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Attributes Influencing Patients Preference for Service Quality: A Conjoint Analysis

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Abstract

The purpose of this paper is to identify and evaluate attributes along with their corresponding values preferred by Patients while utilization of health care services at Amritsar (Punjab) India, using conjoint analysis. Data was gathered from a total of 110 respondents (78.5% of the total subjects). Relative importance of each attribute was accessed. It was found that, Outcome of treatment, Promptness at the Time of Admission, Efficiency of Doctors/Staff in Treatment, their Interpersonal Skills, Basic Amneties and cost of services in decreasing order of relative importance, explains Patients preferences. Results also reveal that, while utilizing health care services, patients prefer to seek services from hospitals which provide them with quick & simple admission procedure, excellent basic amneties, and very efficient doctors having excellent interpersonal skills. They prefer to receive services at affordable cost and want to get best outcome of treatment. This paper provides relative evaluation of quality factors thought to be important for patient while utilizing services at hospital in Amritsar Punjab (India). Implications of results for health care providers are also discussed.

Keywords: *Conjoint Analysis, Health Care, Services quality, Patients preferences, Punjab*

INTRODUCTION

Indian health care sector has made progress over the last few decades however still it is experiencing crisis. Indian health care industry is witnessing a time where new hospitals are being built at a very fast pace. Government of India being aware of the existence of enormous gap in delivery of quality health care is in quest of various measures to diminish it. Punjab is a state of high economic growth has led to a remarkable improvement in the availability of health care institutions and supporting infrastructure in the state. Health care sector have undergone a drastic change especially in Amritsar. It is witnessing a paradigm shift in terms of demand of better quality of healthcare and a slow transition from small nursing homes to mega corporate set ups.

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Although government has formulated various policies, taken action to regulate health care in Punjab but still various gaps were found in Punjab health care systems which are a matter of concern. It might be possible that reason for this is ever changing demands and expectations of health care seeking customers which have been ignored so far. Health seekers behaviour is derived from all those activities that individual could suppose once they are sick and need to recover quickly (Jain, Nandan, & Misra, 2006; Ahmed, 2005). Knowledge of health seekers behaviour is one amongst the foremost important aspects that can't be underestimated (Shaw, Brittain, Tansey, & Williams, 2008). In order to have edge over competitors, Organizations got to awaken for these dynamic desires of health seekers. They need to return up with new ways, new discoveries, and innovations to deliver health care services with amazing expertise to customers. And for that they need to understand the actual preference of patients while they utilize services at hospital. Although literature regarding patients preference is already existing (Weng, 2006; Leister, & Stausberg, 2007; Oudhoff, Timmermans, Knol, Bijnen, & van der Wal, 2007), but it need to be revised as patients preference keep on changing with time. Their data are often utilized in rising health care services, overall potency with which services are provided and most of all the service quality. (Bridges, Hauber, Marshall, Lloyd, Prosser, Regier, Johnson, & Mauskopf, 2011; Jayadevappa, & Chhatre, 2011).

EVIDENCES FROM LITERATURE

Table 1: Matrix of studies included in review

S.No	Authors name	Factors/Attributes along with its values
1	Dor, Paul, & Jacques, 1987	(a) Family income, and (b) cost of services
2	Sheeran, & Abraham, 1995	(a) Threat perception, which depends on perceived susceptibility and severity of illness; (b) health motivation; (c) behavioral evaluation of perceived benefits and barriers of health practice; (d) cues to action; and (e) beliefs and health motivation related to demographic variables and psychological characteristics.
3	Ford, Bach,& Fottler, 1997	(a) Patients feeling about their out-patient visit, (b)hospital stay, (c)medical procedure, (d)total health care experience
4	Leung, Chan, Chau, & Chua, 2001	(a) Self-perceived illness severity, (b)waiting time, and (c)consultation fee
5	Mills, Brugha,. Hanson, & McPake, 2002	(a) Availability and affordability of drug, (b)geographical accessibility to the facility and (c) appropriate opening hours
6	Dzator, & Asafu-Adjaye, 2004	(a) Travel time, (b)education, (c)age, (d)sex, (e)level of education of household head, (f)household size and (g)perceived quality of care
7	Dealey, 2005	(a) "For patients with an acute illness requiring an elective treatment the issues are: information, the delivery of information, the influence of GPs, the role of family and friends, loyalty to local hospital and hospital access." (b) "For patients with a chronic condition the issues around choice are: choice is ongoing, continuity of care, local provision, information and partnership."

