

Improving Service Quality by Prioritizing Service Attributes Using SERVQUAL and Kano Model

A Case Study of Nursing Home in Taiwan

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Abstract. The purpose of this study is to improve the healthcare service in nursing home base on customer desire. Previous studies found that Taiwan nowadays is facing the rapid growth of the ageing population and lack of resources for taking care of elderly. Nursing home has become one of solutions to overcome these issues. However the current condition indicates that some nursing homes can not satisfy the customer desires, especially for elderly who are more sensitive. SERVQUAL model is used to measure the service quality base on the gap score between customer expectation and perception. Kano model is used to categorized and prioritize each service attributes according the degree of influence toward customer satisfaction. The findings of a case study are presented.

Keywords: Service quality · SERVQUAL · Kano · Nursing home · Elderly

1 Introduction

Recent studies show Taiwan is one of country that encounters ageing population issue (Hsu, et al. 2004, Chen, et al. 2010). The Council for Economic Planning and Development (CEPD) had predicted that the rapid growth of elderly population would change Taiwan from ageing society to aged society in 2017 (Bartlett and Shwu-Chong 2000, Kang 2012). In consequence, the rising of many healthcare issues included the long term care for disabled people are unavoidable (Chang, et al. 2010). The global economy changing also would have affected the family structure changing (Kang 2012) and declined birth rates (Tien and Tsai 2013). Every couple in Taiwan nowadays only gives birth to an average of 1.1 children (C.-Y. Chen 2010). As the result, the available resources for taking care of elderly at home are gradually reduced and these changes present considerable challenges to meet the needs of Taiwan's ageing society (Phillips 2002).

Nursing home has become one of solutions to overcome this problem. Nursing home is a multi-residence housing facility that provides service package to elderly. Nursing home plays important role in a long-term care service system which related with people's live (Zinn, Aaronson and Rosko 1993). Elderly feeling and experiences should be involved in the service process because these are important for the life's

meaning in nursing home (Anderberg and Berglund, Elderly persons' experiences of striving to receive care on their own terms in nursing homes 2010).

Customer desire is an important component for new product or service development and the innovation process (Hartono and Chuan 2011). An assessment of service quality based on customer desire can give valuable information to improve the service quality in health service (Mostyn, et al. 2000). SERVQUAL (Parasuraman, Zeithaml and Berry 1988) model has been widely used in health care service area. It was designed to measure the service quality as customer perceived by analyzing the gap between customer expectation and perception. This model provides 22 basic service attributes as analyzing factor with five basic dimensions, (1) Tangible (the appearance of physical facilities, equipment, personnel, and communication materials) (2) Reliability (the ability to perform the promised service dependably and accurately) (3) Responsiveness (the willingness to help customers and to provide prompt service) (4) Assurance (the knowledge and courtesy of employees and their ability to convey trust and confidence) (5) Empathy (the provision of caring, individualized attention to customers). However, even though SERVQUAL provides the gap as the analysis result, it was not designed to address the element of innovation and how the gap can be closed (Tan and Pawitra 2001). Furthermore, it was found that there were nonlinear and nonsymmetrical relationship between service quality and customer satisfaction (Kano, et al. 1984, Baki, et al. 2009). Therefore, it is needed to integrate SERVQUAL model with other service quality tools which more focus on analyzing the relationship between service quality and customer satisfaction.

Nowadays, the use of Kano model (as shown in Fig. 1) has been barely presented into healthcare service business. The Kano model has ability to take out unspoken customer desires (Hartono and Chuan 2011) and to identify attributes which have greatest influence on customer satisfaction (Matzler and Hinterhuber 1998). Kano model provides the categorization of service attributes into three major groups, M-must be, O-one dimensional, and A-attractive (Kano, et al. 1984). Categorizing the service attributes makes the prioritization for services easier because it can be seen clearly which service attributes give greatest effect to increase customer satisfaction.

In addition, the use of Kano model should be initiated by developing questionnaires and SERVQUAL has the ability to develop the questionnaires base on five dimensions to cope all of the service aspects. The purpose of this study is to improve the health care service in nursing home base on customer desires. Servqual and Kano model will be integrated to investigate and to prioritize the service attributes which have greatest impact to the elderly through customer expectation-perception relationship and Kano categories (availability-unavailability relationship of service attributes).

