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## Research Article

# Evaluation of Patient Satisfaction and Patient-physician Relationship in an Out-Patient Department Re-engineered through a Health Information Management System: A Descriptive Study Done at a Major Women's Hospital in Sri Lanka

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### Abstract

**Introduction:** Health information management is one of the major pillars in a health system that improves the effectiveness and efficiency of health services. It is essential to assess the patient perception towards re-engineered services provide through Hospital Information Management Systems (HIMSs) and how this implementation affects the doctor-patient relationship. The objective of the study was to describe the extent of patient satisfaction towards Out-Patient Department (OPD) services, pharmacy service and patient-physician relationship in the OPD, re-engineered through a HIMS, at the Castle Street Hospital for Women (CSHW), Sri Lanka. **Methods:** A descriptive cross-sectional study was carried out among 362 out-patients aged over 18 years attending the OPD of the CSHW during 2018-2019. Consecutive sampling method, and an interviewer-administrated questionnaire were used to collect data. The quantitative analysis was done using the SPSS software version 23. The sentiment analysis was performed to analyze comments given by patients using the Rapid Miner software. **Results:** All participants were females with a mean age of 41years ( $\pm 13.58$ ). Almost all participants were satisfied with overall services provided by the OPD (99.7%) and the pharmacy (98.4%). The majority (65.3%) agreed that implementation of the HIMS had improved the doctor-patient relationship. All reported comments regarding the re-engineered services of the OPD were 'positive'. The study also suggests considering providing information in all common languages while announcing the patient's OPD number at the waiting area in future implementations. **Conclusions:** The majority of patients were satisfied with the overall OPD services provided through implementation of the HIMS at the CSHW, Sri Lanka.

**Keywords:** Health information systems, Hospital information management system, Outpatient department, Patient-physician relationship.

### Introduction

Health information management is one of the major segments of a health system. Integration of health information management systems improves the effectiveness and efficiency of health services. According to the World Health Organization, it is one of the six building blocks that strengthen a health system [1]. Electronic Health Information Systems (eHISs) are known to improve health

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information management. It helps to collect, aggregate, store, analyze and evaluate health-related data accurately and timely from health facilities to the federal level [2]. Recently, health information management has become important for improving and measuring the quality and coverage of health services globally. However, only a few developing countries have sufficiently strong and effective eHISs [3].

With the technological revolution, the computerization of information made the evolution of eHISs possible in hospitals, resulting in improved performances in the quality of care and productivity. The state health sector of Sri Lanka is also looking into the development of electronic health solutions. Although many attempts have been made to establish Health Information Systems (HISs) in government hospitals, achieving a reliable and usable HIS is still challenging in Sri Lanka [4]. In 2013, the Government of Sri Lanka introduced a Hospital Information Management System (HIMS) as an eHIS for the major state hospitals [5]. However, most of the state hospitals in Sri Lanka still depend on paper-based data recording systems. This study was carried out in the Castle Street Hospital for Women (CSHW), one of the hospitals currently implementing a HIMS in Sri Lanka.

The CSHW is the premier women's hospital in Sri Lanka. It has a 24-hour Out-Patient Department (OPD) service, and approximately 150 patients seek OPD services daily [6]. In a hospital, the OPD is the first contact point of a patient and serves as the window to many healthcare services provided to the public. The reception and consultation of outpatients are the core functions of an OPD [7]. The OPD has specific challenges, such as receiving all patients 24-hours, seven days a week regardless of the number and their conditions. There is a great need to; improve promptness of registration, reduce waiting time, improve quality and promptness of consultation, optimize

resources available and improve the satisfaction of the users and clients in an OPD [4]. It is expected that the implementation of a HIMS by including electronic-based data recording systems will provide more efficient services so that these patients receive better access to quality care with better patient satisfaction [8].

The CSHW has a well-functioning OPD providing re-engineered services through a HIMS. The pharmacy and laboratory services of the OPD are also facilitated with the HIMS. In this OPD, every patient should be registered at the registration counter, and every registered patient has a Personal Health Number (PHN), which is unique for each. Upon entry, patients are provided with an identification number (OPD number), which is displayed on a screen outside the consultation room. Mainly, this process aims to reduce waiting time and feeling of discomfort, while improving efficiency leading to improved patients' satisfaction with the services delivered [4].