8	Wollmann, Steiner, Vieira, & Steiner, 2012	(a)Location of service points; (b)effectiveness of doctors, clinics and hospitals (c)promptness and kindness when caring for patients and family members ; (d) ease of access to the authorization forms for consultations, examinations, hospitalizations and surgeries; (e)price; (f) diversity of available doctors, clinics and hospitals .
9	Farley, Thompson, Hanbury, & Chambers, 2013	(a)Impact on care,(b)Costs,(c) Local health needs, (d)Minimum standards,(e)Strength of supporting evidence, (f)Priority, and (g)Existence of local expertise
10	Jannati,Bahrami,Gholizadeh, Alizadeh,& Khodayari, 2013	(a)Ambulance, (b)physicians' advice, (c)family income, (d)insurance type, (e)hospital services quality, (f)employment of patients' family members in hospital, (g)cost of services provided at hospital and (h)information given to patients about their disease

Various factors were identified based on a review of past literature on patient preference and hospital selection (Table: 1). Consumer's choice of hospital is driven by various factors such as, quality of service, cost, effectiveness of doctors, quality of treatment, promptness of service, information given to patient etc. Most of the studies stated that along with these factors, demographic characteristics of respondent are also responsible for affecting the thought of consumer while they utilize services at the hospital. However, there is a little information concerning the factors that impact patients preference while they utilize health care services in Amritsar (Punjab). So far there is no study which talks about during hospitalization behaviour of consumers towards hospital .This study argues that patient's behaviour towards hospital can further be analysed on the bases of pre hospitalization behaviour and during hospitalization behaviour which further results in post hospitalization behaviour. When a person chooses hospital, factors affecting his mindset are different from those while he is actually availing services and at the end both these factors are responsible for guiding his post hospitalization behaviour. Study of both the factors is important to have actual understanding of patient's psychology. No doubt along with these, demographic characteristics of patients also have impact on their behaviour. In this paper an attempt has been made to identify factors influencing urban health care customers of Amritsar (Punjab) with regard to their service quality preference when they are utilizing hospital services as impatient.

METHODOLOGY

For the above study, the target population was person who is admitted as impatient in the hospital or person accompanying that patient. Prior to data gathering, the researchers explained the reason for data collection to the participants and obtained their written consent. Each attribute along with its corresponding levels was explained to the participants to ensure better understanding. They were also communicated that even if data is filled by person accompanying patient, it has to be filled regarding patient and his preference. In this paper only those attributes are taken into consideration which impact during utilization of health care services. Response was obtained from patients by giving them a situation of "After they have selected hospital, during hospitalization as impatient, which of the following services profile would they prefer the most?" The data collection was

carried out from October 10 to october 20, 2014. A total of 110 respondents were selected using the following inclusion criteria of Age 18 years old & above, mentally stable and in good condition to response to questionnaire. Data was filled by patient or person accompanying patient, on or a day before their day of discharge from the hospital. Data was collected from patients of four multispecialty hospitals, which are serving from more than past ten years having number of beds more than 50. A sample of 28 each was collected from two private hospitals i.e. EMC Hospital &Fortis Hospital and of 27 each from two government hospitals i.e. Guru Nanak Dev Hospital & Civil Hospital using random sampling technique. Metric Conjoint Analysis was used. Total 18 profiles were included in the questionnaire. Respondent were asked to evaluate each profile within the range from 0 (least preferred) to 5 (most preferred). Along with that, questionnaire also requested information regarding demographic profile of the participants, which included the following: (a) gender, (b) age, (c) education, (d) occupation, and (e) income. Conjoint analysis was performed using SPSS 20.