2 Methodology

2.1 Setting

This study was conducted in 4 nursing homes in Taoyuan County. To accomplish the purpose of this study, a quantitative research approach was adopted and the integration method between SERVQUAL and Kano model was used to develop research instruments and to analyze the result. The research framework is shown in Fig. 2.



Fig. 1. Kano model (Kano, et al. 1984)

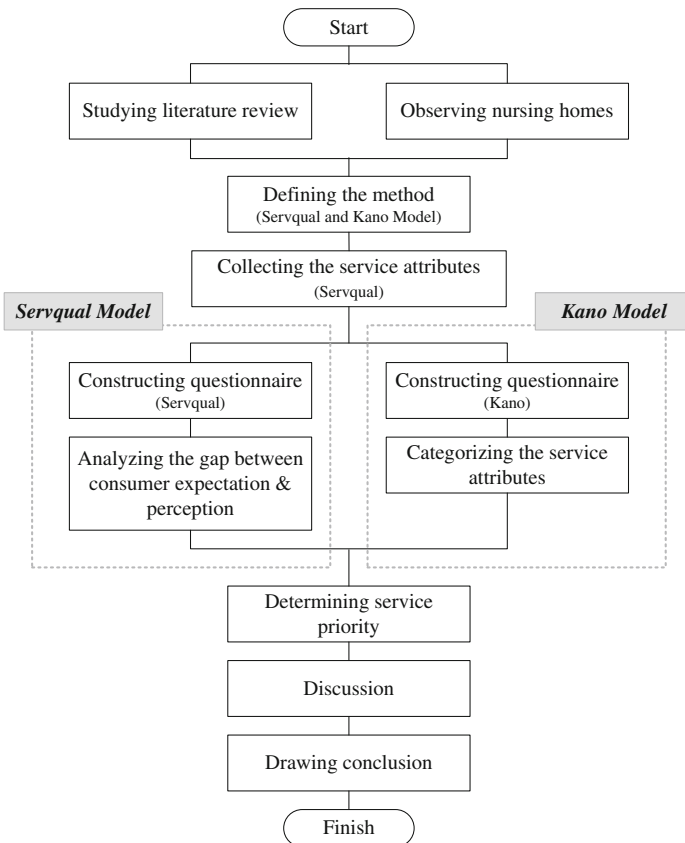


Fig. 2. Research framework

2.2 Collecting Service Attributes

The service attributes were collected base on 22 items basic service attributes of SERVQUAL model and therefore were adjusted to be used in nursing home according to observation results. A total of 24 services attributes (as shown in Table 1) were categorized into 5 basic dimensions of SERVQUAL.

Table 1. List of service attributes

Dimension	No.	Code	Service Attributes
Tangible	1	T1.	Medical instrument and physical facilities are visually appealing
	2	T2.	Employees uniform are clean, nice, and neat
	3	T3.	Clean, adequate supplies, and well maintained for every rooms
	4	T4.	Well lighted for every rooms
	5	T5.	Suitable temperature at patient rooms
	6	T6.	Meals served are clean and hygiene
	7	T7.	Meals served are delicious
	8	T8.	The atmosphere for every rooms are cozy
	9	T9.	The scent for every rooms are refreshing
Reliability	10	RL1.	Appropriate employees response
	11	RL2.	Medical treatment and doctor visiting are well scheduled
	12	RL3.	Available and adequate patient family visiting time
	13	RL4.	All patient activities are well scheduled
	14	RL5.	The employees solve the patient’s problem sincerely
	15	RL6.	All equipment (AC, TV, radio, light, etc.) work properly
Responsiveness	16	R1.	Employees give clear information and understandable
	17	R2.	Appropriate and prompt services
	18	R3.	Quick medical treatment response when patient need it
Assurance	19	A1.	Feel safe and feel at home
	20	A2.	Employees behavior instills confidence in patients
Empathy	21	E1.	Good communication among employees and patients
	22	E2.	Employees are helpful, careful, and friendly
	23	E3.	Nurses understands patient’s needs
	24	E4.	No discrimination to the patients