The use of HIMSs facilitates quick management of patients with the proper order of investigations and treatments. Although users and administrators are benefited from this implementation, the major advantage is offered to the patients as they receive efficient and safe healthcare through this system [9]. Furthermore, the implementation of HIMSs offers the opportunity to use computers and printed documents in consultations.

The patient-physician relationship is one of the main concerns in medical consultations. There should be a healthy relationship between the physician and the client to provide high-quality care. Effective communication, attention and trust are the key elements among the other factors in building a healthy relationship. Trust and effective communication are essential for better patient care and patient satisfaction in healthcare settings. The use of digital technologies may affect the patient-physician relationship. Therefore, patients'

perception towards the patient-physician relationship in medical consultations will be influenced by this electronic-based prescription and data recording system in the consultation area. However, there is limited information on how computers in HIMS affect interactions between physicians and patients [10]. Therefore, this study aimed to assess patient satisfaction towards re-engineered services and the patient-physician relationship in consultations at the OPD of the CSHW, implemented with a HIMS.

## **Methods**

### ***Study design***

A descriptive cross-sectional study was conducted among 362 outpatients over 18 years old who attended the OPD of the CSHW, Colombo 8, Sri Lanka, over six months from September 2018 to February 2019. Patients who had difficulties in communicating (with hearing and articulation problems) and those who needed emergency treatments were excluded. Data were collected using a consecutive sampling technique while waiting for their turn for consultation and after the consultation.

### ***Data collection***

An interviewer-administered questionnaire was utilized to collect data. The questionnaire consisted of five sections to collect socio-demographic data and the characteristics of the registration counter, waiting area, consultation area, and pharmacy area. Using an open-ended question, the participants were allowed to express their comments regarding the current OPD services re-engineered with the HIMS. The satisfaction of the first visitors and subsequent visitors were assessed separately. The questionnaire was developed after reviewing previous studies conducted in developed as well as developing countries. It was subsequently reviewed by a panel of experts to obtain content validity. A pilot study was done before the data collection to refine the questionnaire and assess

the feasibility of the process. An attempt was made to collect data with minimal disturbance to routines.

### ***Data analysis***

Quantitative data analysis was carried out using the Statistical Package for Social Sciences (SPSS) software version 23, and qualitative data were analyzed using the Rapid Miner software. In quantitative analysis, responses obtained for each question on their satisfaction with the OPD services were scored on a Likert scale ranging from 1-4. Higher scores indicated a higher level of satisfaction with the service provided. According to the score obtained for each question, patients were divided into two categories: highly satisfied and satisfied as “satisfied” (scores of 3 or 4) and unsatisfied and highly unsatisfied as “unsatisfied” (scores of 1 or 2). Thereafter, mean scores were calculated for individual questions, and scores for each section of the OPD services were calculated using mean scores. The composite score was developed for overall satisfaction using an average of scores of all sections. Overall satisfaction score was compared with selected socio-demographic factors using *t*-test and one-way ANOVA test.

The respondents were prompted to express their comments regarding services provided by the OPD based on the implementation of the HIMS. The comments were translated from the Sinhala language to English using several rounds of translation and back-translation process. Sentiment analysis was performed to statistically analyze whether respondents’ texts were positive, negative, or neutral using the Rapid Miner software.

### ***Ethical consideration***

The ethical approval for the study was obtained from the Ethics Review Committee of the Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka (Ref: Nur/01/18), and the Ethics review committee, the CSHW, Sri

Lanka. A written informed consent was obtained from each participant, after giving information through an information sheet before the data collection. To maintain confidentiality, the collected data were stored with the utmost protection and was not shared with any other third party.

## Results

A total of 362 female patients participated in the study. They were between 18-83 years, and the mean age was 41 years ( $\pm 13.6$ ). More than half (64.9%) of the participants were from the Colombo District. Most (85.4%) were married women. Among the different ethnic and religious groups that participated in the study, the majority (85.4%) were Sinhalese and Buddhists (83.1%). Among the study participants, 45.9% had passed

the G.C.E (Ordinary Level) examination, and most (84.8%) were unemployed. Of the respondents, 70.2% were first visitors, and 29.8% were subsequent visitors. Most of the subsequent visitors belonged to the two to five visits category.

