

Semua laporan kemajuan dan laporan akhir yang dikemukakan kepada Bahagian Penyelidikan dan Pembangunan perlu terlebih dahulu disampaikan untuk penelitian dan perakuan Jawatankuasa Penyelidikan di Pusat Pengajian.

USM R&D/JP-04

## LAPORAN AKHIR PROJEK PENYELIDIKAN R&D JANGKA PENDEK

### A. MAKLUMAT AM

Tajuk Projek: Patient Satisfaction Toward Medical Ward Services In Hospital  
Universiti Sains Malaysia (HUSM) AND Hospital Kota Bharu (HKB)

Tajuk Program: seperti di atas

Tarikh Mula: 15<sup>th</sup> November 2003

Nama Penyelidik Utama: Dr Than Winn ( 205351 )  
(berserta No. K/P)

Nama Penyelidik Lain: 1. Profesor Dr Abdul Aziz Baba ( 550611-04-5395 )  
(berserta No. K/P) 2. Dr Lin Naing @ Mohd Ayub Sadiq ( 114524 )  
3. Dr Mazlan bin Abdullah (690103-03-6921)  
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### B. PENCAPAIAN PROJEK:

(Sila tandakan [/] pada kotak yang bersesuaian dan terangkan secara ringkas di dalam ruang di bawah ini. Sekiranya perlu, sila gunakan kertas yang berasingan)

☐ Peningkatan pengetahuan (Increase body of knowledge)

Despite low prevalence of patient satisfaction for both HKB and HUSM (54% versus 42%,  $p=0.018$ ), HKB medical inpatients were more satisfied with the interpersonal communication and perceived services of medical ward staff and financial aspect of medical ward services while HUSM medical inpatients were more satisfied with the clean and comfort (include medical ward facilities and infrastructure) aspect of medical ward services. Type of hospital (teaching hospital versus general hospital) and outside food expenses (more than RM5) were significantly associated with satisfaction score of combined seven domains of medical ward services. It is recommended that hospital administration use satisfaction data to identify and improve specific medical ward service areas in order to gain higher patient satisfaction and better utilization of their medical ward services.

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<input type="checkbox"/>	Din. Penyelidikan, PUSAT
Tarikh : <u>6/2/05</u>	

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**Rekaan atau perkembangan produk baru,**  
(Sila beri penjelasan/makluman agar mudah dikomputerkan)

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**Mengembangkan proses atau teknik baru,**  
(Sila beri penjelasan/makluman agar mudah dikomputerkan)

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**Memperbaiki/meningkatkan produk/proses/teknik yang sedia ada**  
(Sila beri penjelasan/makluman agar mudah dikomputerkan)

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C. PEMINDAHAN TEKNOLOGI

☐ Berjaya memindahkan teknologi.

Nama Klien: (1) Tidak berkaitan

(Nyatakan nama penerima pemindahan teknologi ini dan sama ada daripada pihak swasta ataupun sektor awam) (2) \_\_\_\_\_

(3) \_\_\_\_\_

☐ Berpotensi untuk pemindahan teknologi.  
(Nyatakan jenis klien yang mungkin berminat)

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D. KOMERSIALISASI

☐ Berjaya dikomersialkan.

Nama Klien: (1) Tidak berkaitan

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☐ Berpotensi untuk dikomersialkan.  
(Nyatakan jenis klien yang mungkin berminat)

Tidak berkaitan

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**E. PERKHIDMATAN PERUNDINGAN BERBANGKIT DARIPADA PROJEK**  
(Klien dan jenis perundingan)

- (1) Tiada
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- (3) \_\_\_\_\_
- (4) \_\_\_\_\_

**F. PATEN/SIJIL INOVASI UTILITI**

(Nyatakan nombor dan tarikh pendaftaran paten. Sekiranya paten/sijil inovasi utiliti telah dipohon tetapi masih belum didaftarkan, sila berikan nombor dan tarikh fail paten).

- (1) Tiada
- (2) \_\_\_\_\_
- (3) \_\_\_\_\_

**G. PENERBITAN HASIL DARIPADA PROJEK**

**(i) LAPORAN/KERTAS PERSIDANGAN ATAU SEMINAR**

(1) Paper presentation at the 11th Community Health National Colloquium at Summit Hotel, Subang Jaya, Selangor from 21<sup>st</sup>-22<sup>nd</sup> September 2004.

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(ii) **PENERBITAN SAINTIFIK**

(1) Dalam perancangan untuk menghantar kertas saintifik kepada jurnal 'Malaysian Medical Journal of Science' dan 'Malaysian Journal of Public Health Medicine.'

(2)

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**H. HUBUNGAN DENGAN PENYELIDIK LAIN**

*(sama ada dengan institusi tempatan ataupun di luar negara)*

(1) Ketua Jabatan Perubatan, Hospital Kota Bharu (Dr Hj Rosemi Salleh) sebagai penyelidik bersama

(2)

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(4)

**I. SUMBANGAN KEWANGAN DARI PIHAK LUAR**

(Nyatakan nama agensi dan nilai atau peralatan yang telah diberi)

- (1) Tiada
- (2) \_\_\_\_\_
- (3) \_\_\_\_\_

**J. PELAJAR IJAZAH LANJUTAN**

(Nyatakan jumlah yang telah dilatih di dalam bidang berkaitan dan sama ada diperingkat sarjana atau Ph.D).

**Nama Pelajar**

**Sarjana**

Dr Mohd Zamri Md Ali

Matric No. P1081/00-02

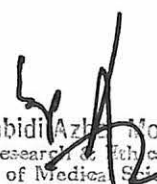
**Ph.D**

**K. MAKLUMAT LAIN YANG BERKAITAN**

Tiada

26/11/5

**Tarikh**

  
Professor Zabidi Azhar Mohd. Hussin  
Chairman of Research & Ethics Committee  
School of Medical Sciences  
Health Campus  
Universiti Sains Malaysia  
Kangar, Perlis  
KELANTAN, MALAYSIA.

**TANDATANGAN PENERUSI**

**JAWATANKUASA PENYELIDIKAN**

**PUSAT PENGAJIAN**

Pn. My doc geran j/pendek

# **PATIENT SATISFACTION TOWARD MEDICAL WARD SERVICES IN HOSPITAL UNIVERSITI SAINS MALAYSIA (HUSM) AND HOSPITAL KOTA BHARU (HKB)**

## **INTRODUCTION**

### **Definition of patient satisfaction**

There are several definitions of patient satisfaction given by different authors. For instance, Steiber defined satisfaction as a subjective perception of the customer who receives a service (Steiber,1990). Pascoe defined patient satisfaction as a health care recipient's reaction to salient aspects of (his or her) service experience. In Pascoe's definition, he assumed that patient satisfaction has a cognitive evaluation and an emotional reaction to the structure, process and outcome of care (Pascoe,1983). Pascoe further defined patient satisfaction into two-parts, firstly; the 'contrast' model which stated that whenever the service experience is greater than the patient's expectations, he or she is satisfied. On the other hand, the 'assimilation' model stated that when the patient does not fully understand the service experience (due to inadequacy of clinical knowledge), he or she may adjust their expectations downward if the service experience falls below expectations. This assimilation model may explain about the higher satisfaction rating of health personnel compared to lower non-clinical experience such as satisfaction rating for hospital food or parking facility (Pascoe, 1983). Linder-Pelz defined patient satisfaction as positive evaluations of distinct dimensions of health care based on patient expectations and provider performance. Examples of health care include the treatment received by patients during their illness episode, a clinic visit, a healthcare setting or the whole health system itself. Patient satisfaction must be understood within a context that contained multiple construct (elements) likely to satisfy the patient (Linder-Pelz S, 1982b).

### **Importance of Patient Satisfaction**

Measurement of patient satisfaction can fulfil several functions such as description of health care services from the patient's point of view, a measure of the process of care and evaluation of health care (Sitzia and Wood,1997). If health manager can identify source of patient dissatisfaction, the health organization can address system weakness and improve their service to patients (Strasser and Davis, 1991). Satisfied patients are less likely to disenroll from health plans and more likely to return to a physician or hospital and less likely to bring a malpractice suit (Steiber and Krowinski, 1990). Satisfied patients are more likely to maintain consistent relationship with their healthcare provider (Wartman,1983).