Conjoint analysis

Conjoint analysis is a statistical technique used to determine overall effect of attributes and what combination of attributes will be most influential on respondent's preferences regarding any product or service. It has been used widely in market research, transport economics, and environmental economics. Various reviews of conjoint analysis confirm its applications in health have continued to grow over years. (Ryan, & Gerard, 2003and Marshall, Bridges, Hauber, Cameron, Donnalley, Fyie, & Johnson, 2010). In recent years, the technique has been gaining increasing popularity in the health care setting as it benefits health care policy makers to determination patient's preferences so as to provide them with better services. (Ryan, & Farrar, 2000).The basic model of conjoint analysis is (Carroll & Green, 1995; Haaijer, Kamakura, & Wedel, 2000):

$$U(X) = \sum_{i=1}^{m} \sum_{j=1}^{ki} \acute{a}ij\ xij$$

Where,

U (X) = Overall utility (importance) of an attribute

αij = part-worth utility of the j^{th} level of the i^{th} attribute, $i = 1, 2...., m$, $j = 1, 2...., ki$

$xij = 1$, if the j^{th} level of the i^{th} attribute is present = 0, otherwise.

The ordinary least squares (OLS) regression algorithm using dummy variable, is used to estimate basic model of conjoint analysis where preference rating is dependent variable and independent variables are dummy variables for each attribute. For conducting a conjoint analysis, attributes also referred to as factors along with their values called levels are chosen. Through review of several literatures and the expertise of author, six major attributes were known that may have an influence on patients preference during hospitalization. For this study attributes and their corresponding levels identified were Promptness at the time of admission (Quick & Simple, Time Consuming Due To Complicated Procedure and Long Waiting Time Due To Overcrowding), Basic Amneties To Make Stay Comfortable (Provided In Excellent Condition, Provided But Not Satisfactory & Not Provided), Efficiency of Doctors/Staff in treatment (Very Efficient, Less Efficient), Interpersonal Skills of doctors and staff (Excellent, Satisfactory, Poor), cost of services (Affordable, Unaffordable & Reasonable), Outcome Of Treatment (Best That Could Be Achieved, Satisfactory & Worst). In this study multi-factor evaluation conjoint analysis methodology is used (Green, & Srinivasan, 1990). Each of the six attributes has 3, 3, 2, 3, 3, and 3 levels respectively. So the number of profiles required to realize all combinations is (3*3*2*3*3*3) 486 (stimuli). Orthogonal factorial design was used to reduce the stimuli profiles

and make them manageable (Green, & Srinivasan, 1990). The numbers of stimuli profiles were reduced from 486 to 18 stimuli which were used for calculating part-worth functions for the attribute levels. Creation of the profiles is facilitated with the Display Design procedure. Consumer's preference can be estimated by using part-worth model as it is the most flexible model out of all others. (Green, & Srinivasan, 1978). Utility of levels is calculated to identify if attribute value have positive or negative influence on consumer preference. Part-worth utilities are used to determine the relative importance of different attributes to the customer (Green,&Krieger, 1991). Relative importance of each attribute depends on the relative rank between maximum and minimal levels within limits of utility attribute. It is biased on the assumption that bigger the difference between maximum and minimum level, more important an attribute will be. Relative importance of attribute is calculated in percentages according to this formula (Green, & Srinivasan, 1978):

$$Wi = \frac{Max(aij) - Min(aij)}{\sum_{i=1}^{m} [Max(aij) - Min(aij)]} \times 100 \quad \ldots\ldots\ldots\ldots (1)$$

Here
Wi - relative importance of attribute **i**;

Max (aij) - maximum level utility in attribute **i**;

Min (aij) - minimal level utility in attribute **i**.

In conjoint analysis, separate combinations of attributes as judged by respondents are expressed in the form of utility results. If utility is high, it shows higher preference by consumer and vice versa. Total utility of profile is calculated by aggregating all utility levels of the attributes in certain profile.

