Integrating Kano Model and Herzberg Two Factor Theory to Unveil the Third Quality Factor of Patient Satisfaction in a Multispecialty Outdoor Medical Centre

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Abstract— Perception of quality by customers remains most important determinant of success of a healthcare unit, influencing consumption of service by improved compliance, better satisfaction levels and stronger bondage between healthcare team and patients. Whereas Herzberg two factor theory was designed originally to discover hygiene and motivating factors for employees, it could be used similarly to identify such factors in a customer population of an industry. Kano model to study service quality attributes considers both functional and non functional data analysis to classify attributes in four categories viz. must- be, reverse, indifferent and attractive.

Present study was conducted on 243 employees of Institute of Nuclear Medicine and Allied sciences (INMAS), Delhi. Data was collected in structured questionnaire (Both functional and non functional) developed based on Kano model. Frequency analysis was done to identify Kano category of service attribute and customer satisfaction coefficient was calculated to identify hygiene or motivating factors.

We concluded that it is possible to identify key determinants of quality perception using Kano model in a healthcare service unit. Also, it was concluded that service quality attributes could be categorises not only in hygiene and motivating factors but some of them are both hygiene and motivating

Index Terms—Healthcare, Kano model, Patient satisfaction, Service quality.

I. INTRODUCTION

Quality in healthcare could be defined as the extent to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge[1]. This definitions doesn't consider the quality perception of a healthcare programme or facility by the recipients of such care, who may not be confident or informed adequately, more so when inherently healthcare industry empowers provider of the care to purchase the core product on their behalf [2].

As in any other industry, extreme levels of customer satisfaction are the chief determinant of customer compliance, better known as "patient compliance" in medical fraternity [3].

Such patient compliance is directly related to better outcome of a health event through multiple modes including close observation by medical personnel leading to better prognostic speculations and communication to the patient, timely correction of development of newer symptoms and signs, modification of refractory treatment, consumption of medicines as per requirements and most importantly a development of personal bondage between the patient and healthcare provider.

Donabedian has stated that achieving and producing health and satisfaction, as defined for its individual members by a particular society or subculture, is the ultimate validator of the quality of care [4]. Patient satisfaction, like a customer, depends upon meeting all stated, implied and unstated expectations not easy to monitor by the service providers, who mainly focus on meeting the guidelines and objective parameters of cure rate and success leading to suboptimal achievements. Most of the patient satisfaction surveys, discharge interviews, discussions by healthcare counselors etc. record either the views of the patients on the available facilities and services or suggestions on adding new facilities i.e. functional aspects of service attributes. Also, such modalities map such service attributes asa linear relationship between performance on them and satisfaction level of patients. Kano, influenced by Herzberg's motivator – hygiene theory, developed a model of customer survey, which takes into consideration not only the customer opinion on absence of a service attribute i.e. dysfunctional aspect but also conceptualizing performance- satisfaction relationship beyond a linear pattern of a must- be, reverse, indifferent or attractive outcomes[5]. Herzberg's two factor theory, though originally developed to identify factors influencing motivation level of employees at work place, the philosophy of the theory has been extrapolated to identify quality attributes for customer satisfaction [6]

As more and more health providers are offering differentiated value added services to enhance patient delight, many of such services, which could be visualized as attractive in past, may become "must be" or "one dimensional" [7]. The present study was carried out with the objectives to assess the stated or implied quality requirements of the customers of a multispeciality medical centre, to redesign the system for enhanced quality perception as per the preferred quality attributes using Kano model, and to identify motivators and hygiene quality factors amongst the studied quality attributes into categories of motivators and hygiene factors as per Herzberg two factor theory.

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II. METHODOLOGY

The present study was undertaken at Health Centre (HC) of Institute of Nuclear Medicine and Allied Sciences (INMAS). HC provides multispecialty outdoor and emergency services in the field of General Medicine, Surgery, Gynaecology and Obstetrics, Dermatology, Ophthalmology and ENT. The beneficiary group consists of employees of the organisation and their families. The consultation is provided free of cost to the employees. Only emergency medicines are dispensed. Patient requiring admissions to indoor wards are referred to other hospitals through established official channels of referral.

