

## Service Satisfaction and Dissatisfaction Model for Discharge Service Delivery at Public Local Hospitals

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**Abstract:** Complaints are indicator to service satisfaction performance in local healthcare service provider. By fact, the complaint frequencies on local public hospital services are keep incre asing. Thus, the identification of service gap between delivered service and expectation of service by Inpatients and Outpatients (IOP) is important to reduce the complaint frequency. The purpose of this study is to determine the service gap between service delivery and service recipient in local healthcare service. This study presents the service gap analysis based on service satisfaction model that h as been developed using modified Kano-QFD model. Admission and discharge service are considered as two healthcare service variables to represent the inpatients and outpatients, respectively. Berger's coefficients analysis is used to determine the Kano Quality Attribute (KQA) and service gap based on complaints and compliment in pertinent to dissatisfaction index and satisfaction index. Service satisfaction model is validated with original Kano grid mapping and service gap. The results have shown the incre ased of dissatisfaction level towards public healthcare delivery and varies according to the service elements for admission and discharge. As a conclusion, the developed Kano-QFD satisfaction model is found to have well agreement with original Kano's model and possess ability to evaluate service gap efficiently.

**Key words:** Kano-QFD, satisfaction and dissatisfaction model, complaint, compliment, service gap

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### INTRODUCTION

Based on Health Facts 2012, the Malaysian Ministry Of Health (MOH) aimed to ensure a high quality health system that is customer oriented, equitable, affordable, efficient, technologically appropriate, environmentally appropriate and innovative. Therefore, in order to achieve the mission, the healthcare system must be able to cope with the multitude challenges, ranging from physician involvement to service planning and delivery as well as continuous work towards customer satisfaction attainment (Butler and Leong, 2000). However, it is a huge challenge for 214 public hospitals around Malaysia with all the resource limitations to deliver the best service delivery. Besides, it w as observed that MOH h as been facing huge challenges to maintain and to provide high standard of service delivery to stakeholders due to low ratio of clinical staff to Inpatients and Outpatients (IOPs). as defined in the Annual Report from the Ministry of Health in 2011, the total admission had been 2.15 million, out-patients were 38.4 million, dental health attendances

were 9.3 million and maternal and child health attendances were 11.9 million. This scenario is sufficient enough to prove how important service design is particularly on the improvement of healthcare service design that able to account and quantify the Voice of Patients (VOP) after the service is delivered to them. Therefore, the need of developing service satisfaction model is a must to support the better understanding of the nature of VOPs and prioritized the VOPs correspond to delivered services by public hospital. In the present work, a service satisfaction model h as been proposed to deal with above matters.

### Literatures on healthcare service and satisfaction model:

Complaints are defined as a result of failed expectations (Scott, 2003) and perceived negatively by service dissatisfaction (Jangland *et al.*, 2009). Complaints by dissatisfied patients actually provide opportunity to managers to learn the problems and take corrective action for improvement. Perceptions refer to the patient's evaluation of the service provided as good quality of services will result in positive perception while poor

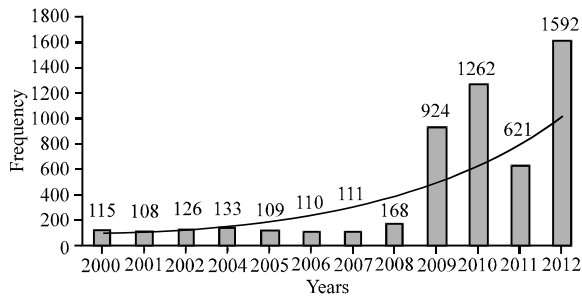


Fig. 1: Complaints frequency received by public hospital from year 2000-2012; Malaysian Public Complaints Bureau (PCB) through i-Aduan

service will end with negative perception (Cheng and Tang, 2000). Expectation is the central of satisfaction (Coye, 2004) and perception can disconfirm expectation for worse or better or conform it as neutral (York and McCarthy, 2011). Hence, service dissatisfaction can be referred as negative perception of poor service quality that fails to exceed patient's expectation which is expressed through complaints or medication satisfaction claim. In this case, service performance is noted as low service quality. On the other hand, compliments are defined as a result of exceeding expectations and satisfying consumption (Friman and Edvardsson, 2003) to express satisfaction. as discussed by Coye (2004), Cheng and Tang (2000), compliments could also be defined as positive perception of good service that is able to exceed patient's expectation as a result of service satisfaction. Thus, it suggests that the service performance is of high service quality. The service delivery issues in healthcare service quality that are addressed through complaints are viewed from the perspectives of customers and clinicians.