### **Predictors of patient satisfaction**

Factors assumed to be related to patient satisfaction include physical and psychological status, attitudes and expectations toward medical care also the structure, process and outcome of care, patient sociodemographic characteristics (Cleary and Mcneil, 1988).

### Structure of care

#### a. The organization and financing of care

The way in which medical care is organized and financed may be related to patient satisfaction. This means that the provider and organizational characteristics which result in more personal care and better communication with their patient are associated with higher levels of satisfaction (Cleary and McNeil, 1988).

### Process of care

#### a. Technical Quality of Care

Satisfaction with the ambulatory care mostly is associated with satisfaction toward the treating physician while the inpatient experience is more associated with the quality of staff. With the physician, patient satisfaction breaks down into two aspects (i) satisfaction with perceived technical competence and (b) satisfaction with interpersonal skills (Hall and Dornan, 1988). On the other hand, nurses, midwives and physician assistants tend to be scored highly on interaction with patients because patients often emphasized on the interpersonal aspect, rather than on perceived technical competence (Hall et al., 1990).

#### b. Interpersonal Aspects of Care

People like to have doctors talk to them in an egalitarian way, listen, ask a lot of questions, answer a lot of questions, explain their health condition in a simple way that the patient can understand, and allow patients to make decisions about their care (Hall et al., 1988).

### Outcome of care

A satisfaction study toward three types of hospital services (medical, nursing and supportive) using structured interview method (n=476) found when patients perceived that their health improved, patient satisfaction increased (Carmel, 1985).

### Sociodemographic characteristics

In her meta-analysis on patient satisfaction studies, average magnitudes of relationship between sociodemographic characteristics with patient satisfaction were very small. Older age was the strongest correlate of satisfaction (mean  $r=0.13$ ). Greater patient satisfaction was significantly associated with greater age and less education, and marginally associated with having higher social status and being married. No relationship between satisfaction and gender, ethnicity, income or family size (Hall & Dornan, 1990).

### Literature review

Several patient satisfaction studies have been conducted in various different settings and medical specialties to address different issues. For instance, a descriptive correlation study in a Emergency department found that 28 patients generally satisfied with the four areas of Emergency department being examined i.e. nursing care, information received, ancillary services, and environment (Bruce et al, 1998). In a client satisfaction study (n=1913) toward health care provided in government health facilities of rural Bangladesh, the important predictors for client satisfaction was healthcare provider interpersonal behaviour (especially respect and politeness) and a reduction in waiting time (on average to 30 min) (Aldana et al., 2001). An example of satisfaction studies



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focusing on specialty services was a satisfaction study toward cardiac speciality services in coronary care unit of Ontario hospitals in Canada (Alter, Iron et al. 2004).

In Malaysia, there were several local patient satisfaction studies conducted in various different setting which address specific issues like satisfaction following orthognathic surgery (Siow and Ong, 2002); dissatisfaction with medical treatment of Vasomotor rhinitis (Krishnan and Khanijow 1994); quality of life assessment before and after transurethral resection (Quek, Loh et al. 2001) and expectations of outpatients attending the Cardiology Clinic (Yusoff, Roslawati et al. 1992). There are few satisfaction studies done in the general hospitals and teaching hospitals. For example, a satisfaction study had been conducted at the Nancy University Hospital, France between April 1997 until May 1998. A Patient Judgements Hospital Quality questionnaire which covered seven dimensions of satisfaction (admission, nursing and daily care, medical care, information, hospital environment and ancillary staff, overall quality of care and services, recommendations/ intentions) were administered to 533 patients discharged from 12 medical and surgical services of Nancy Hospital. Older age and better self-perceived health status were the strongest predictors of satisfaction for all dimensions (Nguyen et al. 2002). Another patient satisfaction study which involved seven Malaysia's public hospitals was conducted in year 2000. These hospitals include one national referral hospital (Kuala Lumpur Hospital), two state referral hospital (Klang Hospital and Seremban Hospital), two district hospital with specialist (Banting Hospital and Kuala Pilah Hospital) and two district hospital without specialist (Tanjung Karang Hospital and Jelebu Hospital). The SERVQUAL self-administered satisfaction questionnaire were randomly administered to total 247 inpatients of medical, surgical, orthopaedics and obstetric & gynaecology wards. Roslan found that 47 (19%) out of 247 subjects were satisfied (Roslan, JMG, 2000).

However, there was no study in the literature looking at the patients' preferences reflecting their expectation from their providers in two distinct settings of the hospitals. This study was designed to look at the factors which influence the level of patient satisfaction toward medical ward services in several perspectives such as personnel, physical infrastructure, finance and miscellaneous domains of medical ward services in two hospitals. These hospitals were Hospital USM (a teaching-oriented hospital) and Hospital Kota Bharu (a service-oriented hospital). We tried to compare patient groups in regards to the way in which they rate the level of satisfaction for the medical ward services which they had used during their hospitalization.

### **Background of the research setting**

Hospital Kota Bharu (HKB) was opened in 1930 covering 35 acres area. It is located in the centre of Kota Bharu town, the capital city of Kelantan state (Appendix B). HKB (with 920 bed capacity) is one of two tertiary centre which received patients from seven Ministry of Health (MOH)'s district hospitals, MOH health centres and local private clinics. The clinical services offered by HKB include Internal Medicine, Pediatrics, Surgery, Obstetric & Gynaecology, Orthopaedic, Otolaryngology, Ophthalmology, Anaesthesiology and Psychiatry. HKB also offered hospital support services include

medical imaging, medical laboratory, physiotherapy, hospital food and medical record (Source: Kelantan State Health Department's Annual Report 2000).

Table 1.6A below shows HKB's hospital statistic that there was about 43% increased in inpatient admission to medical ward from 5264 patients (year 1996) to 7962 patients (year 2000). However, Hospital USM's medical inpatient admission showed a reduction from 3374 patients (year 1996) to 3155 patients (year 2000) i.e. about 6.5%. In the year 2000, average length of stay (ALOS) of medical wards of HUSM was 7 days and 5.1 days for medical wards of HKB. In the year 2000, bed occupancy rate (BOR) in the medical wards of HKB was 57.6% which is lowered than BOR in Medical of HUSM (72.2%).

Table 1.5A Hospital statistic: medical ward of HKB

	Medical HKB		
	1996	2000	
Annual inpatient admission (number)	5264	7962	Increased by 43% in 5 years
Annual bed occupancy rate (percent)		57.6	
Annual mean length of stay (days)		5.1	

(Source: Medical Record Unit of HKB)

Hospital USM (HUSM) is a 716 bedded, eight storey building, teaching hospital situated at Jalan Raja Zainab 2, Kubang Kerian, Kelantan. HUSM is located 5km away from Kota Bharu town, the capital city of Kelantan state. The clinical services offered by HUSM include Internal Medicine, Pediatrics, Surgery, Obstetric & Gynaecology, Orthopaedic, Otolaryngology, Ophthalmology, Anaesthesiology and Psychiatry. The hospital supportive services include medical imaging, medical laboratory, physiotherapy, hospital food and medical record. On the other hand, the medical wards of Hospital USM is located at the 7<sup>th</sup> floor of HUSM building. The medical wards start its operation since October 1983 (20 years ago). The wards consist of 2 main wards i.e. 7 North (male ward) and 7 South (female ward). These wards usually will admit new medical inpatients. Sometimes, if medical inpatients became more critically ill, they will be transferred to the High Dependency Unit at 8<sup>th</sup> floor or even to the Intensive Care Unit (ICU). Both 7 North and 7 South wards has 32 beds. Each ward has several ward facilities such as treatment room, pantry, attached bathroom, beds, chairs, fan, lighting etc. A clinical specialist usually will be in-charge of a medical ward. He will be assisted by the Matron, Sister, medical officer and houseman (Source: HUSM Annual Report 1999).

