Research Article

Evaluation of Healthcare Service Quality Using Grey Relational Analysis (GRA) Method

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Abstract: Health services medical professionals, institutions and allied health have employees, they medical care for those who need it provide health services patients, families, communities and serving people. Hospitals, clinic and community health agencies from other work environments it will be very different. Healthcare systems are complex and hospital systems, patient care, insurance, healthcare about providers and legal issues here are what you need to know there are things. This tutorial basic health concepts help to learn, thereby you may succeed in work and can understand the computer. gray relational analysis is gray calculating relational degree and the contribution of the core behavior of the organization between measurement or system factors determine the degree of influence is a method. Two between factors or for two systems of the relationship between the measures is called the degree of gray correlation. Alternative: Scale Construction, Scale Validation, nurses, staff members. Evaluation Preference: Medical service, Service responsiveness, Discharge, Admission, Hygiene, Visual Facility. From the result it is seen that Discharge is got the first rank where as is the Admission is having the lowest rank. Resulting in discharge ranked first, there admission has low rank.

Keywords: primary health care, gra, hygiene.

1. Introduction

Healthcare services are all inpatient services are intensive maintenance diagnosis and treatment inpatient hospital services, outpatient services are intensive care diagnosis and treatment outpatient services, ambulatory surgery and radiology services and doctors or others licensed medical services professional services provided respondent including obstetric services and according to the contract between the insurer, and services provided by the defendant professionals within the scope. Healthcare services are demographics health plans or employee or such as group wellness programs does not mean managing patient care. Obstetrics, dentistry, pharmacy, midwifery, nursing, optometry, audiology, psychology, occupational therapy, physical therapy, athletic training and other health professions. All are part of health care. Primary care, secondary maintenance and tertiary maintenance, as well as public health it also includes work done. Multiple health service utilization modelsthere are, but for mental health reasons most about service usage studies developed by anderson in the 1960s use behavioral modeling. This model is a precursor of individuals, implementation and requirements health as a function of characteristics conceptualize the application [7] Meet patient expectations health service that makes or violates. A growing population like turkey and implementation in a developing country for choosing this field it also

provides reason. The purpose of the study is the main health determinants are service quality factors also to measure hospital performance these factors are also evaluated by using health service sector is the other service sector was like professions, a patient choose your doctor, many of them have different prices can provide, medical technology different in terms of quality can provide service. In recent years health services in turkey customers are very active be as detailed or specific as needed there are, and to them tend to ask for favors [8]. Health services are very important because of health to improve the quality of service aggressive when needed results may be required. Related to in the literature, quality of health care and in patient satisfaction ratings there are many studies, many of them servqual scale is used. Various statistics in this study explore hypotheses from data by obtaining information, results of statistical tests by evaluating and classifying related in turkey, with views differs from the literature. As for the outpatient approach, current according to rvqual criteria health care quality and patient satisfaction this is intended to measure which of the dimensions is relatively important and demonstrates efficacy to patient satisfaction. A survey was implemented based on the servqual scale and application center (hrac) 623 outpatient health research [9]. Dispersion model, health service the patient's reaction to the experience we depict. Our innovations, patients health how do they rate services? To understand that, back to the provider of the services using and recommending it also helps to decide. Dispersion the model is patient service quality very sensitive to feeling provides an opportunity to discover service features. Hence, judgment and decision-making describe processes better efficiency of non-linear models there are many researchers about should know. Healthcare service researchers in marketing to understand the patient's reaction, his future conduct such stress to predict models are called to believe too much [10]. Phenomenology of social aging, health the need for development is rapid led to increased and long-term improved hygiene such as maintenance services. Problems in long-term care admitted to causing social danger has been taken. U-healthcare services personal through wireless communication provides mobile healthcare services as expected. They are routine hygiene in hospitals integrate with services. For hospital-based u-healthcare regardless of time and place help in providing quality healthcare services technology and each user a service that helps manage requirements technology is also required. Such through technology, users or from their doctors from designated hospitals uninterrupted quality healthcare and information can be obtained. [11]. Criterion construction is theoretical empirical measures for constructions means creating. This activities usually consist of several items. Quantitative data interval and ratio are concepts related to data accuracy and precision. A rating scale is valid if the particular study measures what it is supposed to measure. Caring for patients, with doctors and checking vital signs nurses have many duties including. In employees of workers an employee who is a member. To the general public or to a particular medical treatment and care for the group service provided. Customer will respond character is the service of your business and to respond to inquiries refers to the potential in vaginal discharge is your a clear discharge from the vagina or white liquid. A ticket to a movie sanitation is the protection of health a series of procedures. Visual is a security and facility management company.

