth criterion "satisfaction from doctors' services" The CWV for the case according to different ranking according to importance weights for the DMs are depicted in Table 5. The CF of alternatives' ranking obtained were calculated as 0.07, 0.82, 0.11 respectively. The criterion which has the highest impact for the choice of hospital 2 at the first rank by the DMs is the politeness level of doctors (%11), waiting time for the examination (%20), taking accurate information from the front desk (%14). The criteria which has the highest effect upon the selection of hospital 3 for the second rank are politeness level of doctors (%11), waiting time for the examination (%18), taking accurate information from the front desk (%13). The criteria which have the highest effect upon the selection of hospital 1 for the third rank are politeness level of doctors (%10), waiting time for the examination (%16), and taking accurate information from the front desk (% 11). As mentioned above, the criteria determine preference orders are the same for this approach. However the impacts levels are different for each of the three hospitals. Also, the criteria number of doctors has nearly no impact in the ranking of hospitals. The criteria which have the lowest effects are the noise level of hospital, easiness to show test results to doctors, fee of medical care, easy accessibility.

The assessment of the results: According to research results, hospital 3 is preferred at first rank in weighting approach. However hospital 2 is chosen as first hospital for the ranking approach. When comparing these two approaches, ranking approach is found to be much more realistic. That was

due to the fact that the importance weights of criteria used in the weighting approach were very close to each other and this makes criteria effect levels equal. In the ranking approach, the criteria were prioritized taking the small differences between importance weights into account. In other words, according to the patients' opinions, hospital 2 is the first preferred hospital towards criteria in the context of this study. Therefore, the ranking approach gives more realistic and acceptable rankings of the hospitals comparing weighting approach. CF values also support and verify this judgment. Also in weighting approach, hospital 3 has been chosen by the patients as first rank with a confidence level of %83 respectively. In the ranking approach, the confidence level of hospital 3 being at first rank decreased to %11. Because of taking the small differences between criteria weights into consideration, the hospital 3 was selected as second rank by the patients who were highly preferred in weighting approach. It is understood that criteria evaluations which carry Hospital 3 at first rank weighting approach is not very important for patients really. It is seen that hospital 2 has become much more favorable based on the criteria which are really important for the patients.

Table 5. Central Weight Factors and Confidence Factors of Hospitals For Three Different Approaches

Alternatives	CF	Criteria Impact Levels																
		1*	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Different Criteria Importance Weights																		
Hospital 1	0.04	0.06	0.06	0.06	0.06	0.06	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Hospital 2	0.13	0.06	0.06	0.06	0.06	0.06	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Hospital 3	0.83	0.06	0.06	0.06	0.06	0.06	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Ranking of Criteria Importance Weights																		
Hospital 1	0.07	0.04	0.03	0.03	0.08	0.07	0.05	0.05	0.10	0.06	0.16	0.09	0.05	0.11	0.01	0.04	0.01	0.02
Hospital 2	0.82	0.02	0.02	0.02	0.08	0.07	0.04	0.04	0.11	0.06	0.20	0.09	0.05	0.14	0.00	0.03	0.01	0.01
Hospital 3	0.11	0.03	0.02	0.02	0.08	0.07	0.05	0.04	0.11	0.06	0.18	0.10	0.05	0.13	0.00	0.03	0.01	0.01

*: Criterion

RESULTS AND DISCUSSION

Zarei et al. (2012), Groot et al. (2012), Fletcher et al. (1983), Longman et al. (1992), Cymbalist and Wolff (1988), Health Link (2004), Lang et al. (2004), Rao et al. (2006), Allen et al. (1991) similarly accepted "the waiting time for the examination" as the most important criterion for the selection of the hospitals. The criterion of "taking an accurate information from the front desk" were also shown among the most important criteria as it was in our study by Bostan et al. (2007), Dijs-Elsinga et al. (2010), Satcher et al. (1980), Groen et al. (1991), Bendtsen and Bjurulf (1993). The criteria of "the politeness level of the doctors" and "finding doctors trustable" were emphasized by Goldstein and Fyock (2001), Drury et al. (1988), Lee et al. (2008), Mcbride et al. (1994), Bartholomew and Schneiderman (1982).