Table 1.5B below showed HUSM's hospital statistics, that there was a 20% reduction in the HUSM's annual average bed occupancy rate from 69% (1994) to 55.1%(1999). There was also reduction of annual average length of stay (ALOS) from 6 days (year 1994) to 5.3 days (1999). HUSM's inpatient admission has increased by 4% in 7 years, i.e. from 25,320 inpatients (1994) to 26,215 (2000). Meanwhile, annual average bed occupancy rate of HUSM's medical unit reduced from 83% (year 1994) to 72 % (year 2000). Annual

average length of stay in HUSM's medical unit also reduced from 9 days (year 1994) to 7 days (year 2000). However, annual admission to HUSM's medical unit increased from 2725 (year 1994) to 3155 (year 2000) ie. about 16% rise. The annual discharge from HUSM's medical unit was 2762 (year 1994) and 3190 (year 2000).

Table 1.5B Hospital statistics of HUSM

	HUSM			Medical HUSM		
	1994	2000		1994	2000	
Annual inpatient admission(number)	25320	26215	Increased by 4% in 7 years	2725	3155	Increased by 16% in 7 years
Annual bed occupancy rate (percent)	69	55.1	Reduced by 10% in 7 years	83	72	Reduced by 13% in 7 years
Annual mean length of stay (days)	6	5.3	Reduced by 20% in 7 years	9	7	Reduced by 22% in 7 years

(Source: Medical Record Unit of HUSM)

Objectives we pursued include the assessment of the level of patient satisfaction and factors associated with it and comparing patient satisfaction between two groups of inpatients admitted to medical wards of HUSM & HKB. The satisfaction data gathered from this study could be utilized by the local hospital managers to improve their medical ward services to the local medical inpatients.

## METHODOLOGY

A contrived cross-sectional study design which involved medical inpatients admitted to the medical wards of HUSM and HKB. The inclusion criteria were medical inpatients who spent at least two nights of hospitalization and more than 15 years of age. The exclusion criteria was respondents who had been selected for six monthly HKB survey on patient satisfaction.

### Sampling Method

A "virtual sampling frame" was developed basing on patient-discharge registers of last 3 years. Between 1998 & 2000, HUSM medical ward had discharged 9864 patients. Therefore on the average 274 patients would be discharged every month. Sampling frame of eligible patients with four month study period (July to Oct 2002) was approximately 2000. 188 patients were selected systematically with a sampling interval of 6. Similar procedure was adopted for HKB medical ward patients.

### Survey Instrument

Before developing the instrument for assessing patient satisfaction, we reviewed available patient satisfaction tools which have been used in previous studies. Most patient satisfaction scales produce high, undifferentiated levels of reported satisfaction that fail to detect program areas that patients do not like. Methodological problems apparently contribute to these results. An alternative procedure, the Evaluation Ranking Scale (ERS), was formulated and tested. Compared to the global measure, the ERS provided more specific information about particular program components, was more discriminating, and resulted in mean satisfaction scores that were significantly lower. This new approach may be a more effective technique for assessing the psychosocial effectiveness of human service programs. (Pascoe and Attkisson 1983). The Evaluation Ranking Scale (ERS) had equally good patient acceptability, yielded more normally distributed satisfaction scores, and the results allowed comparative information about patients' evaluation of specific service dimensions (Attkisson, Roberts et al. 1983).

We developed our self-administered questionnaire on Patient Satisfaction Toward Medical Ward Services (PSMWS). This was then further improved after gathering some inputs made by the medical ward patients from HUSM through a series of focus group discussions. PSMWS questionnaire was then subjected to content validity exercises by a panel representing the hospital management, ward staff, health management and social scientists. The face validity of the revised questionnaire was checked on a small sample of patients followed by a reliability analysis. Fifty medical inpatients admitted to HUSM were asked to answer the PSMWS questionnaire. Initially, this questionnaire comprised 80 items under ten tentative domains satisfaction related to staff manner, ward facilities, staff communication, hospital regulations, continuity of care, hospital bill and perceived competence. All these items were mainly focused on the patient's stay in the medical ward before being discharged. Forty-five significant items were retained after factor analysis. The principal component extraction with varimax rotation of specific items revealed seven factors (Eigenvalues  $> 1.7$ ) explaining 75.6% of the total variance. There were 3 items in loyalty domain, 13 items in doctor domain, 4 items in nurses, 4 items in other staff, 9 items in clean and comfort, 10 items in miscellaneous and 2 items in financial domains. The Cronbach alpha values for the internal consistency reliability range from 0.71 to 0.87 (Table 3.1). PSMWS satisfaction questionnaire consist of three sections; sociodemographic (11 items), patient satisfaction toward medical service questionnaire (46 items) and Patient's Out-Of-Pocket Expenditure (POE) (4 items). Each satisfaction questionnaire item comprised of five points Likert scale response. These scale response were represented by numeric number of 1 until 5. The numeric 1 represent response 'Strongly Disagree', numeric 2 represent response 'Disagree', numeric 3 represent response 'Quite Agree', numeric 4 represent response 'Agree' and numeric 5 represent response 'Strongly Agree'.

Table 3.1 Scale reliability coefficient of PSMWS satisfaction questionnaire

Satisfaction Domains	Number of items	Cronbach alpha
1. Loyalty	3	0.84
2. Nurse	4	0.74
3. Doctor	13	0.88
4. Other Staff	4	0.69
5. Clean and comfort	9	0.86
6. Miscellaneous	10	0.71
7. Finance	2	0.71
Total	45 items	

#### Data collection

Every ninth eligible patient discharged from the medical ward was requested to complete the PSMWS questionnaire after a brief session of acquiring the consent and explanation. The data collection was carried in the two study hospitals simultaneously. Most questionnaires were completed in the same day on which the patients were discharged. About ten percent who did not return were followed up to their homes to collect the questionnaires. Incidentally 188 patients from each study hospital completed the questionnaires and the quality of the data checked and corrected as and when required.

#### Data Analysis

The Epi Info 6.1 software was used for data entry and cross-validated by double entry of the raw research data. Data analysis was conducted using the SPSS version 11.0 software (SPSS 2003) which is licensed to the Postgraduate Biostatistic Computer Laboratory of School of Medical Sciences, Universiti Sains Malaysia Health Campus, Kubang Kerian, Kelantan. The cut-points used to categorize the categorical characteristics of the respondents were as follows: (i) age group (young aged was 15 to 35 years old, middle aged was 36 to 45 years old, old aged was 46 years old and above); (ii) education level (low education was primary school education, middle education was secondary school education, high education was university or diploma education); (iii) income group (low income was RM0-500, middle income was RM501-1000, high income RM1001 and above); (iv) residence (urban was Kota Bharu, rural was Bachok, Pasir Mas, Tumpat); (v) occupation (employed include government and private, otherwise include unemployed); (vi) outside food expenses (low expenses was RM0-2, medium expenses was RM3-7, high expenses was RM7 and above); (vii) admission diagnosis [infectious diseases e.g. dengue and malaria, respiratory/ chest diseases e.g. Chronic Obstructive Airway Disease(COAD) or pulmonary tuberculosis(PTB), cardiovascular diseases(angina), renal diseases e.g. end stage renal failure(ESRF) and Nephrotic syndrome, metabolic diseases e.g. diabetes mellitus and thyroid disease, other diseases]; (viii) hospital bill expenses by patient (low expenses was RM0-10, medium expenses was RM11-20, high expenses was RM21 and above); (ix) length of stay (2-3days, 4-5days, more 5 days).