2. Healthcare service

Health service than other sectors of defining quality and it is very difficult to measure. Iranian health system a with a strong public sector component classified. Public health the services are private sector private hospitals and independent medical practitioners are carried out by clinics. Health delivery systems are three structured in stages. First stage, health and medical education ministry of (MOHME) primary health care (PHC) services free offers. Rural at this stage cathar houses, rural health centers, urban health centers and urban health centers are included. Second level of organization district health centers and there are district hospitals. Planning of PHC network, for supervision and support district health center is responsible. The third level of organization is provincial health centers and specialty hospitals there are all formal workers and them dependents social security are insured by the organization (SSO). Have been done. In their SSO facilities they get health services for free [1]. A healthcare service an intangible production and physically produced like things touch, feel, see, count or cannot be measured. Firm producing goods is quantity allows actions. However, quality of health care, its ambiguity because, service process, customer and service provider depends on the contacts. Consistency, like perfection and efficiency some health service quality dimensions for the client's subjective assessment beyond that is hard to measure. Manufacturers, clients, places and time differentiate between restore standard health services it is often difficult to create. Various specialists, doctors, nurses have different needs this is because it provides services to patients with diversity can occur. In service activities establishing quality standards is very important difficult education/training, experience, personal like skills and personalities as factors vary, health professionals they offer different services. Health services concurrently produced and consumed cannot be stored for later consumption [2]. Quality of health care, health basic dimensions of service quality and how it is measured published to understand that compilation of knowledge. Quality of healthcare service, service quality dimensions and its significant in measurement literature review including research, conducted in ebsco and google scholar databases. Inventions are medical and clinical non-sanitary features quality of service provided. dimensional in quality of health care context and patient dependent they weigh them differently. Based on interval score just comments, rather than models dominating health quality assessment. Also, quality construction of health care and its measurement is primarily that of the patient made in perspective, however, on quality of health care the provider's perspective is not considered [3]. In health care practice, an ideal and an affordable healthcare delivery system a base that can be combined to create we need to create the components. These elements and concepts, for example, human resources performance and risk based allocation and their cost, intelligent decision-integrated computing medical records, various medical problems like head injury expert-systems for treatment. And efficiency of hospital units analysis and formulas, various health services cost-effectiveness of activities development of indices (CEI), income-expenditure distribution of health professionals in the category deterministic decision analysis and (RCB) will calculate and CEI maximize RCB balancing [4]. Based on patient experience health service. Specifically, this paper is patient experiences value health care essential for co-creation considers the component, thus the patients and meetings between providers or in tangents healthcare

based on contacts to design the service process proposes the model. This study new design for health care provides approach, which is maintenance quality, patient satisfaction and experience and value co-creation about the relationships between further research can be developed. In addition, the developed framework, the patient for participation, value co-creation how the service promotes interaction provides that for health service design the proposed model is qualitative of the patient in providing services value includes experiences better service quality through integration to help organizations achieve [5]. Many professionals are for health services to satisfy projected demand a single solution, service efficiency and cost performance enhancing technologies is to implement. Japan's economy of the ministry of commerce and industry based on a 2005 study, for the elderly health services market 37.38 that could reach trillions of us dollars predictably, it was in 2001 more than this plan is for health new and innovative to participate in health services designed to promote companies emerging from the developmentally older population making the business successful. Other taiwan also das as in industrialized economies that hing population. Taiwan's ministry of economic affairs (MOEA)according to estimates, related to the elderly population 24.6 billion in business opportunities in 2001 108.9 billion by 2025 from us dollars that will grow into us dollars expectedly, this is a growth of 340% [6]. Among persons with mental disorders widespread need for psychiatric treatment, among them majority of the health services generally agreed not to use is taken. Due to mental disorders less than 40% of those affected are canadians a health professional for mental health reasons or canadian to access the services studies show. So, mental health health services for reasons factors promoting use there is a need to identify. Help for mental disorders seeking is complex process, which is individual and social demographic characteristics, symptoms culturally mediated interpretations, availability of health services factors and health care character, economic and social-structure including organization.