2.3 Constructing Questionnaire

SERVQUAL Questionnaire. To evaluate the service quality, customers will compare the service they expected/expectation and perceived/perception (Lewis and Booms 1983, Parasuraman et al. 1985). Two types of questionnaires were first developed to identify customer expectation and perception. The question to identify consumer expectation is how important these services attribute, with 5-point Likert scale method ranging from not important at all (1) to very important (5). The question to identify

consumer perception is how do you feel about these services attributes provided, also with 5-point Likert scale method ranging from very bad (1) to very good (5).

Kano Questionnaire. A pair of question was formulated and the elderly were asked to answer in one of five different ways, ranging from ‘I like it very much’ (1) to ‘I do not like it’ (5). The first question (functional questionnaire) concerns with the response of the elderly due to the availability of services (how do you feel if these service attributes are well provided) and the second question (dysfunctional questionnaire) concerns with elderly response to the unavailability of services (how do you feel if these service attributes are NOT provided).

2.4 Pilot Study

The result of pilot study showed, since there were 4 types of questionnaires (expectation, perception, and a pair of Kano questionnaire), the elderly could reply to a maximum 3 questionnaires before losing patient and interest. Hence, the interviewer asked those four questions in once for each service attributes. Some service attributes were also modified by adjusting to the elderly viewpoint. For instance, the speed of the employees’ service will not affect the elderly response since they are old and do every activity slowly, but what the elderly need is the appropriate service and the employees’ understanding to their needs.

2.5 Data Collection

After the final questionnaires was constructed, the data collection was proceed. A total of 42 elderly which selected randomly were participated in this study. Firstly, the interviewers explained the study objective to elderly. Secondly, the elderly were asked for responses base on service attributes in 4 questionnaires (expectation, perception, functional, dysfunctional). The process of interviewing an elderly took around 30 min.

3 Result

3.1 Participants

The elderly gender was split into 67 % (28) males and 33 % (14) females. The average age was 76 years old (at range 71–80) and the average length of staying in the nursing homes was 5 years (at range 1–5). The average age when the elderly started to live in nursing home was 71 years old.

3.2 Questionnaire Validity and Reliability Test

Validity and reliability test was conducted using SPSS 16.0 to evaluate the adequacy of relationship model between constructs and the measurement items of the research

instrument. Validity refers to the degree to which evidence and theoretical support the interpretations of test scores entailed by proposed uses of test (Messick 1995). Reliability refers to the internal consistency of construct variable by using Cronbach's Alpha coefficient (Osburn 2000, Streiner 2003).

In this study, criterion-related validity was evaluated using Pearson correlation coefficient to examine the relationship between the score of each attribute and the total score. The results showed the item code RL2 (medical treatment and doctor visiting are well scheduled) from expectation questionnaire and A1 (feel safe and feel at home) from perception questionnaire were not valid because the coefficient r ($RL2 = 0.193$; $A1 = 0.258$) < 0.304 (for $n = 42$). For Kano questionnaires, all of the service attributes were valid ($r > 0.304$).

For reliability test, the value of 0.7 of Cronbach's Alpha was suggested as a standard (Nunnally 1994). The result showed the coefficient for all questionnaires were reliable (expectation = 0.884, perception = 0.900, Kano = 0.891 and 0.944).

Some of variables did not reach the standard of validity test. However, based on some literature review and peer evaluation, it was decided to keep those invalid variables on the next analysis in order to have better comprehension of the study.

3.3 Data Analysis

SERVQUAL. The service quality evaluation process generated the mean score of expectation and perception for each service attributes based on total score from each elderly divided by the number of the elderly. The result showed the elderly have high expectation where all the mean of each service attribute reached score above 4. The highest mean score was 4.69 for item code T3 (clean, adequate supplies, and well maintained for every rooms) and the lowest mean score was 4.19 for item code RL4 (all patient activities are well scheduled). The result also showed the elderly have high expectation on the 'empathy' category. For the customer perception, the highest mean score was 3.98 for item code T9 (the scent for every rooms are refreshing) and RL6 (all equipment such as AC, TV, radio, light work properly), and the lowest mean score was 3.14 for item code A1 (feel safe and feel at home). The result also showed that the elderly had high perception on the 'reliability' category.