All the contactable employees of INMAS between 1st Jan 2013 to 31st Jan 2013 were enrolled for the study as convenient sampling. The minimum number of sample was calculated as 135 (alpha = 0.05) using Cochran method [8].

The employees were contacted individually and were explained in detail about the intent and scope of the study. The responses in two separate questionnaires, both functional and dysfunctional types, with similar statements in the similar order, were recorded. The data was entered in Microsoft Excel® and analysed sequentially as below.

1. Kano Quality category

Responses to all questions in both functional and dysfunctional questionnaires were paired to categorise service attributes into the five categories as per original classification process by Kano [5, 9] as shown in table 1.

2. Frequency analysis

The attributes were analysed through frequency analysis in way that the attribute category with the highest frequency among four categories was selected as identifier.

3. Calculation of customer satisfaction coefficient

The customer satisfaction coefficient indicates whether customer satisfaction could be increased by meeting a product requirement, or whether fulfilling this product requirement merely prevents the customer from being dissatisfied [9].The CS-indicates as how strongly a product feature may influence satisfaction or, in case of its "non-fulfillment" customer dissatisfaction. To calculate the impact on satisfaction it is necessary to add the attractive and one-dimensional attributes and divide by the total number of attractive, one-dimensional, must-be and indifferent attributes. For the calculation of the average impact on dissatisfaction you should add the must-be and one-dimensional columns and divide by the same normalizing factor [9]. It could be summarised as

Extent of satisfaction = (A+O)/ (A+O+M+I)
Extent of dissatisfaction = ((O+M)/ (A+O+M+I)) (-1)
Where,
A = Attractive attribute
O = One dimensional attribute
M = Must be attribute
I = Indifferent attribute

The values of customer satisfaction coefficient vary from -1 to 1. A score close to 1 indicates higher influence of the attribute on satisfaction level, where as a score closer to -1 indicates significant role of the attribute to create dissatisfaction.

4. Identification of factors

The attributes studied were plotted on a X,Y scatter as per the customer satisfaction coefficient. The median value was used to divide the scatter in 4 quadrants. The factors present in each quadrant were identified and categorized in 4 categories

of motivators, hygiene factors, both motivators and hygiene factors and factors without any motivating or hygiene significance.

III. RESULTS AND DISCUSSION

A total number of 243 employees were enrolled for survey using construct used by Dr. DwiSulisworo [10] modified suitably, out of which, 231 employees could complete the questionnaire on all attributes hence included in the results. A summary of the results is shown in table 2.

The results of the frequency analysis as shown in table 3 indicates that out of 26 studied attributes in our study, only 5 attributes(attribute 3,9,11,13,26) were found to be "must be" attributes. There was no attribute which could be categorized into "attractive" or "indifferent" category. Most of the attributes (21/26) were "one dimensional".

Customer satisfaction coefficient of all the attributes is shown in table 4. Figure 1 shows the customer satisfaction coefficient as a scatter diagram with satisfaction on y axis and dissatisfaction coefficient on x axis. The diagram is further divided into 4 quadrants taking median of both coefficients as divider. Left upper quadrant includes item numbers with more than median score on satisfaction and less than median score on dissatisfaction coefficient. The 11 attributes in this quadrant could be assumed as leading to maximum dissatisfaction if absent but if present could create maximum levels of satisfaction amongst customers. Herzberg's motivator – hygiene theory, which was originally developed to identify motivating and demotivating factors for job satisfaction, but in principle, the theory have been extrapolated on not only to measure such factors amongst students persuing various courses but also on customer to identify such factors[11],[12]. Present study shows that if we use customer satisfaction/ dissatisfaction coefficient on data collected through Kano model, these factors in the first quadrant of the figure are both, hygiene factors and motivators. The factors present in the quadrant 2 could be motivators because their presence leads to higher levels of motivation amongst the customer but the absence will not lead to much dissatisfaction. Such factors could lead to customer delight, unexpectedly. Edvin et al did an extensive literature review taking hotel industry as model to develop a managerial model for effective management of customer relation [13]. They concluded that customer delight was a better measure of customer relation than just customer satisfaction.

 Similarly, factors present in quadrant 3 are hygiene factors leading to dissatisfaction if not available but not much satisfaction if introduced and factors in quadrant 4 are neither motivators nor hygiene factors.