The experience of services received by patients at the registration counter is summarized in Table 1. The majority were satisfied regarding the adequateness (97.2%), simplicity (96.9%), and usefulness of (98.3%) of information and instructions displayed at the registration counter. Issuing a PHN was observed as a very beneficial service to patients. A remarkably high response rate was received as satisfied for issuing a PHN number (99.4%), and 98.3% of participants were satisfied to keep their PHN for subsequent visits. When considering the experiences of subsequent

**Table 1:** The level of patient satisfaction at the registration counter (n=362)

Characteristics	Satisfied		Unsatisfied		Satisfaction Score
	n	%	n	%	Mean ( $\pm$ SD)
The experiences of participants at the registration counter					
Adequateness of instructions displayed	352	97.2	10	2.8	2.71 (0.52)
Simplicity of the information displayed	351	96.9	11	3.0	2.73 (0.50)
Usefulness of the information displayed	356	98.3	6	1.7	2.72 (0.48)
User-friendliness of the PHN	360	99.4	2	0.6	2.86 (0.36)
The willingness of keeping the PHN for subsequent visits	356	98.3	6	1.7	2.82 (0.44)
Opportunity to make an appointment via telephone	358	98.7	4	1.1	2.76 (0.46)
The experiences of first visitors at the registration counter					
Waiting time for registration	247	96.9	8	3.1	2.48 (0.56)
Promptness of attention of staff	250	98.1	5	1.9	2.65 (0.52)
Time consume for registration	251	98.4	4	1.6	2.69 (0.50)
Cooperation of the staff	254	99.6	1	0.4	2.70 (0.47)
Adequateness of the verbal information given	246	96.4	9	3.5	2.60 (0.56)
The experiences of subsequent visitors at the registration counter					
Method of getting the OPD number	108	99.1	1	0.9	2.85 (0.38)
Time-consuming for getting the OPD number	107	98.2	2	1.8	2.85 (0.41)
The convenience of getting the OPD number	108	99.1	1	0.9	2.86 (0.38)

SD- Standard Deviation, PHN- Personal Health Number, OPD- Out-Patient Department

visitors, the majority (96.9%) were satisfied regarding the waiting time for registration and 99.6% were satisfied regarding the cooperation of staff at the registration counter. Almost all (99.1%) subsequent visitors responded as satisfied with the method and the convenience of getting an OPD number.

The study revealed that the majority were satisfied with the waiting area-related services provided at the OPD (Table 2). The majority (88.4%) were satisfied regarding waiting time for the consultation and almost all (99.5%) were satisfied regarding displaying patients' OPD numbers on the screen in the visiting area. Many participants (98.9%) were satisfied with having an equal opportunity to get an appointment according to the

order of arrival. Moreover, 96.9% of participants responded as satisfied if the patient's OPD number is announced at the waiting area.

Although the study was carried out among 362 participants, only 183 (50.5%) visited the hospital pharmacy. Among them, more than half (68.8%) were satisfied regarding the waiting time of the pharmacy and most (98.4%) were satisfied with the overall services provided by the pharmacy (Table 3).

The extent of patient satisfaction on services received at the consultation area and the patient-physician relationship is shown in Table 4. Almost all (98.9%) participants agreed that the doctor listens carefully to their complaints and 97.5%

**Table 2:** The level of patient satisfaction in the waiting area (n=362)

Characteristics	Satisfied		Unsatisfied		Satisfaction Score
	n	%	n	%	Mean (±SD)
Waiting time for the appointment	320	88.4	42	11.6	2.12 (0.59)
Comfortability of waiting area	358	98.8	4	1.2	2.60 (0.51)
Displaying of OPD numbers on the screen in visiting area	360	99.5	2	0.6	2.69 (0.48)
Clarity of OPD numbers displayed on the screen	358	98.9	4	1.2	2.70 (0.49)
Queue system	347	95.9	14	3.9	2.63 (0.58)
Equal opportunity to get appointments according to arrival	358	98.9	4	1.1	2.78 (0.45)
Suggestion to announcement of OPD number	351	96.9	11	3.1	2.68 (0.52)

