Attributes Influencing Patients Choice of Health Care Provider: A Conjoint Analysis of Pre-Hospitalization Behaviour

*Harinder Singh
**Navalpreet Kaur

ABSTRACT

The purpose of this paper is to identify and evaluate attributes along with their corresponding values preferred by patients while choosing health care provider 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, Past Experience, Accessibility, Source of Awareness, Hospital Kind, Positioning of Hospital, and Hospital Type in decreasing order of relative importance, explains patients choice. While choosing hospital, patients prefer to seek services from private hospitals which are multispecialty, having best doctors, and where they had good past experience. They prefer to receive services at hospital about which they are generally aware and where accessibility is easy. This paper provides relative importance of factors thought to be preferred by patients while choosing a health care provider in Amritsar (Punjab) India. Implications of results for the health care providers are also discussed.

Keywords: Conjoint Analysis, Patient's Choice, Health Care, Amritsar, Punjab

1. Introduction

Health care sector has undergone a vast change over the last few decades due to revolution in technology and development in society especially in Punjab (Amritsar). It has witnessed a slow transition from small nursing homes to mega corporate set ups. Punjab is a state of high economic growth and has led to a remarkable improvement in the availability of health care institutions and supporting infrastructure. Punjab health care system is a blend of public and private health care providers. The public healthcare infrastructure in the state is three tiered with hospitals, community health centers, primary health centers and sub-centers. It also consists of university and medical colleges consisting hospitals. As regard to private sector, there are, general practitioners providing primary care, secondary and tertiary medical care providing multispecialty hospitals. There are also several charitable hospitals and hospitals managed by trusts. Punjab is a part of developing country India; here health care system is not universally free. Government of Punjab being aware of the existence of enormous gap in delivery of health care is in quest of measures to diminish it. In a health care system which is a mixture of health care providing options, choice of patients is influenced by many factors. Patient's choice process is much more complex than is often assumed as different patients make different choices in different situations (Victoor, Delnoij, Friele,& Rademakers, 2012). Patient's choice is driven by many factors and understanding of these factors is extremely important to have an insight into their mind. Although literature regarding patients choice is already existing, but it need to be revised as patients demands and expectations keep on changing with time.

2. Evidences from Literature

This research reviewed the antecedents of patient's choice with regard to health care provider. Morrill and Earickson (1968) stated that the rate of use of hospitals declines with distance, or with intervening opportunities. Another study identified following factors influencing patient's choice in descending order of magnitude: nearness, quality of service, relative living in hospital town, finance, ease of transport, religion and connections with hospital staff (Egunjobi, 1983). A further study state that probability of selection of hospital is positively related to size of hospital and negatively to its distance from patients home (Roghmann,. & Zastowny, 1979). Few more researches have explored that patients choice with respect to health care provider is driven by location, service provision, and reputation (Phibbs, Mark, Luft, Peltzman-Rennie, Garnick, Lichtenberg, & McPhee, 1993; Porell, & Adams, 1995; Taylor, & Capella, 1996). Mills, Brugha, Hanson, & McPake (2002), found availability & affordability of drug, geographical accessibility to the facility and appropriate opening hours has impact on choice. Another study stated physician's advice (McMullan, Silke, Bennett, & Callachand, 2004) as an important factor. It is also stated that, along with other factors, patient's demographic factors also have impact on his choice (Dzator, & Asafu-Adjaye, 2004). A further study stated that, experience is found to be most important followed by referral by general practitioner, certified quality

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* Principal, Amritsar College of Hotel Management & Technology, Amritsar, India. harindersinghmajitha@yahoo.co.in
** Research Scholar, Punjab Technical University, Kapurthala, India. n_p_21@yahoo.com

management system, positive press coverage, recommendation by relatives & acquaintances and distance to the hospital. Reception area design, the personnel's friendliness, the website quality and the published quality report are less relevant. And for people without experience factors like, reception area design, personnel's friendliness and distance to the hospital are important in increasing order (Leister & Stausberg, 2007). Bhangale, (2011) stated quick services and multispecialty hospital is the need of the hour. The effect of perceived overall reputation and availability of particular clinical services on hospital choice was much larger than the effects of quality scores, perceived cost, or nonprofit status (Jung, Feldman, & Scanlon, 2011). Patients base their decisions not only on outcome indicators but also on a variety of provider characteristics. They often attach greater importance to their own previous healthcare experiences or to general practitioners recommendations. Comparative information seems to have a relatively limited influence on the choices made by many patients (Victoor, Delnoij, Friele,& Rademakers, 2012) . Jannati, Bahrami, Gholizadeh, Alizadeh,& Khodayari, (2013), stated factors like quality of the medical, distance to the hospital, amount paid at the initial visit, amount paid at hospitalization for examinations, and the organizational form of the hospital also have influence on patients choice.