Besides, the Malaysian National Healthcare Statistics Initiative report by Majeed *et al.* (2011) outlined that delivery of healthcare and continuous evaluation of healthcare delivery is compulsory for public hospitals in Malaysia. Different hospitals could provide similar services but they do not provide the same quality of services as claimed by customers and healthcare clinicians (Scott, 2003). Delivering poor quality service definitely increases the frequency of complaints from healthcare customers. Based on Malaysian Public Complaints Bureau (PCB) through I-Aduan the complaints frequency from 2000-2012 is exponentially increased. Figure 1 demonstrates the trend of complaints which is very critical in the sense that dissatisfaction is actually voice up from patients.

Moreover, the Malaysian Ministry of Health had established a systematic complaint process and procedure to assess complaints from various healthcare

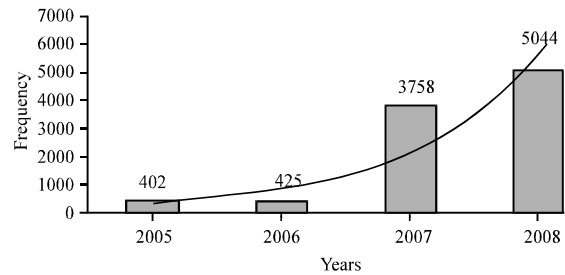


Fig. 2: Complaints frequency received by public hospital from year 2005-2008; corporate communication unit, ministry of health (Singh *et al.*, 2011)

stakeholders, particularly patients. Figure 2 shows the statistics of increased frequency for complaints from year 2005-2008, adapted from the Corporate Communication Unit in the Ministry of Health (Singh *et al.*, 2011). It can be observed that from 2006-2007, the frequency of complaints increased to 1286 and from 2007-2008 the frequency continued to increase by 34.2%.

Therefore, to cope with present challenge of Malaysia healthcare service delivery and complaints and compliment scenario in public hospital, it can be concluded that a new service satisfaction model must be able to simultaneously account the measurement complaints and compliments from patients. Theoretically, this is the best way to evaluate the extent of service gap between service delivery and service recipient based on the dissatisfaction and satisfaction level (York and McCarthy, 2011). Based on complaints and compliment scenario in Malaysia healthcare service, the nature of dissatisfaction and satisfaction towards service delivery is behaviorally uncertain and unexpected or can be defined as non-linear behavior (Nordin and Razak, 2014). For example, the very good service delivery is not essentially granted with high merit of satisfaction and conversely, very poor service delivery is not necessarily return with very high level of dissatisfaction (Gupta and Srivastava, 2012). Indeed, service satisfaction and service dissatisfaction need to be translated as non-linear assumption such as attractive and indifferent.

The non-linear relationship is more complicated and complex than linear relationship. Hence, in order to solve the complexities of non-linear relationship, customer satisfaction is measured as customer attributes with important values or indexes. In dealing with this complexities, Kano model has been widely adopted to convert customer satisfaction based on quality attributes. More modification and extension of Kano model are discussed for example, the introduction of regression model of quality attributes by Lin *et al.* (2010), theory of