The gap score which is the difference value between perception and expectation score showed the range of difference between how the services were experienced and expected by the elderly. The lower of the gap value, the wider the range of difference between the services are experienced and expected. The result showed the item code T5 (suitable temperature at patient rooms) and A1 (feel safe and feel at home) had the lowest gap scores (-1.26 and -1.19).

Kano. The elderly responses for each service attribute from functional and dysfunctional questionnaire were combined and categorized based on Kano evaluation table (shown in Table 2). Frequency analysis was applied as shown in Table 3 to evaluate and to define Kano category for each service attributes regarding the highest frequency they had (Sauerwein, et al. 1996, Bayraktaroglu and Özgen 2008).

Table 2. Kano evaluation table (Kano, et al. 1984)

		Dysfunctional				
		1	2	3	4	5
Functional	1	Q	A	A	A	O
	2	R	I	I	I	M
	3	R	I	I	I	M
	4	R	I	I	I	M
	5	R	R	R	R	Q

Table 3. Frequency analysis

Service Attributes	A	O	M	I	R	Q	Total	Category
Medical instrument and physical facilities are visually appealing	15	12	5	10	0	0	42	A
Employees uniform are clean, nice, and neat	10	14	4	13	1	0	42	O
Clean, adequate supplies, and well maintained for every rooms	14	16	3	9	0	0	42	O
Well lighted for every rooms	12	11	5	13	1	0	42	I
Suitable temperature at patient rooms	15	11	4	12	0	0	42	A
Meals served are clean and hygiene	7	16	3	14	2	0	42	O
Meals served are delicious	9	15	6	10	2	0	42	O
The atmosphere for every rooms are cozy	15	12	4	8	3	0	42	A
The scent for every rooms are refreshing	16	12	5	9	0	0	42	A
Appropriate employees response	14	7	8	12	1	0	42	A
Medical treatment and doctor visiting are well scheduled	18	8	4	12	0	0	42	A
Available and adequate patient family visiting time	18	6	5	11	2	0	42	A
All patient activities are well scheduled	11	11	4	15	1	0	42	I
The employees solve the patient's problem sincerely	20	11	5	6	0	0	42	A
All equipment (AC, TV, radio, light, etc.) work properly	17	8	7	10	0	0	42	A
Employees give clear information and understandable	19	9	8	6	0	0	42	A
Appropriate and prompt services	12	12	3	14	0	1	42	I
	16	12	4	10	0	0	42	A

(Continued)

Table 3. (Continued)

Service Attributes	A	O	M	I	R	Q	Total	Category
Quick medical treatment response when patient need it								
Feel safe and feel at home	17	9	4	11	1	0	42	A
Employees behavior instills confidence in patients	11	11	6	12	1	1	42	I
Service Attributes	A	O	M	I	R	Q	Total	Category
Good communication among employees and patients	15	12	6	9	0	0	42	A
Employees are helpful, careful, and friendly	14	15	6	5	2	0	42	O
Nurses understands patient's needs	18	13	3	8	0	0	42	A
No discrimination to the patients	15	16	5	6	0	0	42	O

According to Kano (1984), there are 6 Kano model categories: (1) Attractive/A, the increase of service attributes quality will increase the consumer satisfaction, but the decrease of service attributes quality will not decrease the consumer satisfaction (2) One-dimensional/O, the service attributes quality is proportional to the customer satisfaction (3) Must-be/M, the increase of service attributes quality will not increase the consumer satisfaction, but the decrease of service attributes quality will decrease the consumer satisfaction (4) Indifferent/I, whether the service attributes quality increase or decrease will not affect to consumer satisfaction (5) Reverse/R, the service attributes quality is not linear to the customer satisfaction (6) Questionable/Q, whether the service attributes quality increase or decrease, it has possibility to satisfy and/or to disappoint the consumer.