On the basis of past review of literature, various factors influencing patient's choice were identified. Patients choice of hospital is driven by various factors such as, accessibility, opening hours of hospital, organization form of hospital, distance from hospital, experience of patient, perceived overall reputation of hospital, reference by general practitioner, relatives and acquaintance, 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 choose the hospital. However, there is a little information concerning the factors that influence patient's choice in Amritsar (Punjab). So far there is no study which talks about pre hospitalization behaviour of patient towards hospital .This study argues that patient's behaviour towards hospital can further be analysed on the basis of pre hospitalization behaviour and during hospitalization behaviour which would 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 person also have impact on patient's behaviour. In this paper only those attributes are taken into consideration which results in pre hospitalization behaviour. This study aimed to highlight the main attributes influencing patients' choice and also attempt has been made provide a better understanding of psychology of urban patients of Amritsar (Punjab) with regard to their choice of health care

provider before they choose any hospital for treatment as impatient.

3. 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 has impact on patient's choice before hospitalization. Response was obtained from patients regarding the selection of hospital by asking them "which of the following you take into consideration before choosing any hospital for treatment as impatient?" 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. Charitable and hospitals managed by trust are not taken into consideration for this study. A sample of 28 each was collected from two private hospitals i.e. EMC Hospital & Fortis Hospital and of 27 each from two public hospitals i.e. Guru Nanak Dev Hospital & Civil Hospital using random sampling technique. Metric Conjoint Analysis was used. Total 25 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.

a. 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. In this technique, respondents are required to evaluate various levels of attributes conjointly i.e in combination with each other (McDaniel, & Gates, 2010). Conjoint analysis has grown in popularity as it is more flexible, better predictor of perception than traditional concept testing (Wittink, & Cattin, 1989). Nowadays it is used in lots of social sciences and is applied in marketing, product management, and operations research. It has been used widely in market research, transport economics, and environmental economics also. Various reviews of conjoint analysis confirm its applications

in health have continued to grow over years. (Ryan, & Gerard, 2003 and Marshall, Bridges, Hauber, Cameron, Donnalley, Fyie, & Johnson, 2010). This technique has been gaining 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):

$$U(X) = \sum_{i=1}^{m} \sum_{j=1}^{ki} \alpha_{ij} x_{ij}$$

Where,

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

α_{ij} = part-worth utility of the jth level of the ith attribute , i= 1, 2...., m , j= 1, 2…., ki

x_{ij} = 1, if the jth level of the ith 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 choice. For this study attributes and their corresponding levels identified were Hospital Type (Public and Private hospital), Hospital Kind (Multispecialty, Hospital Where Specialist Doctor Visits and Specialty Hospital Related To That Illness), Positioning of Hospital (Economical, Best Basic Service, Best Doctors and Reputed), Past Experience (Good, Satisfactory, No Past Experience and Bad), Source of Awareness (General Awareness, Referred by Family/Friends/Doctors, and Banners/Hoardings/Newspapers), Accessibility to hospital (Easy, Moderate , Difficult). In this study multi-factor evaluation conjoint analysis methodology is used (Green, & Srinivasan, 1990). Each of the six attributes has 2, 3, 4, 4, 3, and 3 levels respectively. So the number of profiles required to realize all combinations is (2*3*4*4*3*3) 864(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 864 to 25 stimuli. Creation of the profiles is facilitated with the Display Design procedure. Conjoint analysis then processes these preferences in such a way as to generate a utility for each level of each attribute for a given respondent, that will best fit the actual preferences indicated by the respondent. 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 based 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):

$$W_i = \frac{Max\ (a_{ij}) - Min\ (a_{ij})}{\sum_{i=1}^{m} [Max\ (a_{ij}) - Min\ (a_{ij})]} \times 100 \qquad …(I)$$

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

Max (a_{ij}) - maximum level utility in attribute **i**;

Min (a_{ij}) - 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.

b.   Model of the Study:

The following equation (II) defines the conjoint analysis model of our study:

$$U = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 ... + b_{13}X_{13} + e. \qquad …(II)$$

The dependent variable *U* refers to a patient's choice and it is to be measured using ranking. The independent variables *X1 … X13* refer to dummy variables that represent attributes influencing choice of patients and interaction among them is assumed to be negligible.