attractive quality and life cycles of quality attributes by Lofgren *et al.* (2011) and classifying technique of quality attribute by Mikulic and Prebezac (2011). In healthcare, patient perception may be indifferent and the non-linear relationship may exist due many factors such as patient emotions (Vinagre and Neves, 2008), gratitude, faith and loyalty (Staniszewska and Henderson, 2005). To deal with non-linear relationship, Kano Model has been employed in healthcare services assessment to measure patient satisfaction through complaints (Gruber *et al.*, 2011) and compliments (Jangland *et al.*, 2009). A study by Schvaneveldt, Enkawa and Mikiyaka categorised dissatisfiers as Must-be (M) attributes, satisfiers as attractive (A) Attributes, criticals as one-dimensional and neutrals as Indifferent (I). Different KQ as (A, M, O, I, R, Q) result in different satisfaction impacts to every Patient Attribute (PA). The degree of satisfaction impact will inversely affect the dissatisfaction impact for every PA. Attractive (A) attribute has the greatest impact on how satisfied a customer is in a given service. If the A attribute is fulfilled, proportionally more satisfaction level is expressed. However, if A attribute is not fulfilled there is no feeling of dissatisfaction or no impact at all.

Therefore, it can be concluded that A attribute is the key determinant to satisfaction expression among other KQ as. Must-be attribute (M) has less impact on satisfaction level compared to A attribute. Customer satisfaction will not significantly increase in fulfilment of the PA and if M attribute is not fulfilled, the dissatisfaction level will extremely increase and the customer may not be interested in the service at all. Meanwhile, one dimensional attribute (O) defines customer satisfaction level as proportional to the level of service fulfilment. Hence, it can be said that the higher the level of service fulfilment, the higher the level of customer's satisfaction PS and vice versa. On the other hand, Indifferent attributes (I) do not really translate the satisfaction level at an instant time. The customer is not very interested in it. The presence of this element gives insignificant impact to PS. However, in life cycle of quality attributes, I attributes may turn to A attribute before change to O attributes and finally, end with M attributes. The combination of complaints and compliments is relatively new challenge. In practice, new satisfaction coefficient is introduced to represent the satisfaction impact such relational impact (Gaubert *et al.*, 2011), logarithmic transformation (Shahin and Nekuie, 2011) and Kano satisfaction index (Lee *et al.*, 2009) and satisfaction impact based on Critical Incident Technique (CIT) and Analysis of Complaints and Compliments (ACC) proposed by Mikulic and Prebezac (2011).

However, the adaptation of service satisfaction scale that paired with conventional Kano functional and

dysfunctional question is still lacking due to Kano model limitation (Rashid, 2010). In complaint and compliment assessment, the combination of above approaches will lead to the simplification of Kano model questionnaire but translate the VOP in non-linear behavior manner. Quality Function Deployment (QFD) which introduced by Akao and Mazur has been proven in prioritizing the customer attributes in services (Andronikidis *et al.*, 2009). Review of QFD application in healthcare service by Dijkstra and Van (2002) has addressed the aspect of prioritization in healthcare service is most essential for service quality performance. Therefore, the integration of Kano and QFD is very important. For example, the integration research by Lai *et al.* (2004), Matzler *et al.* (2004), Matzler and Hinterhuber (1998), Shen *et al.* (2000); Sireli *et al.* (2007) and Tan and Shen (2000) have successfully prioritized the VOC and therefore, service attributes and patient attributes could also be prioritized based on non-linear VOP by the integration of Kano model and QFD in healthcare.

In present research, an extension of satisfaction model is proposed by using the integration of Kano and QFD. It aims to account and evaluate the non-linear behavior of VOP using Kano model and implementing the prioritization process of VOP by using QFD. A new scheme of modified Kano model known as Kano-Q and Kano-SS is introduced to address the combination of traditional Kano and service satisfaction scale. VOPs are defined by synthesizing the measurement of service variable and service elements in conjunction with service attributes and patient attributes. For case study, service variable of admission and discharge with their service elements are measured using developed satisfaction model.