Model of the Study:
The following equation defines the conjoint analysis model of our study:

$$U = b0 + b1X1 + b2X2 + b3X3 + b4X4 + b5X5 + b6X6 + b7X7 \ldots + b11\,X11 + e. \quad \ldots\ldots\ldots (2)$$

The dependent variable U refers to a patient's judgment regarding a given service and it is to be measured using ranking. The independent variables *X1 …X11* refer to dummy variables that represent service quality attributes and interaction among them is assumed to be negligible. Here: X1 & X2 = dummy variables representing promptness at the time of admission, X3 &X4 = dummy variables representing Basic Amneties, X5 = dummy variables representing Efficiency of Doctors/ Staff in Treatment, X6 & X7 = dummy variables representing Interpersonal Skills. X8 & X9 = dummy variables representing Cost of Services and X10 & X11 = dummy variables representing Outcome of Treatment. Ordinary least squares regression can be used to estimate the parameters b1 ... b11, which are part worth's, attached to each of the attributes. Here b0 represents constant and e represents an error term with an expected value of zero.

RESULTS AND DISCUSSIONS

Respondents

Table 2: Respondents characteristic

		Frequency	Rate (%)
Gender	Male	53	48.18
	Female	57	51.82
Total		**110**	**100.00**
Age	18- 20 years	12	10.91
	21-30 years	25	22.73
	31-40 years	43	39.09

	Above 40 years	30	27.27
Total		**110**	**100.00**
Education	Illiterate	4	3.64
	Up to metric	12	10.91
	Senior secondary	17	15.45
	Graduation	37	33.64
	Post graduation	40	36.36
Total		**110**	**100.00**
Occupation	Business	24	21.82
	Profession	34	30.91
	Service	24	21.82
	Homemaker	28	25.45
Total		**110**	**100.00**
Annual Family Income	Below 1,00,000	10	9.09
	1,00,000-2,00,000	17	15.45
	2,00,00-3,00,000	25	22.73
	3,00,000-4,00,000	18	16.36
	4,00,000-5,00,000	20	18.18
	Above 5,00,000	20	18.18
Total		**110**	**100.00**

Source: Author's calculation

Out of 140 subjects to whom questionnaire was distributed, 117 responded and complete responses were obtained from 110 respondents (78.5%). The descriptive characteristics of respondents are summarized in Table 2.

RELIABILITY AND VALIDITY

Results (Table: 3) state that value of correlation coefficient R is .984 ($p<.05$), which is closer to one. It shows there is high correlation between service quality preferred by patients and all attributes. R^2 is .968 ($p<.05$). It means 96% of the variance in service quality preference is explained by attributes and 4% by factors other than that. It implies attributes are good predictor of service quality preference and hence it implies a good fit. On comparing the standard error of estimate with R^2, it was found lower, which indicates strong predictor regression model. The value of Durbin-Watson statistic is 2.041, which is <2, showing that autocorrelation is not present. There is no multicollinearity in the data as VIF is <2 as stated in the (Table: 5). ANOVA results (Table: 4) indicates the significance of overall model ($F= 16.585$, sig =.001, $p<0.05$). So, we can say that our conjoint model has high predictive accuracy and internal validity.

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimte	Durbin-Watson
1	.984[a]	0.968	0.91	0.41388	2.041

Source: Author's calculation

Table 4: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	31.25	11	2.841	16.585	0.001
Residual	1.028	6	0.171		
Total	32.278	17			

Source: Author's calculation

By replacing the beta values (Table: 5) in the conjoint analysis model (equation 2) we get:

U = 5.361 + (-0.667) X1 + (-1) X2 +(-0.667) X3 + (0.01) X4+ (-0.917) X5 + (-0.333) X6 + (0.833) X7+ (-0.5) X8+ (-0.167) X9+ (-0.667) X10 + (-2.5) X11+ e …….. (3)

