Application of the Kano Model for Determining Service Attributes Preferences of Hospital Inpatients

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Abstract

Kano Model was used to find how hospital inpatients view twenty pertinent service attributes. Based on the patients' responses, Kano model allowed us to characterize these attributes into "must", "attractive" or indifferent". The highest scoring "must" attributes were "cleanliness" and "quick response by nurses", the most "attractive" were "provision of magazines" and having a "private room" and the most "indifferent" was "allowing visitors all the time". Perceptions among patients were affected by ward type, sex, education level and number of hospitalizations but not by marital status, age, employment or duration of hospitalization

1. Introduction

Patient satisfaction is a pivotal component of good patient care.(Scotti, Harmon, &Behson, 2007)(Stewart et al., 2000).Satisfied patients are less likely to complain and more likely to be compliant with treatment (Scotti, Harmon, & Behson, 2007), (Glickman, Baggett, Krubert, Peterson, & Schulman, 2007) ,(Argentero, Dell'Olivo, Santa Ferretti, on Burnout, & others, 2008). Satisfaction assessments incorporate, not only the medical care but also incorporatethe hospital environment.(Cowing, Davino-Ramaya, Ramaya, & Szmerekovsky, 2016),(Berenson & Cassel, 2009), (Cohen & Martinez, 2009), (Hibbard, Greene, & Tusler, 2008),(Fung, Lim, Mattke, Damberg, & Shekelle, 2008)

Common causes for lack of satisfaction is for the patient having to wait too long to be attended to and having unmet expectations. (Berenson & Cassel, 2009), (Cohen & Martinez, 2009), (Pitrou et al., 2009), (Jackson, Chamberlin, &Kroenke, 2001)The quality of care can be assessed using many different tools. (Cowing et al., 2016). A logical way to assess patient satisfaction would be to ask the patients themselves about their own experiences and expectations. (Goldstein, Farquhar, Crofton, Darby, & Garfinkel, 2005)There are a number of established tools to assess patient satisfaction.(Cowing et al., 2016), (Kleefstra et al., 2010). In a previous study, we assessed patients satisfaction in different wards in in our hospital using a tool adapted from the Hospital Consumer Assessment of Healthcare Providers and Systems) survey approved by the National Quality Forum (NQF). (Goldstein et al., 2005)

In one study from Saudi Arabia, (Binsalih, Waness, Tamim, Harakati, & Al Sayyari, 2011), it was found that the factors with positive impact on patient satisfaction were the female gender and shorter length of stay (LOS). There was higher satisfaction in the medical than surgical services for the three domains of satisfaction studied.

In another study undertook to assess dialysis patient satisfaction, adopting another tool namelythe questionnaire developed by Juergensen et al. (Juergensen et al., 2006) , it was concluded that the level of satisfaction among patients is affected by gender, duration on dialysis, educational level, and standard of care given. (Al Eissa et al., 2010)

In this current study, we chose to use a tool well tried in industry and business world- namely the Kano Model. (Hejaili et al., 2009).The Kano model of analyzing customer expectation/satisfaction is used to help companies focus on attributes that will augment product/service value and therefore increase sales and profits.We used this tool specifically because we were more interested in exploring the patients' expectations and preferences in different service attributes than just satisfaction at the service given per se. We feel this would provide an interesting and new insight.

The Kano survey model simply asks the customers (in this case, the patients) about different specification/quality/ attributes of a given product or service. Analysis of the patients' responses for any given service attributes classifies expectations into one of the following categories a) an "indifferent "attribute) a "must be" attribute, c) an "attractive" attribute or d) a "one directional" attribute (meaning that the more there is of that particular attribute (specification).

1. Methods

2.1 Sample studied

This is a comparative cross-sectional study using a questionnaire based on Kano model for the assessment of inpatient expectations in the service provided. The sampling technique used in this study was stratified probability sampling based on the type of the ward (either surgical ward patient or medical ward patient).Fifty patients were recruited from five general surgical wards and fifty patients from five general medical wards.