## MATERIALS AND METHODS

### Satisfaction model development

**Kano-QFD algorithm:** This study aims to address the extension concepts of Kano-QFD integration which was based on the limitations and the weaknesses from previous Kano-QFD integration and implementation. The operational aspect of Kano's Model is well established to provide effective approach to categorize and understand the nature of customer requirements or client needs. The model used to identify the non-linear relationship between service delivery and patient fulfillment and analyses the non-linear relationship by service attributes and patient attribute prioritization. The section contains the development of Kano-QFD Phase 1, 2 and 2 sampling techniques, research instrument design and description of pilot test and implementation of data analysis procedure

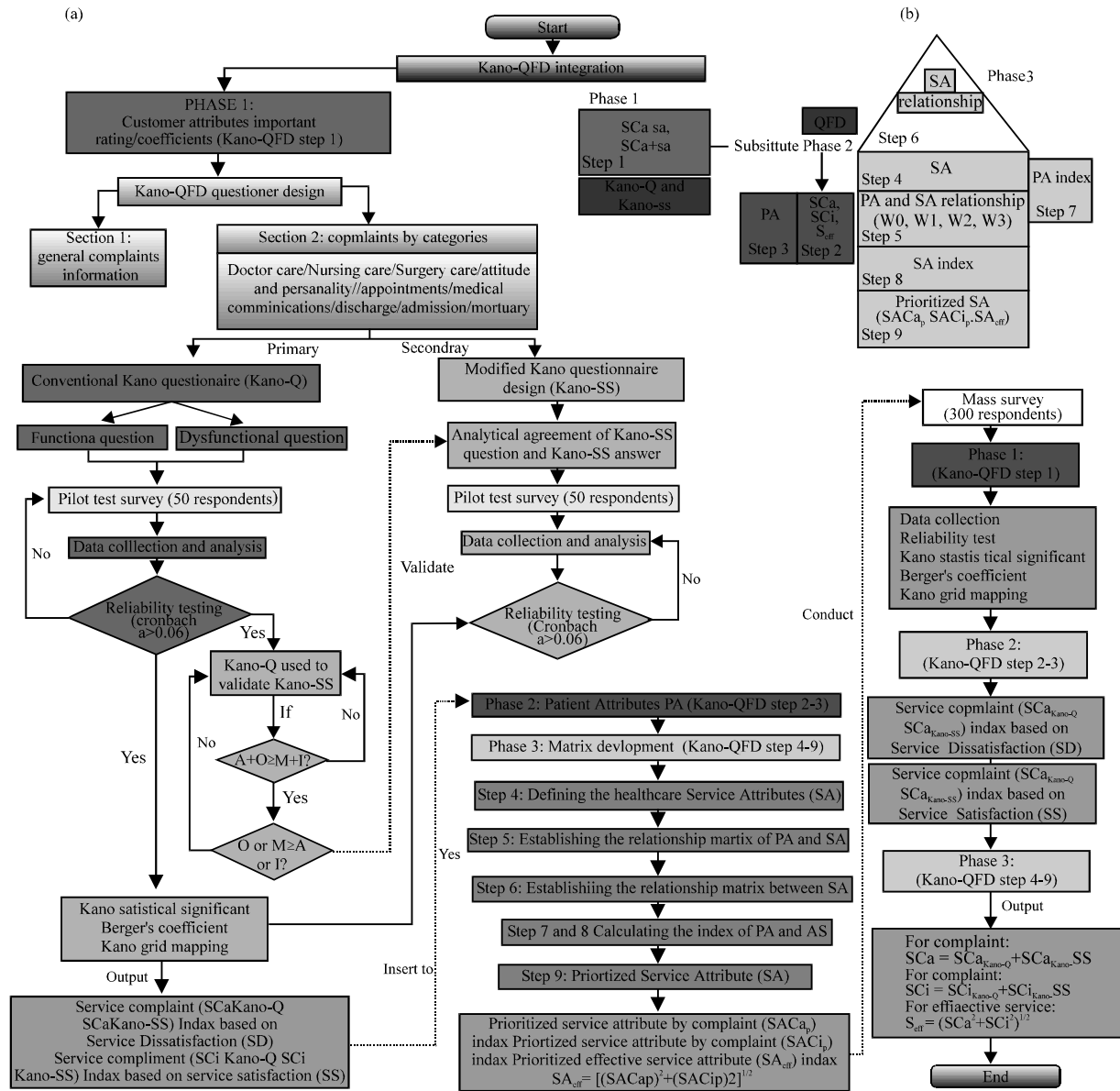


Fig. 3: QFD-Kano integration algorithms

using Kano-QFD. Finally, the chapter discusses the refinement of satisfaction model from pilot test for mass survey. The overall Kano-QFD integration is shown in Fig. 3 details of phase 1 Kano-QFD and the parameters involved in Kano-Q and Kano-SS execution. The main expected output of phase 1 is to obtain the value of  $SC_a$ ,  $SC_i$  and  $S_{eff}$ .