The result of Kano categorization showed 14 items were on Attractive category, 6 items on One-dimensional category, 4 items on Indifferent category. Five of six service attributes in 'reliability' dimension had attractive (A) quality, which were appropriate employees response, medical treatment and doctor visiting are well scheduled, available and adequate patient family visiting time, the employees solve the elderly problem sincerely, all equipment (AC, TV, radio, light, etc.) work properly, and the rest was indifferent (I) quality which is all patient activities are well scheduled. This showed that the elderly expected the ability of employees to perform the promised service dependably, consistently, and accurately. The elderly did not expect their activities are well scheduled (this had the lowest score of expectation questionnaire, 4.19), therefore whether this attribute quality increase or decrease will not affect the elderly satisfaction (Indifferent category). This was understandable since the average age of the elderly was 76 years old, thus they are not able to do a lot of activities and

they had a lot of free times. What the elderly needed was empathy or the provision of caring and individualized attention.

Integration of SERVQUAL and Kano. Offering consumers the expected service attributes (must-be) will not meet customer satisfaction in few next day because of the temporary world and the environment changing (Shen, Tan and Xie 2000, Pawitra and Tan 2003). Thus, instead focusing on Must-be or One-dimensional attributes, the nursing homes should focus on Attractive attributes (please refer to Fig. 1) in order to get higher elderly satisfaction (Chen and Su 2006, Hartono and Chuan 2011). The statistic data of combination of SERVQUAL (gap score) and Kano model (categorization) is shown in Table 4.

The result of this study showed the service attributes provided had not achieved the elderly desires since all the gap had negative scores with average score = -0.83 . The 5 service attributes with lowest of gap scores were suitable temperature at patient rooms (-1.26), feel safe and feel at home (-1.19), medical treatment and doctor visiting are well scheduled (-1.10), meals served are clean and hygiene (-1.05), appropriate and prompt service (-1.05).

Refining to Kano model, improving the service attributes with Attractive quality would give more impact to elderly satisfaction, thus the attributes ‘meals served are clean and hygiene’ and ‘appropriate and prompt service’ were eliminated because they were on one-dimensional and indifferent category. As the final result, the first priority of service attributes need to be improved was ‘the adjustment of the temperature of patients’ rooms’. The second and the third priority would be ‘feel safe and feel at home’ and ‘medical treatment and doctor visiting are well scheduled’.

The results of this study were based on the elderly desires through the questionnaire responses. Based on gap score analysis, 24 items of service attributes had not satisfy the elderly needs since all items had negative gap score. During the service encounters, customers compare the services provided with their expectation and evaluate the service quality based on that comparison. The negative gap scores indicated the services provided were less than customer expectation. It was naturally understandable that the elderly had higher expectation to the suitability of the temperature of patients’ rooms since the weather is unstable recently. Thus, it is important for nursing homes to adjust the temperature carefully in order to enhance the elderly comfort.

4 Discussion

The prioritization of service attributes based on Kano and SERVQUAL in nursing homes has significant implications for improving service quality. Both Kano and SERVQUAL model collect and analyze data base on customer desire. Customer desire is important to be involved in service process, specifically for elderly who are more sensitive and easily to get hurt. The elderly were active in receiving care on their own terms and demands. The elderly also tried to manage and maintain their own abilities to have a sense of control for their life (Anderberg and Berglund 2010).

SERVQUAL model emphasized the analysis based on the gap score between perception and expectation, while Kano emphasized the analysis based on categorization.