Here: X1 = dummy variables representing Hospital Type,

X2 &X3 = dummy variables representing Hospital Kind,

X4, X5 &X6   = dummy variables representing Positioning of Hospital,

X7, X8 &X9 = dummy variables representing Past Experience,

X10 &X11 = dummy variables representing Source of Awareness

And   X12 &X13 = dummy variables representing Accessibility.

Ordinary least squares regression can be used to estimate the parameters *b1 ... b13*, 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.

4. Results and Discussions
a. Respondents

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 I. Out of all, majority of respondents were females, belonging to age group 31-40 years, post graduates, doing business and whose annual income of family falls in the slab of 2,00,000 - 3,00,000.

Table 1
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	Profession	24	21.82
	Business	34	30.91
	Service	24	21.82
	Homemaker	28	25.45
Total		**110**	**100.00**
Annual Income(Family)	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

b. Reliability and Validity

Results (Table: II) state that value of correlation coefficient R is .970(p<.05), which is closer to one. It shows there is high correlation between choice of patients and all attributes. R^2 is .94 (p<.05). It means 94% of the variance in dependent variable i.e. choice of patients is explained by attributes and 6% by factors other than that. It implies attributes are good predictor of choice 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 2.062, 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: IV). ANOVA results (Table: III) indicates the significance of overall model (F= 13.303, sig =.001, p<0.05). So, we can say that our conjoint model has high predictive accuracy and internal validity.

Table 2
Model Summary

Model	R	R Square	Adjusted	Std. Error of R Square	Durbin-Watson the Estimate
1	.970[a]	.940	.870	.430	2.062

Table 3
ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	31.967	13	2.459	13.303	.000
Residual	2.033	11	0.185		
Total	34.000	24			

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

$U = 5.133 + (0.167) X1 + (-0.4) X2 + (-0.2) X3 + (0.1) X4 + (0.3) X5 + (0.1) X6 + (-0.2) X7 + (-2.2) X8 + (-0.6) X9 + (-0.7) X10 + (-0.1) X11 + (-1.4) X12 + (-1.2) X13 e$ ...(III)

Table 4
Coefficients and Collinearity Statistics

Model	Unstandardized Coefficients		Collinearity Statistics
	B	Std. Error	VIF
(Constant)	5.133	0.26	
Private hospital	0.167	0.176	1
Hospital Where Specialist Doctor Visit	-0.4	0.192	1.2
Specialty Hospital Related To That Illness	-0.2	0.235	1.2
Best Basic Services	0.1	0.235	1.2
Best Doctors	0.3	0.235	1.2
Reputed	0.1	0.235	1.2
Satisfactory	-0.2	0.235	1.2
Bad	-2.2	0.235	1.2
No Past Experience	-0.6	0.235	1.2
Referred By Family/Friends/Doctors	-0.7	0.192	1.2
Banners/Hoardings/Newspapers	-0.1	0.235	1.2
Moderate	-1.4	0.192	1.2
Difficult	-1.2	0.235	1.2

c. Part-Worth Utility

Table: V shows attributes studied along with their corresponding values. Past worth utilities were calculated using zero-centered differences; that is, the sum of the part worth utilities for each attribute is equal to zero. Past worth utility of hospital type is higher for private hospitals and lower for public hospitals. As regards to hospital kind, past worth is highest for multispecialty hospitals, neutral for specialty hospital related to that illness and lowest for hospital where specialist doctor visits. With regard to