Table 5: Coefficients and Collinearity Statistics

Model	Unstandardized Coefficients		Collinearity Statistics
	B	Std. Error	VIF
(Constant)	5.361	0.331	1.333
Time Consuming Complicated	-0.667	0.239	1.333
Long Waiting Due To Overcrowding	-1	0.239	1.333
Provided Not Satisfactory	-0.667	0.239	1.333
Not Provided	0.01	0.239	1
Less Efficient	-0.917	0.207	1.333
Satisfactory	-0.333	0.239	1.333
Poor	-0.833	0.239	1.333
Unaffordable	-0.5	0.239	1.333
Reasonable	-0.167	0.239	1.333
Satisfactory Outcome	-0.667	0.239	1.333
Worst	-2.5	0.239	1.333

Source: Author's calculation

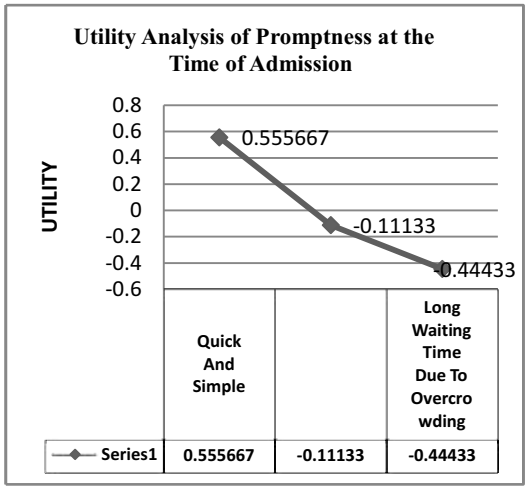
Part-Worth Utility

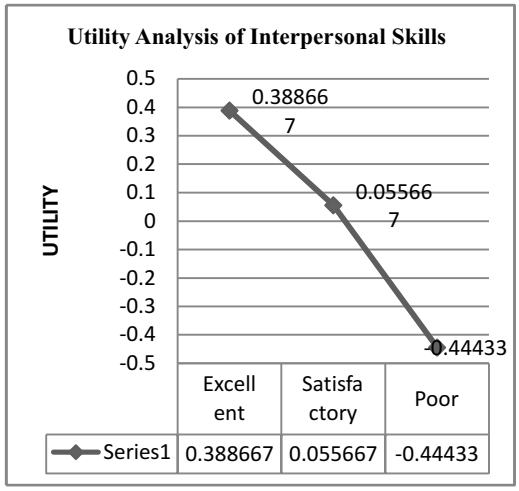
Table: 6 shows attributes studied along with their corresponding values. Part worth utility of promptness at the time of admission is higher for quick & simple procedure and lower for procedure which involves long waiting time due to overcrowding. As regards to basic amneties, part worth is highest when they are provided in excellent condition followed by not provided and lowest for provided but not is satisfactory condition. With regard to efficiency of doctors/ staffwhile providing treatment, part worth is higher for very efficient doctors/staff and lower for less efficient. When it comes to interpersonal skills of doctors/staff, part worth is higher for doctors/staff having excellent skills, followed by satisfactory and is lowest for poor skills. In relation to the part worth of cost of services, it is highest for affordable cost, followed by reasonable and lowest for unaffordable. When it comes to outcome of treatment, patients prefer best that could be achieved, followed by satisfactory and part worth utility is lowest for worst outcome. Utility analysis of various attributes along with their different levels is shown in Figure 1.

Table 6: Attributes, Values, Part-Worth Utility, Range and Relative Importance

S.No	Attributes	Values	Part -Worth Utility	Range	Relative Importance
1	Promptness At The Time Of Admission	**Quick & Simple**	0.556	1.00	15.59
		Time Consuming Due To Complicated Procedure	-0.111		
		Long Waiting Time Due To Overcrowding	-0.444		
2	Basic Amneties	**Provided In Excellent Condition**	0.226	0.67	10.40
		Not Provided	0.216		
		Provided But Not Satisfactory	-0.441		
3	Efficiency Of Doctors/Staff In Treatment	**Very Efficient**	0.459	0.92	14.30
		Less Efficient	-0.459		
4	Interpersonal Skills	**Excellent**	0.389	0.83	12.99
		Satisfactory	0.0557		
		Poor	-0.444		
5	Cost Of Services	**Affordable**	0.22	0.50	7.76
		Reasonable	0.055		
		Unaffordable	-0.278		
6	Outcome Of Treatment	**Best That Could Be Achieved**	1.056	2.50	38.98
		Satisfactory	0.389		
		Worst	-1.444		