Table 4. Statistic data of SERVQUAL and Kano model combination

No.	Code	Service Attributes	Expectation	Perception	Gap	Kano Category
<i>Tangible</i>			4.42	3.62	-0.80	
1	T1.	Medical instrument and physical facilities are visually appealing	4.26	3.74	-0.52	A
2	T2.	Employees uniform are clean, nice, and neat	4.24	3.83	-0.40	O
3	T3.	Clean, adequate supplies, and well maintained for every rooms	4.69	3.88	-0.81	O
4	T4.	Well lighted for every rooms	4.33	3.69	-0.64	I
5	T5.	Suitable temperature at patient rooms	4.57	3.31	-1.26	A
6	T6.	Meals served are clean and hygiene	4.29	3.24	-1.05	O
No.	Code	Service Attributes	Expectation	Perception	Gap	Kano Category
7	T7.	Meals served are delicious	4.29	3.36	-0.93	O
8	T8.	The atmosphere for every rooms are cozy	4.43	3.55	-0.88	A
9	T9.	The scent for every rooms are refreshing	4.64	3.98	-0.67	A
<i>Reliability</i>			4.39	3.73	-0.67	
10	RL1.	Appropriate employees response	4.43	3.74	-0.69	A
11	RL2.	Medical treatment and doctor visiting are well scheduled	4.48	3.38	-1.10	A
12	RL3.	Available and adequate patient family visiting time	4.33	3.71	-0.62	A
13	RL4.	All patient activities are well scheduled	4.19	3.88	-0.31	I
14	RL5.	The employees solve the patient's problem sincerely	4.62	3.67	-0.95	A
15	RL6.	All equipment (AC, TV, radio, light, etc.) work properly	4.31	3.98	-0.33	A

(Continued)

Table 4. (Continued)

No.	Code	Service Attributes	Expectation	Perception	Gap	Kano Category
<i>Responsiveness</i>			4.41	3.38	-1.03	
16	R1.	Employees give clear information and understandable	4.52	3.57	-0.95	A
17	R2.	Appropriate and prompt services	4.50	3.45	-1.05	I
18	R3.	Quick medical treatment response when patient need it	4.33	3.38	-0.95	A
<i>Assurance</i>			4.37	3.30	-1.07	
19	A1.	Feel safe and feel at home	4.33	3.14	-1.19	A
20	A2.	Employees behavior instills confidence in patients	4.40	3.45	-0.95	I
<i>Empathy</i>			4.46	3.60	-0.86	
21	E1.	Good communication among employees and patients	4.43	3.48	-0.95	A
22	E2.	Employees are helpful, careful, and friendly	4.40	3.81	-0.60	O
23	E3.	Nurses understands patient's needs	4.52	3.50	-1.02	A
24	E4.	No discrimination to the patients	4.50	3.62	-0.88	O
<i>Grand Mean</i>			4.42	3.58	-0.83	

*Notes: Gap = Perception – Expectation; A : attractive; O : one-dimensional; I : indifferent

By using SERVQUAL only, even though the difference between customer perception and expectation can be identified, it still cannot identify whether the improvement of those service attributes with lowest gap score can give significant improvement to increase customer satisfaction. In this case, further analysis of customer expectation to see how attractive those service attributes targeted are needed. Thus, the measurement based on the gap score is confused by customer expectation level which is necessary to be analyzed.

Kano has ability to categorize how attractive the service attributes toward customer by analyzing customer responses for its availability and unavailability. As mentioned before that the relationship between customer response and service quality is not always linear and SERVQUAL model cannot overcome this issue, therefore Kano model can be used to measure customer expectation by categorizing the service attributes into Attractive/One-dimensional/Must-be/Indifferent/Reverse/Questionable.

The result showed some service attributes which have low gap scores were not categorized in Attractive category. This means improvisation to those service attributes can make the gap between customer perception and expectation closer, but it does not give significant effect to improve customer satisfaction, because those service attributes are not attractive for the elderly. Since the goal of nursing homes is to improve service quality base on elderly desire, therefore the combination of SERVQUAL gap score and Kano categorization method is appropriate to be used.

5 Conclusion

This present study has proposed the application of SERVQUAL and Kano model with the object of determining the service improvement priority in which consumer perception and expectation influences the service attributes. The results had showed the SERVQUAL and Kano model were useful as tools to measure the service quality and to define the prioritization of which service attributes need to be improved according to elderly desires. This study conclude there were 3 service attributes (in sequence) need to be improved which had the lowest gap score and were categorized in Attractive (A) quality. They were ‘the adjustment of the temperature of patients’, ‘feel safe and feel at home’ and ‘medical treatment and doctor visiting are well scheduled’. In addition, the improvement of service should be performed across all the dimensions with higher emphasis on Reliability dimension in order to enhance the elderly satisfaction.

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