SD- Standard Deviation, OPD- Out-Patient Department

**Table 3:** The level of patient satisfaction at the pharmacy (n=183)

Characteristics	Satisfied		Unsatisfied		Satisfaction Score
	n	%	n	%	Mean (±SD)
Waiting time at the pharmacy	126	68.8	57	31.2	1.83 (0.65)
Queue of the pharmacy	124	67.8	59	32.2	1.80 (0.71)
Promptness of issuing medicine	182	99.5	1	0.5	2.61 (0.50)
Availability of medicines	178	97.3	5	2.7	2.63 (0.55)
Adequateness of information given by the pharmacist	175	95.6	8	4.3	2.60 (0.56)
Clarity of information given by the pharmacist	174	95.1	9	4.9	2.57 (0.63)
Satisfaction on overall pharmacy services	180	98.4	3	1.6	2.24 (0.45)

SD- Standard Deviation

expressed that they had enough time to discuss with the doctor. The study also observed a higher rate of satisfaction (97.8%) for the time taken by the doctors to enter details into computers and the majority (96.5%) were satisfied with the method of issuing the prescription (printed prescription). Most of them (92.0%) did not believe that the

computer took the doctor’s attention away from the patient and 97.5% strongly agreed that the computer didn’t negatively affect the relationship with the doctor. Furthermore, 65.3% agreed that computers improve the relationship with the doctor and 99.7% were satisfied with the overall consultancy services of the OPD.

**Table 4:** Level of patient satisfaction on consultancy services and the doctor-patient relationship (n=362)

Statements	Agree		No Opinion		Disagree		Satisfaction Score
	n	%	n	%	n	%	Mean (±SD)
Doctor welcomes me	360	99.4	2	0.6	0	-	3.77 (0.44)
Doctor gave enough attention	358	98.9	3	0.8	2	0.6	3.75 (0.48)
Doctor listened carefully to my complaints	386	98.9	3	0.8	1	0.3	3.75 (0.47)
I was given enough time to discuss with the doctor	353	97.5	7	1.9	2	0.6	3.72 (0.53)
Doctor didn’t ask about my previous medical reports	139	38.4	30	8.3	193	53.3	1.93 (1.33)
Doctor had more time to ask about the current condition	345	95.3	8	2.2	9	2.5	3.35 (0.68)
Doctor focused on the computer screen rather than on me	24	6.6	19	5.2	319	88.5	0.79 (0.91)
Doctor explained my sickness clearly	356	98.3	2	0.6	4	1.1	3.31 (0.56)
Doctor explained the reason for the prescribed medication	346	95.6	6	1.7	10	2.8	3.26 (0.63)
I believe that computer took doctor’s attention from me	19	5.3	10	2.8	333	92.0	0.80 (0.78)
I was satisfied with the time taken by the doctor to enter details into the computer	354	97.8	4	1.1	4	1.1	3.47 (0.60)
I was satisfied with the prescription issuing method	349	96.5	9	2.5	4	1.1	3.41 (0.61)
Doctor took more time to issue a printed prescription than writing it	44	12.2	161	44.5	31	43.4	1.68 (0.84)
I am getting a benefit by capturing my disease details to the computer	356	98.3	5	1.4	1	0.3	3.53 (0.54)
I have confidence about my details in the computer	357	98.6	4	1.1	1	0.3	3.59 (0.53)
Computer didn’t negatively affect the relationship with doctor	353	97.5	6	1.7	3	0.8	3.56 (0.57)
Computer improves the relationship with the doctor	236	65.3	119	32.9	7	1.9	2.92 (0.83)
My privacy was maintained	259	99.2	1	0.3	2	0.6	3.45 (0.54)
Doctor was punctual	361	99.7	1	0.3	0	-	3.51 (0.51)
Satisfied with overall consultancy services	361	99.7	1	0.3	0	-	3.45 (0.50)

SD- Standard Deviation

The associations of the overall satisfaction related to services received by patients with their marital status, ethnicity, level of education, and current employment are shown in Table 5. There was no significant association in the overall satisfaction in relation to ethnicity ( $p=0.140$ ) and current employment ( $p=0.216$ ) but, there was a significant association in the overall satisfaction with education level ( $p=0.002$ ) and marital status ( $p=0.021$ ).