3. grey relational analysis (GRA)

Gray correlation analysis (GRA), this type of problem to solve data envelopment analysis facility analyzed. Layout and dispatch rules both cases of selection problem are gra's to illustrate the application, gra procedure were analyzed using gra's core process is first of all compare the performance of alternatives sequential translation. This step ash is called associated formation. Then, compare all gray between rows and reference row the correlation coefficient is calculated. Finally, this gray is related in terms of coefficients, reference sequence and for each comparison sequence the gray in between relative quality is calculated [12]. The surface roughness and bur of the work piece drilling process parameters for height gray related analysis to improve application introduced. An orthogonal sequence to the experimental design was used. Many performance characteristics surface gray for hardness and burr height ash obtained from corresponding analysis machining parameters optimized by relevant standards are determined. By the author of this work for better knowledge, gray is related drilling down using analysis optimization and in the process effect of cutting parameters on several performance characteristics there is no published work to evaluate [13]. Deng (1989) is a gray relational proposed the analysis. Gray relational analysis is gray relational approximate rows using grade a method of measuring

quantity. Some other researchers of process parameters optimization has also been studied. Die-sinking EDM machining parameters related to gray to shape analysis. In polycarbonate composites of yield stress and elongation injection molding for mechanical properties to obtain optimum parameters of the process gray relational analysis. The simulation used the taguchi method and presented an ash-related analysis. Taguchi method and gray related analysis with several performance characteristics improve turn functions. Particle with multiple performance properties wire of reinforced material is electric to optimize the extrusion process gray relational analysis. Taguchi method and gray relational analysis final grinding dry for high purity graphite in process improve machining parameters [14]. Gray correlation analysis, a weighted average in practice depends on several criteria. Several criteria have been proposed decision making for ordering goods. Gray correlation analysis (GRA) is commonly used in asia. It's an impact assessment model, which is relational two in terms of quality similarity between rows or measures the degree of difference. A global comparison to a local comparison is done by measuring the distance between two data sets between two points. Gra has the merit of point set topology therefore, it is subjective to the parameters in the model avoids side effects of the system. Using the ordered pair concept available products and eol the two result domains of the strategy are linked this article is going to provide the method. To apply this domain-combination method the gra model is obviously appropriate [15] Istanbul stock exchange (ISE) some funds in the financial sector index order shares of companies do gray correlation analysis (GRA) is used. Gra has become a benchmark of global comparability contains and to instead, it does not change any hierarchical structure. To retain eligibility, all criteria are also the means of decision are equally distributed. The original decision model was multilevel if in a multilevel hierarchical structure, multiple a level from levels weighting for performance characteristics a change must be made [16] Gray correlation analysis (GRA) based on the use of optimization of wastewater treatment alternatives gray is related to selection analysis. Bad, incomplete and to deal with uncertain information it has been proven to be effective. The main directions gray relational analysis (GRA) is in current applications one of gray system. Gray relationship grades multiple performance by optimizing complexity between characteristics gra can be used to effectively resolve correlations [17]. Gray relational analysis is used with many performance characteristics to solve the turning functions. As a performance index gray relative quality using the taguchi method optimum cutting parameters by can be determined. Ash taguchi by relational analysis multiple performance characteristics by method an overview of optimization first is given. Then, cut select and turn parameters evaluation of machine performance in operations is discussed. Gray communication of taguchi method by analysis basically turn functions the upgrade is described in detail [18]. In gray correlation analysis, electrode wear, material removal rate and surface roughness test results are initially zero, in the normalized range, it is gray, also known as correlation formation. For determining optimum machining parameters gray relational analysis it is reported step by step. Many considering performance characteristics optimum machining parameters are obtained [19].The following conclusions on the benefits of using the Gra method are based on original data, a gray area in multi-attribute decision making (MADM) problems is correlation analysis (GRA) method. The calculations are simple

and easy to understand. In a business context helps in making management decisions this is one of the best methods [20] Multi-functional properties surface removal rate and maximum surface area all 203 particle with hardness for machining reinforced material optimized wire electrical discharge machining (WEDM) gray to determine the parameters correlation analysis. Gray relational analysis method material removal rate using the tool abrasion, surface roughness and specific shear stress of multi-functional properties including basically cutting speed, feed rate, turning parameters such as depth of cut and machining time [21].