positioning of hospital, part worth is higher for hospitals with best doctors and lower for best basic services provider, reputed hospital followed by economical hospital. When it comes to past experience, part worth is higher for good experience, followed by satisfactory & no past experience and is lowest for bad experience. In relation to the part worth of source of awareness, it is highest for general awareness, followed by awareness due to banners / hoardings / newspapers and lowest for awareness due to referred by family /friends / doctors. When it comes to accessibility, patients prefer easy accessibility, and lowest for difficult followed by moderate. Utility analysis of different levels of various attributes is shown in Graph I.
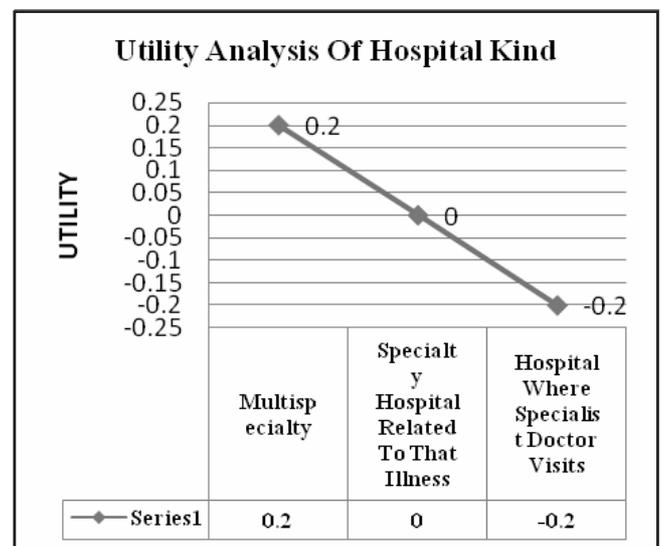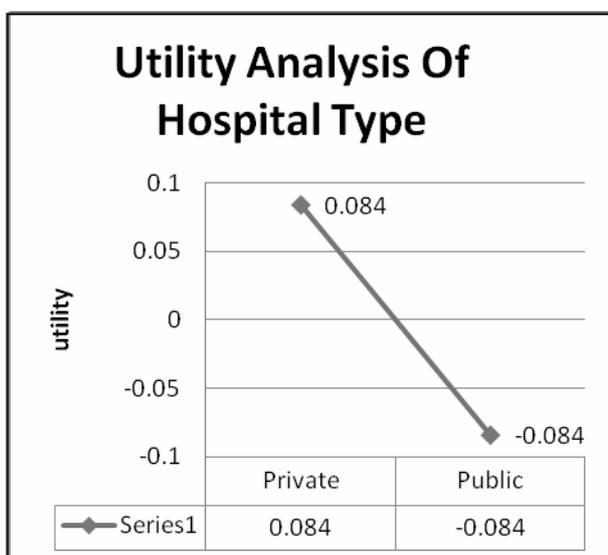
Table 5
Attributes, Values, Part-Worth Utility, Range and Relative Importance