Each patient satisfaction item was scored in Likert scales from 1 = very unsatisfactory or strongly disagree to 5 = very satisfactory or strongly agree. Some satisfaction items having an opposite direction of the scale were reversed appropriately. Before conducting the statistical analysis, item variables were summed for the corresponding domain and transformed into percents of the total maximum score weight. For example, the nurse domain had four items and the maximum satisfaction score would be twenty; thus, the percent score for nurse domain for each patient was the sum of the satisfaction item scores for nurse domain divided by 20 then multiplied by 100. Therefore, the weighted nurse domain score ranged from 25 to 100. This algorithm was used to compute the weighted scores for all domains. One summary measure of patient satisfaction (the composite satisfaction score) was computed by summing all domain variable scores. The continuous independent variables namely age (year), income (Ringgit Malaysia), length of stay (day), hospital bill (Ringgit Malaysia) and total patient out-of-pocket expenditure (Ringgit Malaysia) were checked for normality and linearity in the logit assumptions for logistic regression. Variables which could not be normalized by conventional transformation methods (varimax rotation) were categorized using appropriate cut-points. A series of simple and multiple linear regressions were performed for each domain to identify the social, demographic and patient characteristics associated with the patient satisfaction. Next, the domain scores were then dichotomized at a cut point of below 80 as unsatisfied and equal to or above 80 as satisfied; the dichotomized domain scores were then analyzed using binary logistic regression.

As shown in Table 4.4A-4.4H, eight different multiple logistic regression models were fitted between each domain and several independent variables. Since identical directionality and magnitude of association were found in the multiple linear regression using numerical domain scores and the same independent variables, we only report the logistic regression results which may help better understanding of the association. Stepwise variable selection methods were applied on each domain versus nine independent variables; i.e. residence, admission diagnosis, education level, phone ownership, age group, income group, occupation group, expense on food and hospital where the patient was admitted. The cut points of the p-values for entry and removal of the variables from the model were 0.05 and 0.1 respectively. The variables in the prototype final models were checked for interactions and tested whether they were independent risk factors or confounders. Model fitness and influence statistics for each model were assessed. Because the domain scores were not independent, MANCOVA was done with numerical domain scores as dependent variables and the same independent variables used for multiple logistic regressions as predictors of patient satisfaction. Additionally a discriminant analysis was also done to identify which variables had the high discriminatory coefficients between two patient groups. Next an ordinal logistic regression had been attempted after transforming each domain score into three ordinal levels using appropriate cut points. The results of these analyses were not shown because they geared toward similar inferences drawn from linear and logistic regression results.

## Ethical Issues

This study had been reviewed and approved by the USM School of Medical Science's Research and Ethical Committee on 25<sup>th</sup> March 2002 and by the Ministry of Health (Hospital Kota Bharu) on 10<sup>th</sup> July 2002.

## RESULTS

Total 376 patient satisfaction questionnaires were completed by both HUSM and HKB respondents.

### Description of Respondent Characteristics

Table 4.1A show demographic characteristics (categorical variables) of HUSM and HKB groups. The higher proportion of patients in HUSM was from the urban (Kota Bharu) areas (61.7% vs. 52.1%,  $p=0.061$ ); higher ownership of phones in the HUSM group (45.7% vs. 30.9%;  $p=0.003$ ); there were more infectious and less chronic disease patients in the HUSM group than in the HKB group. There were no significant differences between HUSM and HKB groups in term of gender, marital status, education level, types of occupation and residence.

Table 4.1A: Distribution of the socio-demographic and current admission characteristics of the respondents (categorical variables).

Variables	HUSM (n = 188)		HKB (n=188)		p-value	Total (n=376)	
	Number	%	Number	%		Number	%
Gender							
Male	93	49.47	92	48.94	0.918	185	49.2
Female	95	50.53	96	51.06		191	50.8
Age group							
Young	64	34.04	67	35.64	0.336	131	34.8
Middle	26	13.83	35	18.62		61	16.2
Old	98	52.13	86	45.74		184	49.0
Education							
Low (primary)	80	42.6	72	38.3	0.131	152	40.4
Middle (Form1to5)	76	40.4	68	36.2		144	38.3
High (University)	32	17.0	48	25.5		80	21.3
Marital status							
Married	144	76.60	154	79.26	0.203	298	79.3
Single	44	23.40	34	20.74		78	20.7
Occupation							
Employed	90	47.87	78	41.49	0.213	168	44.7
Otherwise	98	52.13	110	58.51		208	54.3
Residence *							
Urban	116	61.70	98	52.13	0.061	214	56.9
Rural	72	38.30	90	47.87		162	43.1



Income (RM)							
Low (0-500)	53	28.19	66	35.11		119	31.7
Middle (501-1000)	61	32.45	82	43.62		143	38.0
High (>1000)	74	39.36	40	21.28	0.001	114	30.3
Telephone *							
Yes	86	36.70	58	30.9	0.003	164	38.3
No	102	63.30	130	69.1		232	61.7
Admission diagnosis *							
Infectious	55	29.26	42	22.34		97	25.8
Respiratory	27	14.36	39	20.74		66	17.6
Cardiovascular	50	26.60	31	16.49	0.024	81	21.5
Renal	14	7.45	24	12.77		38	10.1
Metabolic	10	5.32	17	9.04		27	7.2
Other	32	17.02	35	18.62		67	17.8
Food expenses (RM)							
Low (0-2)	29	15.43	66	35.11		95	25.3
Medium (3-7)	105	55.85	82	43.62	0.001	187	49.7
High (>7)	54	28.72	40	21.28		94	25.0
Hospital bill (RM)							
Low (0-10)	111	59.04	163	86.7	0.001	274	72.9
Medium (11-20)	15	7.98	6	3.19		21	5.6
High (>20)	62	32.98	19	5.05		81	21.5
Length of Stay (day)							
2-3 days	53	28.19	108	57.45		161	42.7
4-5 days	59	31.38	64	34.04	0.001	123	32.7
>5 days	76	40.43	16	8.51		90	24.0
Zero income (RM)	0	0.00	9	100%		9	100%

\* Significantly different at  $p < 0.05$  (t-test or Mann-Whitney U test)

HKB: Kota Bharu General Hospital

HUSM: University of Science Malaysia Hospital

RM: Ringgit Malaysia

Age group: Young 15-35; Middle, 36-45; Old, 46 and above

Education: High, University/diploma; Medium, Form 1-5; Low, primary school

Occupation: Employed (government, private); Others (unemployed)

Income: Low, RM0-500; Medium, RM501-1000; High, RM1001 and above

Residence: Urban, Kota Bharu; Rural, bachok pasir mas tumpat

Admission diagnosis: Infectious (dengue, malaria), Chest (COAD, PTB),

CVD (Angina), Renal (ESRF, Nephrotic syndrome), Metabolic (Diabetes, Thyroid),

Other disease.

Outside food expenses: Low (RM0-2), Medium (RM3-7), High (Above RM7)

Hospital bill expenses by patient (low expenses was RM0-10, medium expenses was RM11-20, high expenses was RM21 and above); Length of stay (2-3days, 4-5days, more 5 days).

Table 4.1B show demographic characteristics (continuous variables) of HUSM and HKB groups. The median income was higher among HUSM group (RM925 vs. RM775,  $p < 0.05$ ); median length of hospital stay was longer at HUSM (5 days vs. 3 days,  $p < 0.05$ ). Variables related to patients' costs such as hospital bills (RM10 vs. RM3;  $p < 0.05$ ), expenses on food (RM5 vs. RM3;  $p < 0.05$ ) and total patient-out-pocket expenditure (RM35 vs. RM20;  $p < 0.05$ ) were significantly higher among medical inpatients admitted to HUSM than those to HKB. There were no significant differences between HUSM and HKB groups in term of age, admission transport expenses and other thing expenses.

Table 4.1B: Distribution of the socio-demographic and current admission characteristics (Continuous variables) of the respondents.

Variable	HUSM (n = 180)			HKB (n = 180)			Total (n=376)		
	Median	Mean	SD	Median	Mean	SD	Median	Mean	SD
Age (year)	47	44.84	17.72	43	43.93	16.67	44.00	44.38	17.19
Income (RM)*	925	1150.46	824.4	775	905.19	871.05	800.0	1027	855.8
Length of stay (day)*	5	5.77	3.74	3	3.35	1.62	4.00	4.56	3.1
Hospital bill (RM)*	10	21.21	35.64	3	6.66	20.05		13.94	29.8
Food expenses (RM)*	5	6.06	4.37	3	4.46	4.28	5.00	5.26	4.4
Other Expenses (RM)	10	9.06	6.47	9	8.31	6.82	10.0	8.69	6.6
Transport expense (RM)	10	9.03	7.61	5	8.46	9.69	10.0	8.74	8.71
Total Patient-Out-of-Pocket Expenditure (RM)*	35	45.36	39.45	20	27.89	25.08	25.50	36.63	34.1

HKB: Kota Bharu General Hospital

HUSM: University of Science Malaysia Hospital

RM: Ringgit Malaysia

\* Significantly different at  $P < 0.05$  (t-test or Mann-Whitney U test)

## Univariate Analysis

Table 4.2 shows the comparison of the mean and median patient satisfaction scores toward medical ward services (item-wise and domain-wise) between HUSM and HKB patient groups at univariate level.