4. Analysis and Discussion

TABLE 1. Healthcare service Scale Construction it is seen that Discharge is showing the highest value for Hygiene is showing the lowest value. Scale Validation it is seen that Discharge is showing the highest value for Medical service is showing the lowest value. nurses it is seen that Visual Facility is showing the highest value for Medical service is showing the lowest value. staff members it is seen that Admission is showing the highest value for Medical service is showing the lowest value.

Table 1. Healthcare service

	Scale Construction	Scale Validation	nurses	staff members
Medical service	91.08	69.53	19.15	22.05
Service responsiveness	89.12	72.97	33.69	37.30
Discharge	94.08	89.58	49.18	23.10
Admission	73.17	68.28	34.60	47.59
Hygiene	63.33	86.41	27.96	28.89
Visual Facility	87.14	75.62	42.12	38.15

Table 1. shows the Healthcare service Alternative: Scale Construction, Scale Validation, nurses, staff members. Evaluation Preference: Medical service, Service responsiveness, Discharge, Admission, Hygiene, Visual Facility.
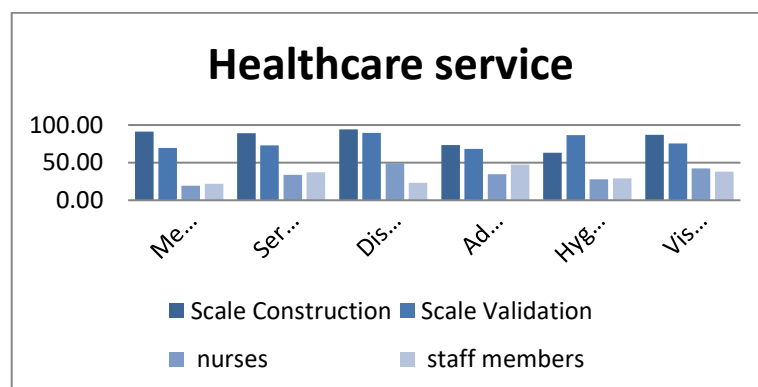
Figure 1. Healthcare service

Figure 1 shows the graphical representation Healthcare service for Alternative: Scale Construction, Scale Validation, nurses, staff members. Evaluation Preference: Medical service, Service responsiveness, Discharge, Admission, Hygiene, Visual Facility.

Table 2. Normalized Data

Normalized Data			
Scale Construction	Scale Validation	nurses	staff members
0.9024	0.0587	1.4152	1.0000
0.8387	0.2202	0.7300	0.4029
1.0000	1.0000	0.0000	0.9589
0.3200	0.0000	0.6871	0.0000
0.0000	0.8512	1.0000	0.7322
0.7743	0.3446	0.3327	0.3696

Table 2 shows the Normalized data for Alternative: Scale Construction, Scale Validation, nurses, staff members. Evaluation Preference: Medical service, Service responsiveness, Discharge, Admission, Hygiene, Visual Facility it is also the Normalized value.

Table 3. Deviation sequence

Deviation sequence			
Scale Construction	Scale Validation	nurses	staff members
0.0976	0.9413	0.0000	0.0000
0.1613	0.7798	0.6852	0.5971
0.0000	0.0000	1.4152	0.0411
0.6800	1.0000	0.7281	1.0000
1.0000	0.1488	0.4152	0.2678
0.2257	0.6554	1.0825	0.6304

Table 3 shows the Deviation sequence for Alternative: Scale Construction, Scale Validation, nurses, staff members. Evaluation Preference: Medical service, Service responsiveness, Discharge, Admission, Hygiene, Visual Facility it is also the Maximum or Deviation sequence value.