**Population and sample:** The population for this study were the hospital patients at Perlis, Kedah, Kelantan and Johor that are registered with the Ministry Of Health (MOH). The sample size for this study was based on the

sample table by Sekaran (2000). In service study, purposive sampling is used in the study that involved the design and modeling of QFD (Nadia *et al.*, 2011; Shahin and Nekuie, 2011) and Kano-QFD (Gupta and Srivastava, 2012). Therefore, purposive sampling or quota stamping is mainly used due to the essential of obtaining desired information from specific group patients which is historical Inpatients and Out Patients (IOP). The most important, the information from the survey can be used for refinement of developed satisfaction model using Kano-QFD integration. The target population is the complete group of objects or elements relevant to the

Table 1: Target population of historical inpatients and outpatients (IOP)

Population definition	Description
Population	Public hospital stakeholders
Target population	Patients
Element	In-patients and out-patients
Sampling unit	In-patients and out-patients experienced primary and secondary care
Extent	The public hospitals with highest average Bed Occupancy Rate (BOR) and Average Length Of Stay for acute care (ALOS)

Table 2: Summary of linear satisfaction model in using QFD and non-linear satisfaction model using Kano and Kano-QFD

Researchers	Application	Sample size (S)		
		QFD	Kano	Kano-QFD
Hwang and Teo	Higher education service	200	-	-
Chin	Library services	31	-	-
Shahin and Nekuie (2011)	Services	-	30	-
Matzler <i>et al.</i> (2004)	Importance performance	-	33	-
Lai	Product design	-	-	30
Sakalauskiene	Dental care services	100	-	-
Chan and Wu	People linguistic	14	-	-
Sireli <i>et al.</i> (2007)	Product design	-	-	50
Helena and Naves (2008)	Airline services	-	249	-
Lee <i>et al.</i> (2009)	Importance performance	-	35	-
Lee <i>et al.</i> (2009)	Healthcare service	-	232	-
Mohd <i>et al.</i> (2011)	Express delivering services	-	83	-
Kong and Muthusamy	Higher education service	-	89	-
Lin <i>et al.</i> (2010)	Service quality	-	100	-
Chen	Home delivery services	-	476	-
Lai and Wu	Rapid Transit services	-	473	-
Shahin and Nekuie (2001)	Travel services	-	200	-
Chaudha	Product and service	-	-	20-30
Meng and Jiang	Service performance	-	-	231
Vazifehdust and Farokhian	Product design	-	-	100
Gupta and Srivastava (2011)	Hotel services	-	-	250

research projects since they possess the information for research to collect. The elements or objects available for the selection are known as sampling unit. Table 1 defines the target population for present investigation. Based on Surat Pekeliling Ketua Pengarah Kesihatan Malaysia Bil. 9/2007 (KKM/NIHSEC/03/0301-01), the approval and permission letter to obtain feedback from historical IOPs was not necessary as there was no involvement of the Ministry Of Health (MOH) facility along the process and completion of the survey. However, since the study dealt with National Healthcare and involved human as research subjects, registration and approval from MOH was obtained from the National Medical Centre, Institute for Health Behavioural Research (IHBR), Ref. No. NMRR-13 21-14590 S2R0. The most recent was obtained from the Medical Research and Ethics Committee, MOH.