Table 4.2: Univariate analysis of item and domain scores of PSMWS questionnaire.

Domains and Items Satisfaction Scores	HUSM		HKB		Hospital given higher scores by patients	p-value*
	Median	Mean	Median	Mean		
<u>Loyalty</u>	12.00	79.25	12.00	78.86	HUSM	0.70
-Overall quality	4.00	3.91	4.00	3.95	HKB	0.90
-Will come back	4.00	3.96	4.00	3.94	HUSM	0.50
-Will recommend	4.00	4.01	4.00	3.93	HUSM	0.10
<u>Nurse</u>	16.00	78.62	16.00	80.37	HKB	0.05
-speak politely	4.00	3.86	4.00	3.98	HKB	0.013
-satisfied service	4.00	3.92	4.00	4.04	HKB	0.036
-skill & knowledge	4.00	3.89	4.00	3.94	HKB	0.70
-use easy language	4.00	4.03	4.00	4.09	HKB	0.30
<u>Doctor</u>	48.00	74.30	50.00	76.48	HKB	0.01
-speak politely	4.00	4.11	4.00	4.09	HUSM	0.50
- introduce themselves	3.00	3.18	3.00	3.26	HKB	0.40
-greet patient	3.00	3.15	3.00	3.27	HKB	0.20
-listen to patient problems	4.00	3.91	4.00	3.96	HKB	0.30
-explain procedure	4.00	3.74	4.00	3.89	HKB	0.020
-explain treatment	4.00	3.80	4.00	3.93	HKB	0.023
-use easy language	4.00	3.87	4.00	4.04	HKB	0.038
-explain discharge plan	4.00	3.84	4.00	3.82	HUSM	0.90
-told side effect	4.00	3.48	4.00	3.63	HKB	0.10
-told appointment	4.00	3.70	4.00	3.91	HKB	0.003
-told compliance	4.00	3.72	4.00	3.86	HKB	0.005
-satisfied with service	4.00	3.88	4.00	3.92	HKB	0.50
-skill & knowledge	4.00	4.00	4.00	4.07	HKB	0.50
<u>Staff</u>	16.00	78.19	16.00	80.05	HKB	0.055
-dress appropriately	4.00	4.11	4.00	4.16	HKB	0.40
-satisfied attendant service	4.00	3.83	4.00	3.98	HKB	0.032
-satisfied attendant	4.00	3.78	4.00	3.87	HKB	0.60

skills -other staff skill	4.00	3.89	4.00	3.98	HKB	0.30
<u>Clean &amp; comfort</u>	34.00	73.27	33.00	71.60	HUSM	0.039
-furniture is adequate	4.00	3.82	4.00	3.65	HUSM	0.014
-lighting is functioning	4.00	4.01	4.00	3.92	HUSM	0.039
-ventilation is satisfactory	4.00	3.93	4.00	3.74	HUSM	0.053
-bed spacing is adequate	4.00	3.99	4.00	3.57	HUSM	0.001
-linen satisfactory	4.00	3.50	4.00	3.66	HKB	0.033
-number of fans adequate	4.00	3.73	4.00	3.62	HUSM	0.255
-TV adequate	3.00	3.09	3.00	2.96	HUSM	0.043
-toilet cleanliness	3.00	3.23	4.00	3.36	HKB	0.10
-ward cleanliness	4.00	3.63	4.00	3.69	HKB	0.50
<u>Miscellaneous</u>	34.50	69.31	35.00	69.33	HKB	0.90
-food satisfactory	4.00	3.57	4.00	3.61	HKB	0.60
-understand ward materials	3.00	3.05	3.00	3.23	HKB	0.10
-public transport is adequate	4.00	3.45	3.50	3.44	HUSM	0.90
-ambulance is satisfactory	4.00	3.61	4.00	3.63	HKB	0.50
-ward sign adequate	4.00	3.50	4.00	3.64	HKB	0.10
-car parking is adequate	3.00	3.10	3.00	2.86	HUSM	0.01
-child-visitors law allowed	4.00	3.56	4.00	3.53	HUSM	0.80
-outside food law allowed	4.00	3.80	4.00	3.77	HUSM	0.80
-valuables thing law allowed	3.00	2.83	3.00	2.82	HUSM	0.80
-caretaker allowed	4.00	4.12	4.00	4.09	HUSM	0.50
<u>Finance</u>	6.00	64.49	7.00	68.78	HKB	0.001
-afford hosp bill	3.00	3.15	3.00	3.38	HKB	0.001
-bills reasonable	3.00	3.29	4.00	3.49	HKB	0.002
All combined	74.37	73.79	75.32	75.07	HKB	0.018

\* Nonparametric test p-values  
PSMWS: Patient Satisfaction Medical Ward Service

Four domains of patient satisfaction score toward medical ward services namely doctors, nurses, staff and finance domain were found to be significantly in favor of the HKB group. The doctor domain of medical ward services consisted of thirteen satisfaction

score items. These items were doctor introduce themselves to patient, doctor greet patient, doctor listen to patient problems, doctor speak politely to patient, doctor explain discharge plan to patient, doctor explain medical procedure to patient, doctor explain treatment to patient, doctor use easy language in communicating with patient, doctor told side effect of drugs to patient, doctor told appointment date, doctor told importance of drug compliance to patient, patient satisfied with perceived services and knowledge skill of doctor. The nurse domain of medical ward services consisted of four satisfaction score items. These items were nurse speak politely, nurse use easy language, patient satisfied with perceived services and knowledge skill of nurse. The staff domain of medical ward services consisted of four satisfaction score items. These items were ward staff dress appropriately, patient satisfied with attendant's perceived services and skills and patient satisfied with skills of other ward staff (e.g. physiotherapist). The finance domain of medical ward services consisted of two satisfaction items namely patient afford to pay hospital bill and hospital bill was within reasonable price.

The clean-and-comfort domain scores were significantly higher in HUSM group. The clean-and-comfort domain of medical ward services consisted of nine satisfaction items. These items were ward furniture was adequate, ward lighting was functioning, ward ventilation was satisfactory, bed spacing between inpatient was adequate, bed linen was satisfactory, number of ward fans were adequate, number of televisions were adequate, ward toilet's cleanliness and ward cleanliness were satisfactory. On the other hand, the loyalty and miscellaneous domain scores were not different between the HUSM and HKB groups. The loyalty domain consisted of three items namely patient will recommend hospital, patient will come back and patient satisfied with overall quality of medical ward services. The miscellaneous domain consisted of ten items. These items include hospital food was satisfactory, patient understand ward materials, public transport to hospital was adequate, ambulance services was satisfactory, ward signage was adequate, car parking in hospital is adequate, patient supported ward laws/ regulations with regard to allow child-visitors enter ward, bring outside food into the ward, bring valuables thing into ward and allow caretaker into the medical ward.

Some item scores were found to be significantly different between two groups. Two items under the nurse domain, five items under the doctor domain, one item under the staff domain, two items under the finance domains and one item under the clean-comfort domain were scored significantly higher in HKB group whereas four items under the clean-comfort domain and one item under the miscellaneous domain were more in favor among HUSM group. The composite satisfaction scores for all seven domains combined were significantly higher in HKB group than in HUSM group.