Table 4. Grey relation coefficient

Grey relation coefficient			
Scale Construction	Scale Validation	nurses	staff members
0.8367	0.3469	1.0000	1.0000
0.7561	0.3907	0.5080	0.4557
1.0000	1.0000	0.3333	0.9240
0.4237	0.3333	0.4929	0.3333
0.3333	0.7706	0.6302	0.6512
0.6890	0.4328	0.3953	0.4423

Table 4 shows the Grey relation coefficient for Scale Construction, Scale Validation, nurses, staff members. Evaluation Preference: Medical service, Service responsiveness, Discharge, Admission, Hygiene, Visual Facility it is also Calculated the Maximum and minimum Value.

Table 5. GRG & Rank

	GRG	Rank
Medical service	0.7959	2
Service responsiveness	0.5276	4
Discharge	0.8143	1
Admission	0.3958	6
Hygiene	0.5963	3
Visual Facility	0.4898	5

Table 5 shows the GRG, Rank of the final result of this paper the Medical service is in 2nd rank, the Service responsiveness is in 4th rank, the Discharge is in1^{st} rank, the Admission is in 6th rank, the Hygiene is in 3rd rank and the Visual Facility is in 5th rank. The final result is done by using the GRA method.
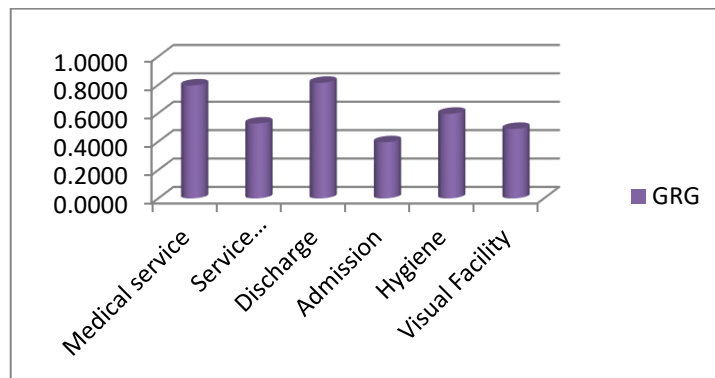
Figure 2. GRG

Figure 2 shows the GRG of the Medical service=0.7959, Service responsiveness=0.5276, Discharge=0.8143, Admission=0.3958, Hygiene=0.5963, Visual Facility=0.4898. Service responsiveness is showing the highest value for Admission is showing the lowest value.
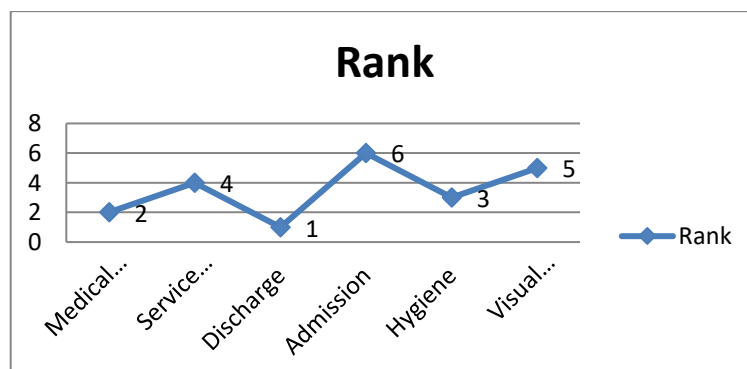
Figure 3. Rank

Figure 3 shows the graphical view of the Medical service is in Second rank, the Service responsiveness is in Fourth rank, the Discharge is in First Rank, the Admission is in Sixth rank, the Hygiene is in Third rank and the Visual Facility is in Fifth rank.

5. Conclusion

Health services medical professionals, institutions and allied health have employees, they medical care for those who need it provide health services patients, families, communities and serving people. Health services departments serve them for the overall health and well-being of communities responsible. Their main focus is public health and though health, health services sectors provide treatment and care to community members who lack sanitation. Gray relational analysis is gray calculating relational degree and the contribution of the core behavior of the organization between measurements or system factors determine the degree of influence is a method. Two between factors or for two systems of the relationship between the measures is called the degree of gray correlation. Medical service ranks second, service accountability ranks fourth, discharge ranks first, admissions ranks sixth, sanitation ranks third and visual amenity ranks fifth.

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