All recruited patients were Saudi adults who were able to comprehend, speak and communicate comfortably and who consented to participate in the study. We excluded patients who were employees of the hospital

2.2 Study tools

The questionnaire was divided into 2 parts; one on demographic characteristics: age, sex, marital status, level of education, age and self-reported health status. The other part asked about 20 possible service attributes. These questions were posed according to the Kano model methodology with a "functional" and a "dysfunctional" parts tothe enquiry about each attribute. (Matzler & Hinterhuber, 1998)

The Kano analysis method was used to calssify the characterstics of the attributes as perceived by the respondants into "attractive" (an extra added value attribute of the service), "must" (an essential component/attribute of the service), "performance " (the more of this attribute is available, the more satisfied the customer would be),   and "indiffrenet" (the presence or the absence of that attribute is the same and adding it to the service would invlove cost without benefit). The classification of each attribute as well as the " customer satisfaction/ dissatisfaction   coefficients were calculated using previously described methods. (Matzler & Hinterhuber, 1998)

2.2 Statistical analysis

Continuous data were presented as means and standard deviations, whereas categorical data were presented as percentage. p-values was calculated by using Student t test for continuous data and Chi-square and t tests used to assess the differences in percentage responses among the different groups. Statistical analysis was performed using SPSS version 21.

2. Results

One hundred patents were enrolled half, each from the medical and surgical wards .Half of our patients were hospitalized for 1 to 3 days and half for more than 3 days, 71% were married, 25% single and 4% divorced' . Forty -six percent were 18 to 40 years of age and 54% over 40 years of age, 51% were employed and 49 % were either retired or unemployed,

3.1 The top 'must' attributes

The top attributes that were perceived as a "must" in our patients' sample were: cleanliness (38%), "quick response by nurses" (30%), "informed about condition" (28%) and "readiness to help" (28%) and "polite nurses" (26%).

3.2 The top "indifferent" attributes:

The top 'indifferent' attributes were "allowing visitors all the time" (21%), "rounds start on time" (18%), "provision of magazines" and "personal attention from doctors" (both 17%) and "having a private room" (13%).

3.3 The top "attractive" attributes:

"Provision with magazines "and "personal attention from doctors" was classified as "attractive" attributes (51% each) followed by "having a private room" (50%), and "nurses able to answer questions" 49% and finally "promises kept" 34%.

3.3 Comparison of responses according to ward type:

3.3.1 for "must" attributes

We observed differing attribute responses based on the type of the wards (whether medical or surgical). The medical patients ranked, "informed about condition" as the top " must" attribute with 26%, followed by "quick response by nurses"," readiness to help", "promises kept"," contacted easily"(all 22%.). (Table 1)

On the other hand, for the surgical patients, "cleanliness" (60%), "quick response by nurses"38%, "readiness to help" 34% and "rounds on time" and "polite nurses". (32%) were the top "must" attributes. (Table 1)

3.3.2 for "attractive" attributes

Attributes labeled as 'attractive' by the medical inpatients were: 'having a private room (70%), 'provided with magazines (58%), and 'nurses able to answer questions (54%),(table 2), whereas the surgical patients labeled the following attributes as being " attractive" 'personal attention from doctors" (50%)', " provision of magazines" (44%) and 'nurses able to answer questions' (42%.) (table 2)

3.3.3 for "indifferent" attributes

The medical patients ranked "visitors all the time" as the top 'indifferent' attribute (26%) followed by "personal attention" (24%) (table 3). The surgical patients, on the hand selected we "rounds at time 22%" and "private room (20%) as their top 'indifferent' attribute (table 3).