### **Level of Patient Satisfaction**

Table 4.3 showed the level of patient satisfaction toward medical ward services in this study using cut point domain satisfaction scores of 75 and 80. If we compared the level of patient satisfaction toward combined seven domains of medical ward services, the level of satisfaction was 49.2 percent (using cut point of 75) compared to 48.1 percent (

using cut point of 80). The proportion of satisfied respondents toward the loyalty, nurses and other staff domain were highest compared to other domains of satisfaction. According to hospital, proportion of satisfied respondents toward HKB was higher than those of HUSM; 54.3% versus 42% respectively (Chi-squared test=5.64,  $p=0.018$ ).

Table 4.3 Proportion of Satisfied Respondents Using Domain Satisfaction Scores of 75 and 80

	Proportion of satisfied patient at cut off point of domain score 75	Proportion of satisfied patient at cut off point of domain score 80
By domains of medical ward services		
Loyalty domain	76.9%	77.9%
Nurses domain	71.8%	71.8%
Other staff domain	70.2%	70.2%
Doctor domain	54.0%	36.4%
Clean & comfort	49.5%	27.1%
Finance domain	37.3%	37.2%
Mischellaneous	21.8%	8.0%
Combined 7 domains	49.2%	48.1%
By hospital		
HUSM respondents(n=188)	45.7%	42.0%
HKB respondents(n=188)	52.7%	54.3%
Combined HUSM and HKB (n=376)	49.2%	48.1%

### Multivariate Analysis

Seven domains and 45 items of patient satisfaction toward medical ward service scores were dichotomized into satisfied and dissatisfied groups using a cut-off point at 80%. Table 4.4A-4.4H show the results of eight different simple logistic regression and multiple logistic regression models fitted separately between each domain and a set of independent variables. The loyalty domain had seven significant predictors; the younger patients admitted with non-infectious disease, owning a phone, high income group, and high education level living in a rural district and admitted to the HUSM were more likely to be loyal to the hospital than those who were older, admitted with chronic diseases, not owning a phone, low income, low education level, living in an urban area, and admitted to the HKB. Belonging to the HKB group, younger age and phone-ownership were about two times more satisfied with the nursing services compared to the respective referent groups. The respondents were satisfied with the doctor services more if they were highly educated, residents of a rural district, having a phone, spending more on food, and belonged to the HKB group. The staff domain had a wider spectrum of predictors, namely hospital group, place of residence, age, education, phone ownership and food cost. The HKB patients, younger age, middle education level, owning a phone, those coming from the rural area, and could afford to pay for food, were satisfied with the staff

services. Clean-and-comfort domain was satisfied by those who were not employed, could afford to pay for food, more educated, owner of phone, and with chronic diseases. Those who were admitted with chronic diseases, paid high food cost, and had phones were satisfied with miscellaneous services. The older patients who had phones, and who could effort on food expanses and belonging to the HKB group were financially satisfied.

When it comes to the overall composite scores of patient satisfaction, the HKB group was twice as satisfied as the HUSM group along with low income group and those who could effort to pay for food. A simple computation based on the r-squared values after a series of simple linear regressions of the composite scores on each domain revealed relative contribution of each domain to the variation in the composite scores. The nurse (20%), the staff (19%) and the doctor (17%), made up over fifty percent of the variation in the composite scores and these domains were scored high among the patients in the HKB group. This finding is consistent with the results of the multivariate analysis after controlling for other independent variables as can be seen in the tables 4.4A-4.4H.

A simple computation based on the r-squared values, after a series of simple linear regressions of the composite scores on each domain showed the relative contribution of each domain to the variation in the overall composite scores. The nurse domain score (21%), the staff domain score (19%) and the doctor domain score (17%); contributed fifty seven percent of the variation in the overall composite scores and these domains were scored high among the HKB respondents. This finding is consistent with the results of the multivariate analysis after controlling for other independent variables as shown in the tables 4.4A-4.4I. Detailed inspection of the tables 4.4A-4.4II would show the fact that the type of hospital where the respondent was admitted is the most important variable showing significant association with four satisfaction domains after adjusting with other variables such as demographics, cost, length of stay and admission diagnosis to the medical wards. Specifically, the HKB respondents were satisfied with five satisfaction domains; namely the doctors, nurses, other staff, finance and overall composite scores. The loyalty, clean-and-comfort and the miscellaneous satisfaction domains were not associated with any patient groups. Other independent variables which were retained in the stepwise multiple regression models as independent risk factors; in descending order of statistical significance were phone, food expense, age, education, admission-diagnosis, area of residence, income and occupation.

Table 4.4A: Simple logistic regression and multiple logistic regression analysis showing association between independent variables and the loyalty domain of the patient satisfaction scores

Independent variables	Crude OR				Adjusted OR			
	Crude OR	S.E.	95% CI	p-value	Adjusted OR	S.E.	95% CI	p-value of LRT
<b>Education</b>								
High (n=48)	1				1			
Medium(n=52)	1.92	0.75	0.90-4.13	0.094*	-			
Low (n=88)	1.22	0.46	0.58-2.56	0.591	0.29	0.393	0.13-0.68	0.049
<b>Age group</b>								
Young (n=64)	1				1			
Middle(n=26)	0.57	0.17	0.31-	0.063*	0.37		1.15-1.92	
Old (n=98)	1.03	0.32	1.03- 0.56- 1.92	0.920*	0.39	0.439	0.20-0.75	0.016
<b>Income</b>								
Low (n=53)	1				1			
Middle (n=61)	0.44	0.31	0.24-	0.008	-		1.31-4.81	
High (n=74)	0.68	0.34	0.81- 0.35- 1.31	0.247	2.51	0.329		0.019
<b>Residence</b>								
Urban (n=116)	1				1			
Rural (n=72)	1.43	0.36	0.86- 2.35	0.167*	2.32	0.268	1.05-5.13	0.049
<b>Admission diagnosis</b>								
Infectious(n=55)	1				1			
Chest (n=27)	-	-	-	-	5.13	0.453	1.99-13.24	0.026
CVD (n=50)	0.58	0.15	0.34-0.98	0.041	3.11	0.460	1.19-8.13	0.032
Renal (n=14)	-	-	-	-	4.90	0.445	1.68-14.28	0.048
Metabolic(n=10)	-	-	-	-	7.86	0.461	2.41-25.65	0.024
Other (n=32)	-	-	-	-	3.08	0.405	1.23-7.74	0.038
<b>Telephone ownership</b>								
No telephone (n=119)	1				1			
Has telephone (n=69)	1.74	0.51	0.98-3.08	0.059*	2.50	0.353	1.21-4.80	0.048
<b>Hospitals</b>								
HUSM(n=188)	1				1			
HKB (n=188)	0.63	0.16	0.38-1.05	0.076*	0.56		0.29-1.07	0.081*

\*Significant at p<0.1 (all other significant at p<0.05)

LRT= Likelihood Ratio test

OR= Odds Ratio

S.E.= Standard error

Age group: Young 15-35; Middle,36-45; Old, 46 and above

Education: High, University/diploma; Medium, Form 1-5; Low, primary school/ others



Income: Low, RM0-500; Medium, RM501-1000; High, RM1001 and above  
 Residence: Urban, Kota Bharu; Rural, bachok pasir mas tumpat  
 Admission diagnosis: Infectious (dengue, malaria), Chest (COAD, PTB), CVD (Angina),  
 Renal (ESRF, Nephrotic syndrome), Metabolic (Diabetes, Thyroid), Other disease.