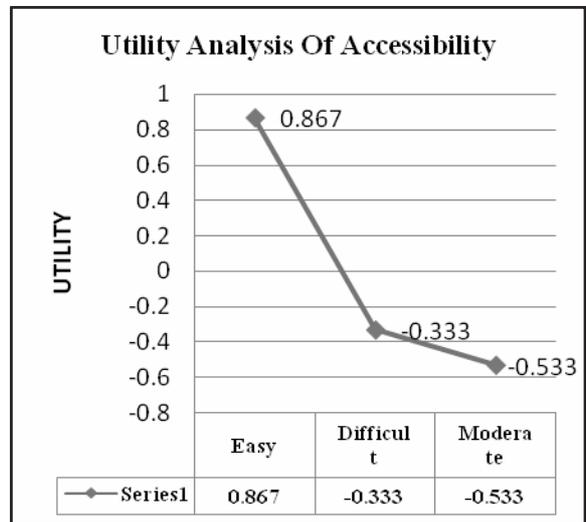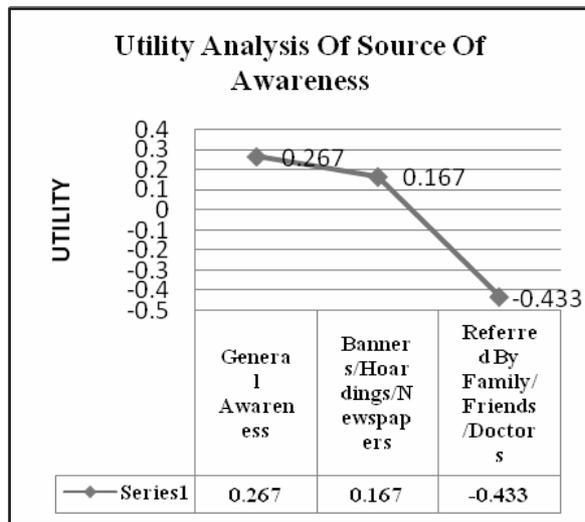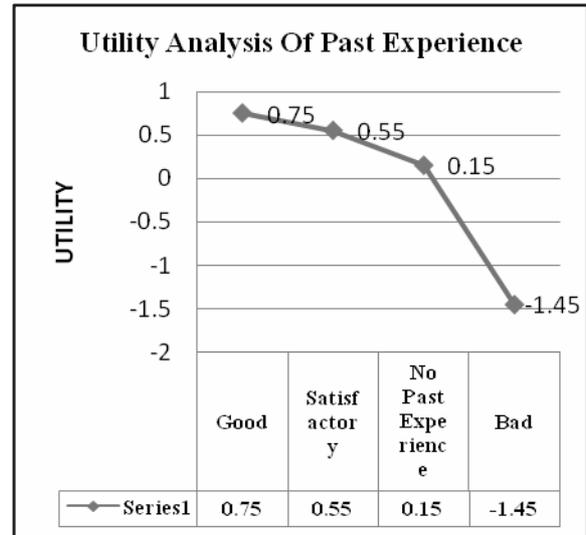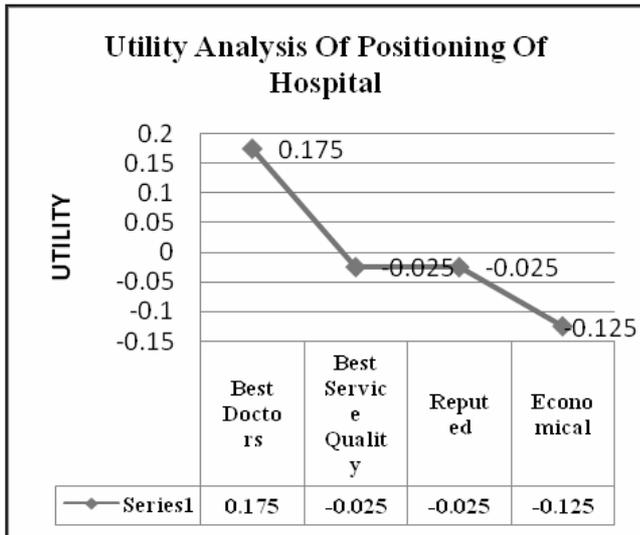
S.No	Attributes	Values	Part-Worth Utility	Range	Relative Importance
1	Hospital Type	**Private** Public	0.084 -0.084	0.168	3.25
2	Hospital Kind	**Multispecialty** Specialty Hospital Related To That Illness Hospital Where Specialist Doctor Visits	0.2 0 -0.2	0.4	7.74
3	Positioning of Hospital	**Best Doctors** Best Basic Services Reputed Economical	0.175 -0.025 -0.025 -0.125	0.3	5.80
4	Past Experience	**Good** Satisfactory No Past Experience Bad	0.75 0.55 0.15 -1.45	2.2	42.57
5	Source of Awareness	**General Awareness** Banners/Hoardings/Newspapers Referred By Family/Friends/Doctors	0.267 0.167 -0.433	0.7	13.54
6	Accessibility	**Easy** Difficult Moderate	0.867 -0.333 -0.533	1.4	27.09