**Sampling frame and respondents:** A sample frame is a comprehensive list of the elements from which the sample is drawn by (2007). According to Malaysian National Healthcare Statistic Initiative report, Ministry of Health, Malaysia by Mohd *et al.* (2011), from 2008-2009, 133 public hospitals were public acute care hospitals and 201 private acute care hospitals. This basis is mainly refers to admission of bed utilization in hospitals as major reference and it would be defined in a basis of average Bed Occupancy Rate (BOR) with 56.22% represented the public hospitals. The higher the BOR, the better reliability of respond and feedback will be obtained from patients. Surprisingly, Perlis has the highest BOR of 75.11%,

followed by Kelantan with 65.37% and Sarawak has the lowest BOR of 36.54%. Moreover, the Average Length Of Stay for acute care (ALOS) in Malaysia is 3.23 days with ALOS in public hospitals exceeding the private hospitals by 0.14 days (Singh *et al.*, 2011; Owusu-Frimpong *et al.*, 2011). Table 2 shows the sampling size for QFD, Kano and Kano-QFD integration based on application for linear and non-linear relationship study.

**Sampling method and sample size:** The selection of sampling method to use in this study depended on a number of related theoretical and practical issues. The present sampling scenario involved sample of patients that was difficult to be generalized to the population. Thus, non-probability sampling best suited to the present case (Sekaran, 2000). Here, sample targets were the historical IOPs who were one of the main healthcare stakeholders. They possessed the experience of healthcare services that had been delivered by the public hospital. Therefore, purposive sampling was the best choice. The estimated number of respondents need for this study is 300 historical inpatients and outpatients. A sample size of at least 300 will usually provide reliable results.

## RESULTS AND DISCUSSION

This study presents the pilot and mass survey results of Kano-QFD integration which represents the Ph

Table 3: Kano-SS KQA for discharge

Discharge	Kano Quality Attributes (frequency)						$\Sigma$	Berger's coefficient		KQA
	A	M	O	I	R	Q		$SS_{ss}$	$SD_{ss}$	
DISCQ97	36	130	27	105	0	2	300	0.21	-0.53	M
DISCQ98	38	127	30	102	0	3	300	0.23	-0.53	M
DISCQ99	42	142	27	86	0	3	300	0.23	-0.57	M
DISCQ100	40	125	31	100	0	4	300	0.24	-0.53	M
DISCQ101	39	122	28	107	0	4	300	0.23	-0.51	M
DISCQ102	42	126	31	97	0	4	300	0.25	-0.53	M
DISCQ103	49	120	24	104	0	3	300	0.25	-0.48	M
DISCQ104	36	133	34	94	0	3	300	0.24	-0.56	M
DISCQ105	43	120	28	105	0	4	300	0.24	-0.50	M
DISCQ106	40	128	30	98	0	4	300	0.24	-0.53	M

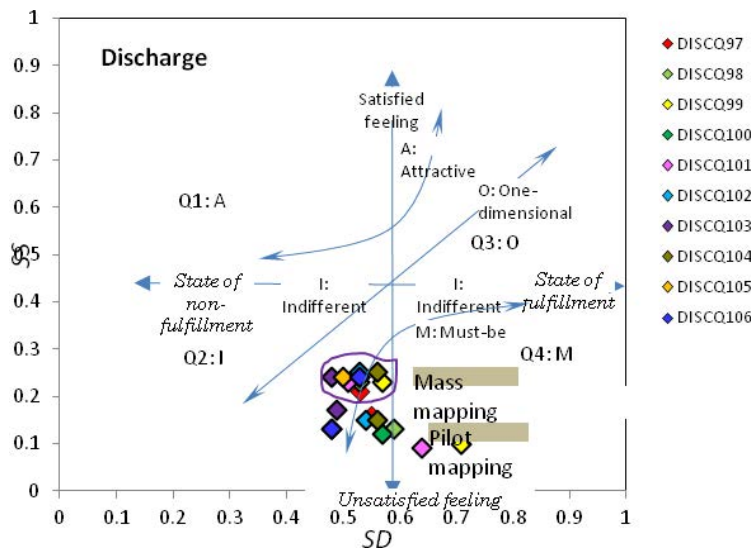


Fig. 4:  $SS_{ss}$ - $SD_{ss}$  grid mapping for Kano-SS discharge

ase 1-3 results. In Phase 1, the Berger's coefficients are presented to define the Kano Quality Attribute (KQA) for every question that covers the ten healthcare service variables. Then, Kano statistical significant test results are presented to define the reliability of KQA. In order to validate the KQA, Kano mapping based on Kano's model theory is presented for each variable. The validation work confirms the SCi and SCa for Phase 2 before the execution of Phase 3. The comparison of pilot and mass survey results for Phase 2 and 3 are discussed and details in Kano-QFD house of quality are provided.