Table 4.4B: Simple logistic regression and multiple logistic regression analysis showing association between independent variables and the doctor domain of the patient satisfaction scores

Independent variables	Crude OR				Adjusted OR			
	Crude OR	S.E.	95% CI	p-value	Adjusted OR	S.E.	95% CI	p-value of LRT
<b>Education</b>								
High (n=48)	1				1			
Medium (n=52)	1.99	0.80	0.90-4.39	0.088	-		-	
Low (n=88)	1.52	0.59	0.72-3.24	0.275	0.54	0.273	0.27-1.09	0.067*
<b>Residence</b>								
Urban (n=116)	1				1			
Rural (n=72)	1.54	0.39	0.94-2.55	0.089	2.63	0.228	1.27-5.44	0.050
<b>Telephone ownership</b>								
No telephone (n=119)	1				1			
Has telephone (n=69)	1.76	0.52	0.99-3.13	0.054*	2.85	0.306	1.42-5.68	0.023
<b>Outside food expenses (RM)</b>								
Low (n=29)	1				1			
Medium (n=105)	1.36	0.27	0.80-2.31	0.252	1.36	0.291	0.94-1.97	0.074*
High (n=54)	1.54	0.31	0.85-2.81	0.156	-			
<b>Hospitals</b>								
HUSM (n=188)	1				1			
HKB (n=188)	1.46	0.37	0.88-2.41	0.142	1.83	0.252	1.00-3.37	0.056*

\*Significant at  $p < 0.1$  (all other significant at  $p < 0.05$ )

LRT= Likelihood Ratio test

OR= Odds Ratio

S.E.= Standard error

Education: High, University/diploma; Medium, Form 1-5; Low, primary school/ others

Residence: Urban, Kota Bharu; Rural, bachok pasir mas tumpat

Outside food expenses: Low (RM0-2), Medium (RM3-7), High (Above RM7)

Table 4.4C: Simple logistic regression and multiple logistic regression analysis showing association between independent variables and the nurse domain of the patient satisfaction scores

Independent variables	Crude OR				Adjusted OR			
	Crude OR	S.E.	95% CI	p-value	Adjusted OR	S.E.	95% CI	p-value LRT
<u>Age group</u>								
Young (n=64)	1				1			
Middle(n=26)	0.47	0.13	0.27-0.82	0.007	0.37	0.374	0.18-0.86	0.025
Old (n=98)	0.69	0.21	0.38-1.26	0.231*	0.60	0.349	0.26-1.00	0.055*
<u>Telephone ownership</u>								
No telephone (n=119)	1				1			
Has telephone (n=69)	1.48	0.42	0.85-2.57	0.163*	2.85	0.288	1.42-5.68	0.065*
<u>Hospitals</u>								
HUSM (n=188)	1				1			
HKB (n=188)	1.33	0.32	0.83-2.12	0.234*	1.66	0.242	0.97-2.86	0.058*

\*Significant at  $p < 0.1$  (all other significant at  $p < 0.05$ )

LRT= Likelihood Ratio test

OR= Odds Ratio

S.E.= Standard error

Age group: Young 15-35; Middle,36-45; Old, 46 and above

Table 4.4D: Simple logistic regression and multiple logistic regression analysis showing association between independent variables and the staff domain of the patient satisfaction scores

Independent variables	Crude OR				Adjusted OR			
	Crude OR	S.E.	95% CI	p-value	Adjusted OR	Standard error	95% CI	p-value of LRT
<u>Education</u>								
High (n=48)	1				1			
Medium(n=52)	1.33	0.50	0.68-2.58	0.404	-	-	-	-
Low (n=88)	0.61	0.20	0.32-1.18	0.143	1.83	0.426	1.07-3.13	0.046
<u>Age group</u>								
Young (n=64)	1				1			
Middle(n=26)	0.65	0.18	0.38-1.13	0.129	0.41	0.349	0.18-0.93	0.013
Old (n=98)	0.74	0.23	0.40-1.37	0.334	-	-	-	-
<u>Income</u>								
Low (n=53)	1				1			
Middle (n=61)	0.45	0.28	0.26-0.79	0.005	-	-	-	-
High (n=74)	0.63	0.30	0.34-1.14	0.123	1.68	0.363	0.96-2.94	0.055*
<u>Residence</u>								
Urban(n=116)	1				1			
Rural (n=72)	1.58	0.38	0.98-2.54	0.062*	2.34	0.242	1.20-4.54	0.037
<u>Telephone ownership</u>								
No telephone	1				1			

(n=119) Has telephone (n=69)	1.76	0.50	1.02-3.06	0.043	2.45	0.336	1.24-4.81	0.032
Outside food expenses (RM)								
Low (n=29)	1				1			
Medium(n=105)	1.64	0.27	0.97-2.79	0.066	2.75	0.330	1.35-5.62	0.049
High (n=54)	1.37	0.31	0.75-2.52	0.304	3.07	0.295	1.41-6.69	0.020
Hospitals								
HUSM(n=188)	1				1			
HKB (n=188)	1.38	0.34	0.86-2.24	0.183	2.51	0.250	1.38-4.56	0.029

\*Significant at  $p < 0.1$  (all other significant at  $p < 0.05$ )

LRT= Likelihood Ratio test

OR= Odds Ratio

S.E.= Standard error Age group: Young 15-35; Middle, 36-45; Old, 46 and above

Education: High, University/diploma; Medium, Form 1-5; Low, primary school/ others

Income: Low, RM0-500; Medium, RM501-1000; High, RM1001 and above

Residence: Urban, Kota Bharu; Rural, bachok pasir mas tumpat

Outside food expenses: Low(RM0-2), Medium(RM3-7), High(AboveRM7)

Table 4.4E: Simple logistic regression and multiple logistic regression analysis showing association between independent variables and the clean & comfort domain of the patient satisfaction scores

Independent variables	Crude OR				Adjusted OR			
	Crude OR	S.E.	95% CI	p-value	Adjusted OR	S.E.	95% CI	p-value LRT
Education								
High (n=48)	1				1			
Medium(n=52)	1.12	0.55	0.42-2.95	0.822	4.24	0.384	1.56-11.62	0.049
Low (n=88)	0.54	0.27	0.20-1.46	0.225	3.51	0.381	1.02-12.10	0.041
Occupation								
Employed(n=90)	1				1			
Others (n=98)	2.6	1.63	0.75-8.93	0.134	3.76	0.294	1.40-10.15	0.035
Admission diagnosis								
Infectious(n=55)	1				1			
Chest (n=27)	-	-	-	-	4.29	0.396	1.46-12.59	0.005
CVD (n=50)	0.50	0.21	0.22-1.12	0.092*	2.74	0.459	0.90-8.33	0.019
Renal (n=14)	-	-	-	-	5.15	0.401	1.43-18.57	0.017
Metabolic(n=10)	-	-	-	-	-	-	-	-
Other (n=32)	-	-	-	-	-	-	-	-
Telephone ownership								
No telephone (n=119)	1				1			
Has telephone (n=69)	2.72	1.07	1.26-5.88	0.011	2.62	0.352	1.11-6.17	0.041

\*Significant at  $p < 0.1$  (all other significant at  $p < 0.05$ )

LRT= Likelihood Ratio test

OR= Odds Ratio

Table 4.4F: Simple logistic regression and multiple logistic regression analysis showing association between independent variables and the miscellaneous domain of the patient satisfaction scores

Independent variables	Crude OR				Adjusted OR			
	Crude OR	S.E.	95% CI	p-value	Adjusted OR	S.E.	95% CI	p-value LRT
Admission diagnosis								
Infectious(n=55)	1				1			
Chest (n=27)	1.5	0.79	0.53-4.23	0.441	6.45	0.403	1.55-26.78	0.046
CVD (n=50)	-	-	-	-	-	-	-	-
Renal (n=14)	-	-	-	-	-	-	-	-
Metabolic(n=10)	-	-	-	-	-	-	-	-
Other (n=32)	-	-	-	-	5.56	0.599	1.45-21.29	0.023
Telephone ownership								
No telephone (n=119)	1				1			
Has telephone (n=69)	3.64	1.94	1.28-10.37	0.016	4.31	0.443	1.39-13.35	0.018
Outside food expenses (RM)								
Low (n=29)					1			
Medium (n=105)	1.98	0.58	0.64-6.15	0.265	-	-	-	-
High (n=54)	3.02	0.60	0.92-9.84	0.067	2.57	0.631	0.83-7.91	0.096*

\*Significant at  $p < 0.1$  (all other significant at  $p < 0.05$ )

LRT= Likelihood Ratio test

OR= Odds Ratio

S.E. = Standard error

Admission diagnosis: Infectious (dengue,malaria), Chest(COAD,PTB), CVD(Angina),

Renal(ESRF,Nephrotic syndrome), Metabolic(Diabetes,Thyroid),Other disease.