A significantly more surgical than medical patients thought of "cleanliness" as a "must attribute (60% versus 16% (p=0.000A significantly more medical than surgical patients perceived "Thirty- four percent of surgical patients considered "rounds at time" as a "must' compared to only 14% of medical patients. On the other hand this same attribute was considered it as 'attractive' by 42% of the medical compared to 20% of the surgical patients (p= 0.039).Only 8% of the medical patients rated "comfort" attribute as 'a must' compared to A "private room" was seen as a "must" by surgical patients versus 6% of medical patients (p=.001)

3.4 Comparing responses according to sex of the patient

Twenty-one percent of male patients considered "understandable explanations" attribute as a 'must' compared to only 11% of females (p=017). Another difference between the sexes was in the "quick response by doctors" attitude which considered as 'indifferent' in 11% of females and by none of the males considered it as such but the difference did not reach statistical significance. (p=.061). In fact, 36% of males rated this attribute as 'attractive' compared to 24% of females. Over twice as many males as females rated "contacted easily" as a 'must' but this did not reach significant difference level (34% versus 15%. (p=.079) The responses to the rest of the attributes were similar between the two sexes

3.5 Comparing responses according to first versus previous hospital admission history

Thirty-eight percent of our samples are hospitalized for the first time. The rest had previously been hospitalized in our hospital. Almost three times as many of the former group viewed "informed about condition" as an "attractive" attribute as did the latter group (42% versus 12% (p=. 001).). Significantly more first hospitalization found the attribute "attention to needs" an "attractive" attribute (35% versus 12% p=.046). Similarly, significantly more   first hospitalization patients found "polite nurses" attribute an "attractive" attribute (32% versus 8%. (p=.008)

3.6 Comparing responses according to self-reported patients' health status

Eighty-eight percent of patients reported their health as being 'good' and 12% reported it as 'poor'. Of the patients with poor health, 55% considered having a "private room" as a ' must' compared to only 11% of those in good health' (p=.017). Conversely, significantly more patients in good health considered having "visitors all the time" as a "must" attribute (15% versus 0% (p=.050)

3.7 Comparing responses according to degree of education

More secondary and university level patients (57%) than "elementary and below" level patients (25%) rated "provision of magazines" as a "must" attribute (p=0.000) More than twice as many 'secondary and university' level as "elementary and below" patients considered the "doctor can be contacted easily" as a "must" attribute (28% versus 12% (p=0.047)

3.8 Comparing responses according to marital status, age grouping, employment and or duration of hospitalization

No differences in responses were detected according to any of these 4 demographic parameters.

3.9 Estimation of customer satisfaction/dissatisfaction coefficients for each attribute

The patients have indicated that they would be most satisfied if the following attributes are present: "nurses answering questions", "examination explained" and "easy to understand explanations" respectively (table 4).
 On the other hand, they would be most dissatisfied if the following attributes are absent "cleanliness", "polite nurses" and "comfort" respectively (table 5). The widest span between satisfaction indices and dissatisfaction indices (and therefore the most satisfying/ important attributes) were "comfort". "Cleanliness", "attention to needs", "easy to understand explanations", "readiness of help" and "polite nurses" respectively (table 6)

The least important/ satisfying attributes included were "having a private room", "visitors allowed all the time", and "having free magazines distributed". However perhaps surprising it also included: "rounding on time", "personal attention from doctors" and "having to wait long before an appointment" (table 6)

3. *Discussion*

One of the main objectives of any service that is provided for patients is to make the customers (patients) as satisfied with the service as possible .(Scotti et al., 2007).Therefore, increasing efforts have been expended to develop reliable tools with consistent results to assess the customers satisfaction. (Kleefstra et al., 2010), including tools that enquire after the patients' own perception and experience of satisfaction or dissatisfaction of the services /products in question.(Goldstein et al., 2005)In a previous study conducted in our institution in inpatient group- using a validated customer based evaluation of the services provided- it was found that certain factors to be associated with more satisfaction such as female gender of the respondent and shorter length of hospital stay. (Binsalih et al., 2011).Another study found that gender, duration of care service and educational level had an effect in the satisfaction score.