Our study adds to the conceptualization of service attributes in three categories by Xiaomeng Fan et al. Concluded from the results of the survey conducted on 2000 patients, they proposed that service attributes in a healthcare industry could be classified into three types depending upon the likelihood by the patient to recommend(LTR) the facility to someone else. Absence of Type 1 attributes could lead to negative performance, presence of type 2 attributes creates better LTR scoring and type 3 attributes are both i.e. the presence could lead to better scoring but non availability of such factors could lead to negative performance on LTR[14].

We could further demonstrate that using quality tools such as kano model, it is possible to identify not only such attributes for further improvement but also to prioritise the effort in implementing change.

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Figure 1

How do you feel if that dimension of that attribute is present in the hospital service *(functional form)*	1) I like it that way 2) I must be that way 3) I am neutral 4) I can life with it that way 5) I dislike it that way
How do you feel if that dimension of that attribute is not present in hospital service *(Dysfunctional form)*	1) I like it that way 2) I must be that way 3) I am neutral 4) I can life with it that way 5) I dislike it that way

| Customer requirements		Dysfunctional form of the question				
		1) I like that way	2) I must be that way	3) I am neutral	4) I can life with it that way	5) I dislike it that way
Functional form of the question	1) I like it that way	Q	A	A	A	O
	2) I must be that way	R	Q	I	I	M
	3) I am neutral	R	I	I	I	M
	4) I can life with it that way	R	I	I	Q	M
	5) I dislike it that way	R	R	R	R	Q

Requirements is :

A : Attractive   O : One dimensional

M : Must be   Q : Questionable

R : Reverse   I : Indifferent

C.R	A	M	O	R	Q	I	Total	Grade
1			1				1	O
2								
3								
.....								

Categorising attributes using Kano model

Source : Kano (1984)

Figure 2
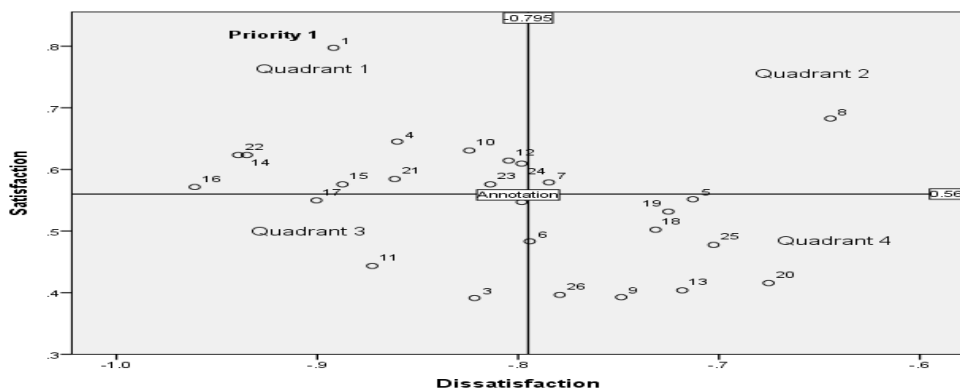
Influence of product features on satisfaction or dissatisfaction

Table 1 Classification of 231 cases as per Kano categories

Question No. / Category	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
O	153	102	80	100	102	91	98	87	50	119	76	98	65	135	116	132	119	97	83	77	126	138	110	119	94	67
A	24	20	10	20	21	10	23	57	25	21	18	31	21	9	17	0	8	19	35	19	9	6	23	23	12	21
Q	9	8	0	12	10	22	22	20	31	9	19	21	18	0	0	0	0	0	9	0	0	0	0	0	0	9
R	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0
I	0	25	31	6	43	33	22	18	23	18	9	10	39	6	9	9	15	43	26	56	23	8	20	24	54	28
M	45	76	109	60	57	75	66	49	93	64	109	71	88	81	89	90	89	72	78	79	73	79	78	67	62	106
Total	231	231	230	198	233	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	233	231	231

Table 2: Summary of Kano categories

Categories	Question No.
Attractive	
Must be	3,9,11,13,26
One Dimensional	1,2,4,5,6,7,8,10,12,14,15,16,17,18,19,20,21,22,23,24,25
Indifferent	
Reverse	
Questionable	

Summary of Kano categorie