**Berger's coefficient:** Table 3 shows the KQA fraction in frequency basis out of 300 respondents for discharge service variable. The quality attribute M is found at the highest frequency, thus resulted as the final KQA. In terms of KQA ranking, it represented the rank of  $M > I > A > O > Q$ .

Based on Berger's coefficient of service dissatisfaction, the "DISCQ99: Doctor available on time" is found as the highest  $SD_{ss} = 0.57$  while "DISCQ103:

Doctor focus and concern" is observed at the lowest  $SD_{ss} = 0.48$ . In terms of service satisfaction coefficient, the highest  $SS_{ss}$  is 0.25 and it refers to "DISCQ102: Informed preventive check-up" and "DISCQ103: Doctor focus and concern". The lowest  $SS_{ss} = 0.21$  is associated to "DISCQ97: Easy discharge". Another significant observation is the frequency of Indifferent (I) attribute is relatively high compared to A and O. That means patients felt no different either the service fulfillment or unfulfilled service is provided for discharge. Maybe time constraint and physiological aspect due to impatient to check-out from ward influenced them to contribute to higher I attribute.

**Kano grid mapping of service satisfaction and dissatisfaction:** The most important validation of non-linear KQA behavior of service elements that based on VOP is Kano grid mapping. Figure 4 shows the  $SS_{ss}$ - $SD_{ss}$  grid mapping for Kano-SS Discharge. It can be seen that the KQA distribution for pilot and mass mapping in Kano model KQA grid map is horizontally

scattered where they are passed the of unsatisfied feeling axis where mass mapping is over the top of pilot mapping region. Based on KSS analysis, the KQA attribute that cross and near to the unsatisfied feeling axis are considered as insignificant in Q2: I and those KQA attributes that located on the side of fulfillment state have resulted with significant. Coincidentally, any Kano significant of KQA will be in Q4: M in complete quadrant and they always positioned in increase trend to achieve fulfillment and satisfied feeling. When relates to Kano Statistical Significant (KSS) analysis, the KQA plots that in Q2: I and located near to the axis of unsatisfied feeling is labeled as insignificant, neither pilot survey nor mass survey. Another interesting point there is discrepancy of KQA different on  $S_{ss}$  and  $SD_{ss}$  index which found to be closed to each other. Overall, the KQA category as depicted in Table 3 is still considered valid and correct due to mapping position that lied in the Q4: M and still under Must-be (M) attributes projection line.

### CONCLUSION

An extension of new satisfaction model has been presented successfully. The integration of Kano-QFD has been completely merged through algorithm development using the introduction of Kano-Q and Kano-SS questionnaire. Moreover, Kano-Q and Kano-SS has been well translated the non-linear behavior of VOP through patient fulfillment on the service delivery provided by public hospital particularly based on two service variable; Admission and Discharge. A set of service gap analysis (e.g., reliability analysis, Berger's coefficient, Kano statistical significant and Kano grid mapping) has been well executed for non-linear relationship Kano assessment (e.g., Must be and Attractive) between service satisfaction and service dissatisfaction that based on compliment and complaints. Most important, the Kano quality attributes are well agreed and mapped into original Kano model for theoretical validation. Further analysis for prioritization, the integration of Kano Q and Kano-SS has been effectively weighted and ranked the VOP in conjunction with service attributes and patient attributes. Thus, the Kano-QFD integration provides a mean for organization to delight VOP by including their voices into healthcare service design process. The major limitation of this research is that it may prove difficulty to apply this approach on a totally new healthcare service design but it may be more practical and cost effective for improving the existing healthcare design particularly on service delivery aspect. For further research, more details comparison with other approach will be useful for detail verification and most essential, a cost model may be

developed in paired with service attributes according to their classification and priorities. Finally, this work analyzed the limitations of methods published in the literature for integration of Kano model in QFD and proposes an alternative one by measuring the complaint and compliments, simultaneously.

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