In this study, using a customer based questionnaire, our aim was to identify the attributes and characterization of the components care services that our patients considered as crucial. We used a Kano model based questionnaire which is a reliable tool in industry and business world. To explore our client's expectations and preferences in regard to different ongoing or potential care services. We were not surprised to discover that cleanliness came as the most rated "must" attribute overall as it's deeply rooted in the Saudi culture and is rooted religious customs.

Interestingly, we found that the "cleanliness" attribute was chosen as a "must" by only 16% of the patients in the medical wards   compared   60% of the surgical wards patients (p=.000). This significant difference could be attributed to the fact that our surgical wards are located in the new surgical tower where the rooms are newer and more modern than in the medical wards. Another possible reason for this difference may lie in the fact that the surgical patients are more concerned and demanding with cleanliness out of fear of contracting a surgical wound infection following their surgical procedures.

The attribute that was rated as the second "must" attribute   among our patients was "quick response by nurses". This could be explained by the fact that our patients depend more on nurses for their immediate needs and daily interactions. In this respect this attribute is similar to the 'readiness for help' attribute, which was equally important for our sample of patients in terms of relying more on the nurses for the immediate help.

It is interesting to note the difference in the surgical and medical wards response to the attribute of "being informed about condition". Here the medical patients were three and half times more likely to consider it as "attractive" than the surgical patients (42% and 12% respectively (p=.001). This difference of opinion between the medical and surgical patients is further consolidated by the fact that, whereas none of the medical patients considered this attribute as being "indifferent", 18% of the surgical patients did. This difference may be related to the fact the nature of the surgical procedures are generally straightforward (and has probably been explained to the patient prior to admission) while the nature of medical illnesses are more difficult to grasp by the patients and may take a long time to be discovered by the physicians. A study from Jeddah, Saudi Arabia showed that 83% of patients with cancer demanded to be informed about their condition. (Eldeek et al., 2014)

Another interesting difference we observed was   in the "comfort" attribute, which was considered as a "must" by 30% of the surgical group as compared to only 8% of the medical group. This might be related to the fact that pain and discomfort are usual accompaniment   following   surgical procedures. We believe that it is for the same reason that we found more that 26% of the surgical group considered having a "private room" service attribute as a "must" attribute compared to only 6% of the medical group. It would also explain why five as many patients with poor health as with good health demanded a private room   (55% versus 11 %.). Similarly we found that none of the patients with 'poor' health wished to "have visitors all the time\' as compared to 15% of the of the patients with 'good' health who rated it as a must. The bottom-line is patients who are in poor health and in pain and discomfort, demand more privacy.

Thirty-four percent of the surgical group rated 'rounds at the time' as a" must" compared to 14% of the medical group. This may be related to the fact the timing for the ward rounds by surgeons are less likely to be adhered to than by physicians as the former may be tied up with surgical procedures. In the vast majority of the attributes, we investigated (eighteen of 20), the surgical patients have higher percentage of the 'must' attributes than the medical patients suggesting that they demand and expect more than the medical wards patients expect. We found out also the patients who were hospitalized for the first time demanded and expected more than the patients who have been hospitalized before. For example, 35% of the first hospitalization patients considered 'attention to needs' as an "attractive" attribute compared to 12% of the multi- hospitalization group and the same was also found in relation to the following attributes: "polite nurses" (32% versus 8%),"promises kept", "rounds at the time".

In terms of the attributes that were considered as "attractive"," availability of magazines" was rated the highest (51%) in our sample as a whole. This was more obviously observed in the more educated patents, who also preferred the easy communicability between them and the hospital by using the modern communication methods. This last attribute (i.e. this 'contacted easily') was rated highly specially among them as they are more familiar with these communication modalities.