Source: Author's calculation

Graph I

Utility Analysis of Various Attributes

Utility Analysis Of Positioning Of Hospital

	Best Doctors	Best Service Quality	Reputed	Economical
Series1	0.175	-0.025	-0.025	-0.125

Utility Analysis Of Past Experience

	Good	Satisfactory	No Past Experience	Bad
Series1	0.75	0.55	0.15	-1.45

Utility Analysis Of Source Of Awareness

	General Awareness	Banners/Hoardings/Newspapers	Referred By Family/Friends/Doctors
Series1	0.267	0.167	-0.433

Utility Analysis Of Accessibility

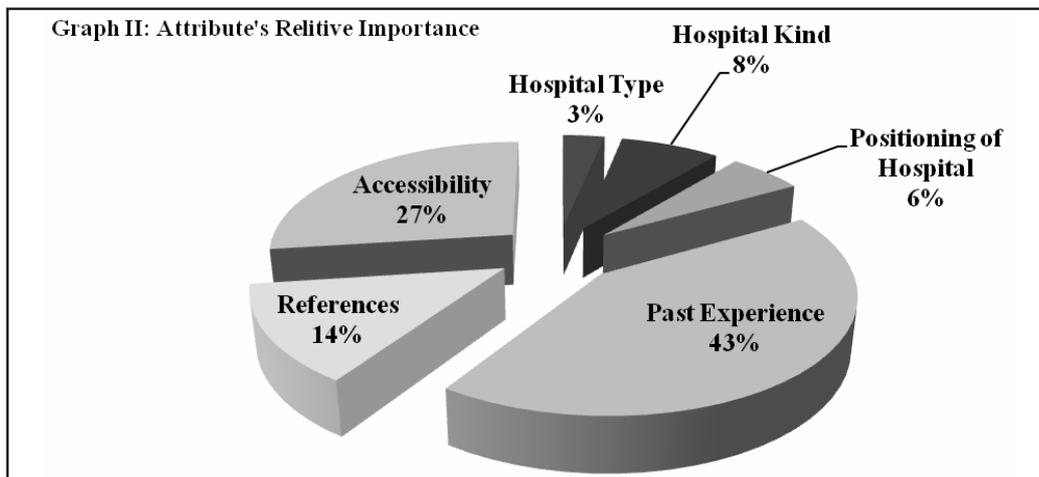|	Easy	Difficult	Moderate
Series1	0.867	-0.333	-0.533

Source: Author's calculation

d. 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. Relative importance was calculated such that the sum across all attributes of the differences between the best and worst attribute levels is equal to 100.

Graph II: Attribute's Relitive Importance

Hospital Kind 8%
Hospital Type 3%
Positioning of Hospital 6%
Accessibility 27%
References 14%
Past Experience 43%

Source: Author's calculation

The result of conjoint analysis technique showed Past Experience is the most important factor

that patients consider while choosing hospital (42.57%). This was followed by Accessibility (27.09%), Source of Awareness (13.54%), Hospital Kind (7.74%), Positioning of Hospital (5.80%) and lastly by Hospital Type (3.25%). It was further plotted on pie chart (Graph: II) which clearly depicts the relative importance of each attribute preferred by patients while choosing hospital.

5. Conclusion & Implications

This study attempts to identify attributes influencing the choice of urban patients of Amritsar (Punjab) with regards to health care provider. Results of this study have an important message for health care sector of Amritsar. Through this paper we want to bring into light that when a patient chooses hospital, they are influenced by certain factors and these have been unobserved so far. While choosing hospital, patients prefer to seek services from private hospitals which are multispecialty, having best doctors, and where they had good past experience. They prefer to receive services at hospital about which they are generally awared and where accessibility is easy. They find past experience as the most important factor and hospital type as least important. Results of the study are providing latest information regarding patient's choice of health care provider. This paper can guide policy makers to frame such policies so as to attract more patients, to avail services from their hospitals and also in retaining the existing once. The results state that, patients choose those hospitals where they had good experience in the past. Knowing the choice of patients, it is the health care provider's responsibility to incorporate it into practice, so as to provide them with best health care experience. 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. 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 for future research to provide essential information for policy makers. As research on factors affecting patient's choice of health care provider in Punjab (Amritsar) has not been fully explored, so this study can serve as a foundation for future research.

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About the Authors:

Harinder Singh, Ph.D. Principal at Amritsar College of Hotel Management & Technology, Amritsar, has rich experience of more than 13 years in academic and research. He is Ph.D. in economics from Punjab School of Economics, Guru Nanak Dev University, Amritsar. His area of interest is Health Economics. He has been a keen researcher, has attended national & international conferences, chaired technical sessions, and presented research papers. He has to his credit various research papers published in refereed national and international journals of repute. He may be contacted at harindersinghmajitha@yahoo.co.in.

Navalpreet Kaur, Assistant Professor at Amritsar College of Engineering & Technology, Amritsar, has over three years of experience in teaching & research. In addition to it she has qualified UGC Net and is pursuing Ph.D. in Management from Punjab Technical University, Kapurthala. Her major research interest lies in the area of Health Care Service Quality. She has to her credit six research papers presented in International & National conferences and a chapter published in edited book. She may be contacted at n_p_21@yahoo.com.

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