On the other hand, the criterion of the "fee of medical care" which, appeared to be the least important one in our study, was reported among the important criteria in many studies in the literature (Taylor and Capella 1996; Lee et al. 2008; Javalgi et al. 1991; Yavaş and Shemwell 2001; Boscarino and Stelber 1982; Wolinsky and Kurz 1984). This situation may be resulted from patients who received health service from the private hospitals generally has a high income level. Due to this fact, these patients may give more importance to others criteria than fee of medical care criterion. A similar explanation is possible for the "easy accessibility" criterion which was found to have a lower priority in this study. The accessibility was found to be a high priority criterion by Health Link (2004), Lang et al. (2004), Gandhi et al. (1997), Taylor and Capella (1996), Javalgi et al. (1991), Leister and Stausberg (2007), Yavaş and Shemwell (2001); Boscarino and Stelber (1982). The criterion of the "hygiene of the hospitals" was found to have lower priority in this study. The reason for the low priority of this criterion may be the fact that study was carried out in private hospitals which give necessary care to this issue. The private hospitals generally see "the hygiene of the hospital" as an indispensable standard. Same arguments may be valid for "the number of doctors".

When looking at results of weighting approach, criteria which have highest impact for the choice of Hospital 2 at first rank are not prioritized as the most important expectations by the patients. This result demonstrates that patients are very satisfied with these criteria which have highest impact for for the choice of Hospital 2 at first rank and this change the importance ranking of criteria in their mind too. Hospital could develop competitive and differentiated advantage by focusing to specialized services to maximize patient satisfaction instead of offering all the services in moderate level according to rivals. This could create an important antecedent of the brand loyalty for hospitals which is so vital for long-run survival and competitive health of the hospital.

The pre-knowledge of the patient's preferences criteria and impacts of these criteria have direct and indirect effects upon the hospitals. The direct effects are related to the increasing satisfaction and demand. The indirect effects are defined as the coordination inconsistency problems and inappropriate use of the resources due to the misinterpretation of patients' preferences.

It was also emphasized that the hospital selection criteria of the patients may vary according to patients related factors such as cultural features, gender and health conditions (Wensing et al. 1998; Kraitz & Melnikov 2001). The situation will become clearer when this study is compared with other studies carried out upon the different samples.

Considering these findings, it is seen that the staff of the hospitals should be subjected on the job training according these criteria. The competency of patient focused, understanding of patients' expectations and coordination of the staff should be improved. It is of utmost importance that the hospital staff must be trained as regards to their interactions with the patients. The findings of this study support the data presented by Souba et al. (2001). The selection criteria of the patients are not only limited to their medical needs but their social and emotional needs as well. The patient–doctor relations should be given the priority in these trainings as mentioned by Henman et al. (2002). The misconceptions of the patients' expectancies and vice versa were pointed out in many studies (Sanchez-Menegay & Stalder 1994, Perron et al. 2003). The reaction of the doctors to the patients' expectations constitutes the most important component of the patient focused approach which provides a very effective communication with the patients.

The hospital selection criteria can be employed to determine the performance based incentives of the staff. By this way, the view point of the patients can be used to evaluate the staff. The accurate determination of the hospital selection criteria of the patients may require changes in the health service process. In macro scale, the planners of the health policy can use these results in planning and revising the health services.

The hospitals are expected to evaluate these criteria as soon as possible to convert the intangible dimensions of health service to tangible ones. This can be achieved by organizing seminars, free training courses and health checks with the related organizations. The accurate determination of the priorities of the hospitals selection criteria of the patients is of critical importance for improving and measuring the quality.

There were recommendations made for the hospitals from the patients' point of view after the investigation of the evaluation of the selection criteria of patients. It is necessary to carry out studies upon hospital administration or the staff point of views questioning these criteria to determine the unrealistic or unsuitable ones.

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