We tried to look into the literature to see and compare our results with other studies in different locations, communities and cultures but we could not find any similar studies which looked into the different preferences by different populations and cultures in terms of health services expectations and satisfaction. This study indicates that the health care institutions must explore what their clients are demanding and expecting and ensure the implementation of the attributes rated as a" must'. In our sample, these attributes included cleanliness, quick response to the patients needs in the wards in a professional way and explaining the medical conditions to the patients in a clear way.

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Table 1: Comparing top "must" attributes by ward type

Attribute	Medical wards	surgical wards	P value
Informed about condition	26%	30%	.001
Quick response by nurses	22%	38%	.315
Readiness to help,	22%	34%	.064
Promises kept	22%	18%	.891
Contacted easily	22%	28%	.892
Cleanliness	16%	60%	.000
Rounds on time	14%	34%	.039
Polite nurses	20%	32%	.163

Table 2: Comparing top 'attractive' attributes by ward type.

Attribute	Satisfaction coefficient (Most satisfaction = 1.0; least satisfaction =0)
Nurses answering questions	0.82
Examination explained	0.8
Easy to understand explanations	0.8
Nurses understand patients	0.75
Comfort	0.75
Quick response by doctors	0.73
Attention to needs	0.73
Personal attention from doctors	0.72
Magazines	0.71
Private room	0.7
Promises kept	0.7
Readiness of help	0.68
Polite nurses	0.66
Contacted easily	0.64
Informed about condition	0.62
Quick response by nurses	0.62
Rounds on time	0.57
Cleanliness	0.57
Visitors all the time	0.38
Waiting time	0.08

Table 3: Comparing top 'indifferent' attributes by ward type.

Attribute	Medical wards	Surgical wards	p value
Visitors all the time	26%	16%	0.008
Magazines	18%	16%	0.324
Personal attention from doctors	24%	10%	0.111
Rounds on time	14%	22%	0.039
Contacted easily	12%	10%	0.892
Informed about condition	0%	18%	0.001

Table 4: The Satisfaction coefficient by the presence of an attribute ((in order of strength of satisfaction)

Attribute	Medical wards	Surgical wards	p value
Private room	70%	30%	0.001
Magazines	58%	44%	0.324
Nurses able to answer questions	54%	42%	0.081
Personal attention from doctors	52%	50%	0.111
Rounds on time	42%	20%	0.039
Promises kept	34%	34%	0.891

The least important/ satisfying attributes included were "

Table 5: The Dissatisfaction coefficient by the absence of an attribute (in order of strength of dissatisfaction)

Attribute	Dissatisfaction Index (Most satisfaction = - 1.0; least dissatisfaction =0)
Cleanliness	-0.91
Polite nurses	-0.75
Comfort	-0.75
Readiness of help	-0.74
Attention to needs	-0.72
Quick response by nurses	-0.71
Contacted easily	-0.65
Quick response by doctors	-0.64
Easy to understand explanations	-0.64
Informed about condition	-0.63
Nurses understand patients	-0.58
Promises kept	-0.56
Rounds on time	-0.5
Examination explained	-0.49
Nurses answer questions	-0.44
Private room	-0.36
Visitors all the time	-0.34
Magazines	-0.29
Personal attention from doctors	-0.28
Waiting time	-0.09

Table 6: Span between the satisfaction coefficient (SC) and dissatisfaction coefficient (DC)

Attribute	Span between SC and DC
Comfort	1.5
Cleanliness	1.48
Attention to needs	1.45
Easy to understand explanations	1.44
Readiness of help	1.42
Polite nurses	1.41
Quick response by doctors	1.37
Nurses understand patients	1.33
Quick response by nurses	1.33
Examination explained	1.29
Contacted easily	1.29
Nurses answer questions	1.26
Promises kept	1.26
Informed about condition	1.25
Rounds on time	1.07
Private room	1.06
Personal attention from doctors	1
Magazines	1
Visitors all the time	0.72
Waiting time	0.17