Source: Author's calculation





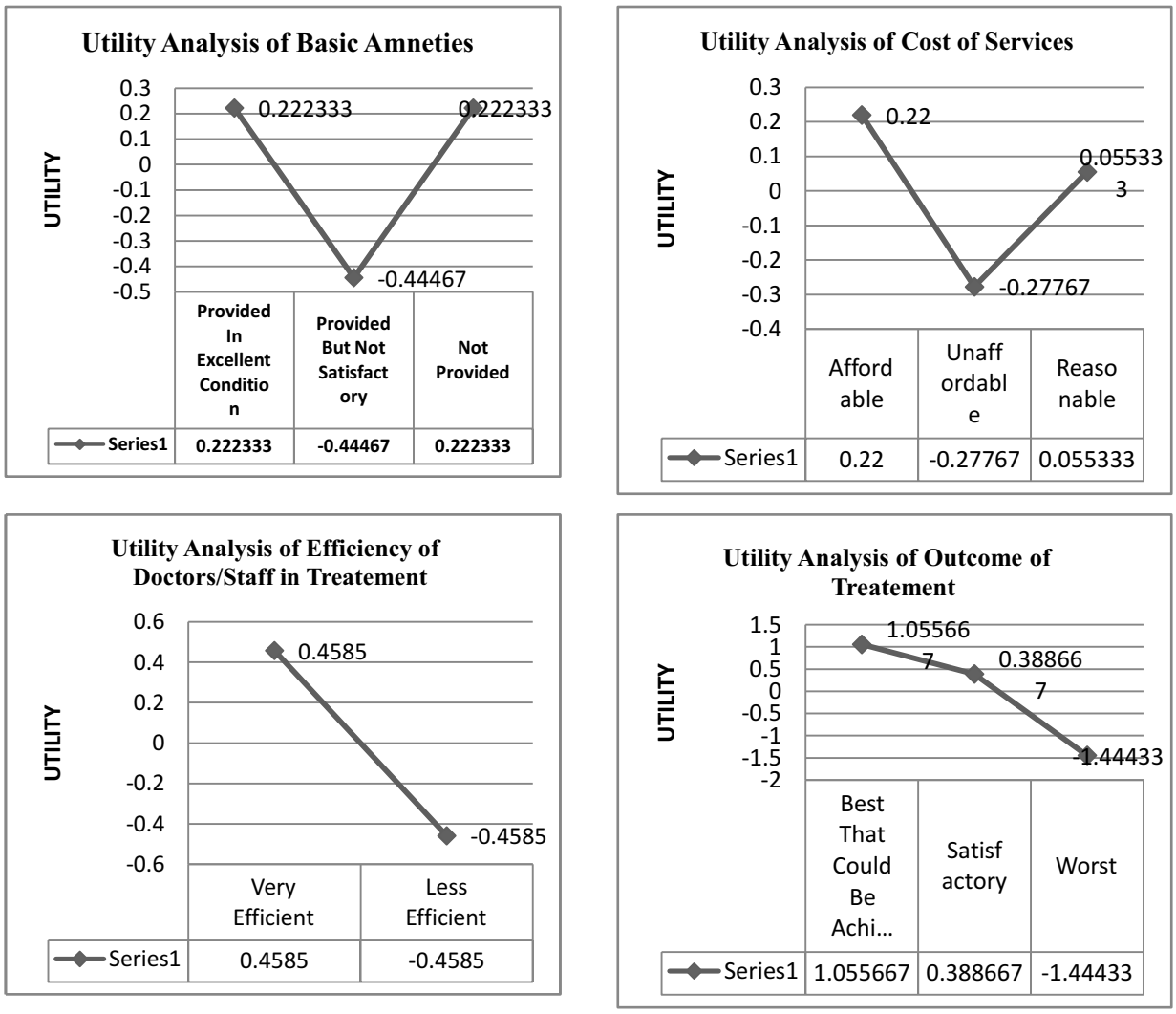


Figure 1: Utility Analysis of Various Attributes

RELATIVE IMPORTANCE

The amount of difference each attribute can make in the total utility is calculated by range. By calculating the percentage from relative range of part worth utility of each attribute, we can obtain attributes relative importance. The result of conjoint analysis technique showed outcome of treatment is the most important factor that patients consider while utilization of health care services (38.98%). This was followed by Promptness At The Time of Admission (15.59%), Efficiency of Doctors/Staff In Treatment (14.30%), Interpersonal Skills (12.99%), Basic Amneties (10.40%) and lastly by cost of services (7.74%). It was further plotted on pie chart (Figure 2) which clearly depicts the relative importance of each attribute preferred by patients.

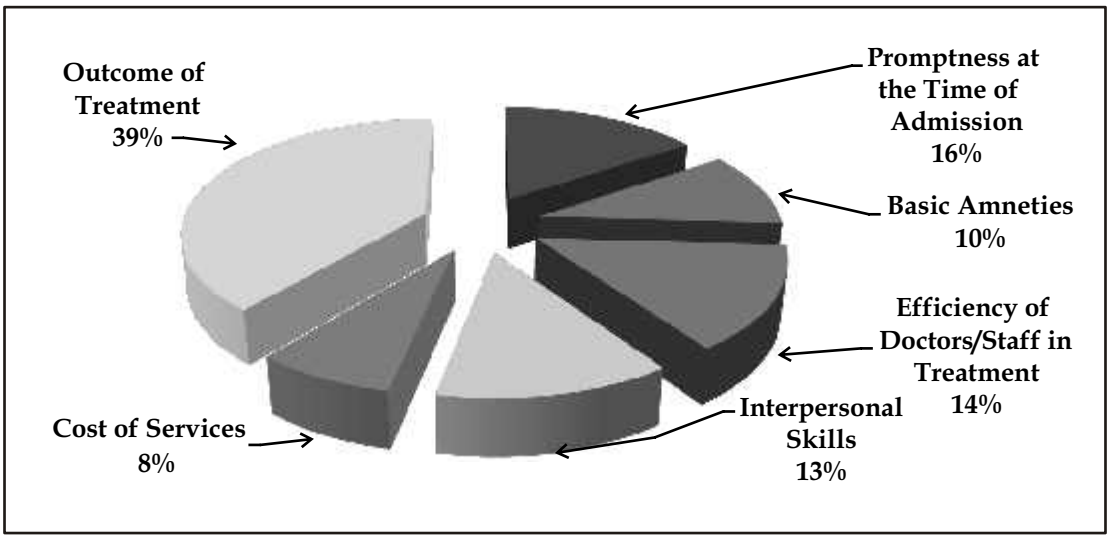


Figure 2: Attribute's Relitive Importance

CONCLUSION & IMPLICATIONS

This study attempts to identify the preference of urban health care customers of Amritsar (Punjab) with regards to health care service quality. Results of this study have an important message for health care sector of Amritsar. While utilizing health care services, patients prefer to seek services from hospitals which provide them with quick & simple admission procedure, excellent basic amneties, and very efficient doctors having excellent interpersonal skills. They prefer to receive services at affordable cost and want to get best outcome of treatment. They find outcome of treatment as the most important factor and cost of services as least important. Results of the study are providing latest information regarding patient's preferences. Through this paper we want to bring into light an issue that health care service quality in Amritsar is not as per preference of health seekers. Private sector is expensive and public hospitals are not providing services up to the quality mark. Health seekers are still not getting good quality services under one roof. Knowing the preference of patients, it is the health care provider's responsibility to incorporate it into practice, so as to provide them with best quality health care. Several limitations should be addressed which could further lead to future research work. Firstly generalization of findings should be made with care as the respondents were from Amritsar only. Further similar analysis could be conducted with respondents from different cities. Secondly, the attributes were defined with the help of literature review and experience of investigator. A different set of attributes and levels can be created in future to provide essential information for strategy makers.

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