Outside food expenses: Low(RM0-2), Medium(RM3-7), High(AboveRM7)

Table 4.4G: Simple logistic regression and multiple logistic regression analysis showing association between independent variables and the finance domain of the patient satisfaction scores

Independent variables	Crude OR				Adjusted OR			
	Crude OR	S.E.	95% CI	p-value	Crude OR	S.E.	95% CI	p-value of LRT
Age group								
Young(n=64)	1				1			
Middle(n=26)	1.38	0.94	0.36-5.25	0.635	1.83	0.337	1.03-3.24	0.049
Old (n=98)	-	-	-	-	-	-	-	-
Telephone ownership								
No telephone (n=119)	1				1			
Hastelephone (n=69)	2.01	1.44	0.49-8.21	0.333	2.14	0.304	1.18-3.90	0.007

Outside food expenses (RM)								
Low (n=29)					1			
Medium(n=105)	1.42	0.27	0.84-2.40	0.190	1.85	0.282	1.06-3.22	0.048
High (n=54)	1.41	0.30	0.77-2.66	0.264	-	-	-	-
<u>Hospitals</u>								
HUSM(n=188)	1				1			
HKB (n=188)	1.25	0.85	0.33-4.73	0.742	2.89	0.259	1.73-4.77	<0.001

\*Significant at  $p < 0.1$  (all other significant at  $p < 0.05$ )

LRT= Likelihood Ratio test

OR= Odds Ratio

S.E.= Standard error

Age group: Young 15-35; Middle,36-45; Old, 46 and above

Outside food expenses: Low(RM0-2), Medium(RM3-7), High(AboveRM7)

Table 4.4H: Univariate logistic regression and multiple logistic regression analysis showing association between independent variables and the combined seven domains of the patient satisfaction scores

Independent variables	Crude OR				Adjusted OR			
	Crude OR	S.E.	95% CI	p-value	Crude OR	S.E.	95% CI	p-value of LRT
<u>Income (RM)</u>								
Low (n=53)	1				1			
Middle(n=61)	0.55	0.25	0.34-0.90	0.017	0.58	0.262	0.37-0.90	0.016
High (n=74)	0.803	0.26	0.48-1.34	0.404	-	-	-	-
<u>Telephone ownership</u>								
No telephone (n=119)	1				1			
Has telephone (n=69)	1.19	0.31	0.72-1.97	0.500	1.67	0.288	0.94-2.98	0.058*
<u>Outside food expenses(RM)</u>								
Low (n=29)	1				1			
Medium(n=105)	2.06	0.26	1.24-3.43	0.005	2.49	0.278	1.45-4.16	0.001
High (n=54)	1.79	0.30	1.00-3.21	0.049	2.18	0.314	1.18-4.03	0.013
<u>Hospitals</u>								
HUSM(n=188)	1				1			
HKB (n=188)	1.68	0.35	1.12-2.53	0.013	2.56	0.251	1.58-4.64	<0.001

\*Significant at  $p < 0.1$  (all other significant at  $p < 0.05$ )

LRT= Likelihood Ratio test

OR= Odds Ratio

S.E.= Standard error

Income: Low, RM0-500; Medium,RM501-1000; High,RM1001 and above

Outside food expenses: Low(RM0-2), Medium(RM3-7), High(AboveRM7)

Table 4.4I Relative contribution of the domain scores to variation in overall domain

Domain score in percent	r-square values	Relative contribution to the variation in overall seven domains of medical ward service
Nurse	0.6871	20.09
Staff	0.6552	19.16
Doctor	0.5962	17.44
Loyalty	0.5003	14.63
Clean & comfort	0.3402	9.95
Miscellaneous	0.3377	9.88
Finance	0.3027	8.85

## DISCUSSION

### Level of Patient Satisfaction

Our result found that by using domain satisfaction score of 75 as the cut point for level of satisfaction, the level of patient satisfaction (based on composite seven domain scores) was 47.9 percent compared to 15.7 percent by using satisfaction domain score cut point domain score of 80. The low prevalence of satisfaction level found in this study was consistent with previous local patient satisfaction study. For instance, in a satisfaction study which involved seven public hospital in Malaysia, Roslan found that only 19 percents of inpatients were satisfied toward the medical care they received (Roslan JMG,2000). However, Hall's meta-analysis of 221 patient satisfaction studies reported that the overall satisfaction toward health care services varied from study to study (Hall and Dornan,1988). A satisfaction study done in Canterbury and Thanet health district of United Kingdom, in which William and Calnan reported that the overall satisfaction toward hospital care was 83 percents (William and Calnan,1991). Another patient satisfaction survey in three public general hospitals in Athen, Greece, (n=1295 patients) reported high prevalence of satisfaction (86 percents) toward medical and nursing services (Niakas et al,2004).

### Patient satisfaction toward satisfaction domains of medical ward services of HUSM and HKB

Using the domain satisfaction scores of 80 as the cut point for satisfied status, the percentages of patient satisfaction toward medical ward services were 83.2% for the loyalty, 82.4% nurses, 80.3% other staff, 54.3% doctors, 49.5% clean-comfort, 49.2% overall composite score, 37.2% finance and 21.8% miscellaneous domains. Nine factors which were significant predictors of satisfaction for at least one of the domains in the multivariate models were stated above. In another satisfaction study of public hospitals in Bangladesh, greater patient satisfaction were associated with five dimension of hospital services namely greater responsiveness of the hospital staff to patient needs, greater level

of assurance given by hospital staff, better quality of interpersonal communication, better level of perceived discipline among staff and lower perceived harassment (Andaleeb, 2001). Because the overall score is the weighted average of the seven domains which again are contributed by the corresponding item scores, we evaluated the satisfaction domains and items which are attributable to the overall patient satisfaction. As stated earlier, nurse, doctor and staff domains carried highest weight for the composite scores, we would look into the detailed aspects of these domains, their respective items and their underlying rationales.

### **Composite satisfaction score**

We found that the major contributors to the overall satisfaction score were service and communication skills of nurses ( $r=0.7$ ;  $P<0.001$ ), doctors ( $r=0.62$ ;  $P<0.001$ ), and staff ( $r=0.27$ ;  $P<0.001$ ) (Table 4.4I). Our finding was consistent with one study which looked at the general and specific aspects of consumer satisfaction with general practitioner services, general dental care services and hospital in-patients care. Despite high general levels of consumer satisfaction (83-97%); detailed and specific questions revealed greater levels of expressed dissatisfaction; 38% felt that they could not discuss personal problems with their general practitioners, 51% felt their dentist was not easy to reach at weekends or holidays, whilst 35% felt hospital doctors did not give sufficient information. Whilst different areas of dissatisfaction were found in each specific medical care setting examined, what was particularly striking was the degree of convergence of the key predictors of overall consumer satisfaction across the medical care settings. The findings clearly suggested that issues concerning professional competence with nature and quality of the patient-professional relationship were the key predictors of overall consumer satisfaction with general practice, dental and hospital care. The physicians giving sufficient information correlated 0.64 with satisfaction scores; competent dentist correlated 0.52 with overall dental satisfaction scores and full confidence in hospital doctors correlated 0.49 with overall hospital satisfaction scores (Williams and Calnan 1991).

### **Nurse domain**

We found that the HKB patients gave significantly high satisfaction scores toward items of 'nurses spoke politely' and most of them strongly agreed with the services provided by the nurses. These items were attributable to high nurse domain scores among this group. The patients were also satisfied with the nurses' use of understandable language and confident in the nurses' skills and knowledge. Some researchers warned the patient satisfaction planners that nurses play strong role in patient satisfaction. In their paper titled "Satisfaction climbs with smiles, other soft skills", the authors stated that patient satisfaction can be improved with more attention to interpersonal skills and catering to the concerns that most patients have about emergency care (Anonymous 2004). We should pursue in the same line as the well-known marketing strategy that patients are always right in the health care market. Simple things such as how a nurse talks to a patient have a significant effect. The Health Service Ombudsman published reports of complaints investigated in the National Health Services of Britain; the poor