During the study, 44 (12.2%) comments were received regarding the current OPD setting based on the HIMS. With regards to sentiment analysis, all sentiments were positive. According to the sentiment score, the probability that sentiments observed in the text is positive towards the implementation and associated OPD services. The

majority commented as “a good method” and “an efficient method” while most of the other respondents commented as “very satisfied” and “saves time”. This indicates that almost all participants were satisfied with OPD services provided at the CSHW through the implementation of the HIMS.

### Discussion

Assessment of patient perception towards health implementations is an important aspect of a healthcare system. In this study, patient satisfaction was assessed concerning re-engineered OPD services provided through a HIMS under four sections and individual aspects within each section. However, there is less evidence regarding similar studies in Sri Lanka and other developing countries.

**Table 5:** Relationship of the level of overall satisfaction on out-patients department services with selected socio-demographic characteristics

Characteristic		Satisfaction Score	p value
		Mean ( $\pm$ SD)	
Marital status	Married	2.71 (0.25)	0.021
	Unmarried	2.77 (0.23)	
Ethnicity	Sinhala	2.73 (0.24)	0.140
	Tamil	2.64 (0.30)	
	Muslim	2.67 (0.32)	
Education level	Not attended school	2.76 (0.10)	0.002
	Grade 1-5	2.72 (0.26)	
	Grade 6-10 completed	2.75 (0.23)	
	Ordinary level completed	2.76 (0.21)	
	Advance level	2.62 (0.31)	
	Diploma level	2.64 (0.55)	
	Degree level	2.62 (0.26)	
Post-graduate studies	2.51 (0.02)		
Current employment	Unemployed	2.73 (0.25)	0.216
	Self - employed	2.73 (0.20)	
	Other employment	2.66 (0.27)	

SD- standard deviation

In the current study, most patients showed a remarkably high level of satisfaction regarding services received at the registration counter, waiting area, consultation area and the pharmacy. In contrast to our study findings, another study carried out in the Panadura Base Hospital in Sri Lanka, which also functions with an eHIS has shown less patient satisfaction with regards to registration services (38.0%), consultancy services (48.0%), and pharmacy services (55.0%). Furthermore, the same study has shown less satisfaction (45.0%) regarding waiting time, although they have an e-health record system [4]. However, the current study revealed a high level of satisfaction regarding waiting time for the registration (96.0%). Another study conducted in Pakistan has shown a nonsignificant association between registration counter services and patient satisfaction ( $\beta=0.028$ ;  $p=0.390$ ) [15]. When considering registration services, the current study revealed a high level of satisfaction regarding instructions displayed at the OPD (97.0%) and verbal information given by the registration counter (96.0%). In comparison, a study carried out in India has shown lower satisfaction for the instruction displayed at the registration counter (67.0%) and verbal information given at the registration counter (88.0%) [12]. The varying number of; outpatients visiting OPD per day, physicians available at a time in the OPD, and staff available at registration desks in different study settings could be considered as the possible reasons for such differences.

Waiting time for consultation is a paramount important aspect of assessing patient satisfaction [13]. The current study revealed a high level of satisfaction (88.4%) regarding waiting time for the consultation. In contrast, a similar survey conducted in the Panadura Base Hospital in Sri Lanka has shown poor satisfaction (33.0%) with the waiting time to consult a doctor [4]. However, the current study recommends introducing a separate queue system for old and new patients

while distributing appropriately among doctors, as new patients require more time for assessing history and examination. It will be beneficial to reduce waiting time at OPD further. In the current study, we found a high level of satisfaction regarding the user-friendliness of PHN (99.4%) and keeping it for subsequent visits (98.3%). These results revealed the patients' high acceptance of the changes that resulted due to the implementation of the HIMS. The hospital administrators and system implementers are accountable for conveying efficient services to the community. Therefore, patients' perceptions and expectations regarding the services are indicators to identify the specific areas that need further improvement. The majority of respondents expressed satisfaction regarding suggestions made by the investigator for further improvement of the implementation such as having an opportunity to make an appointment via telephone (98.0%) and announcing OPD numbers at the waiting area (96.9%). These results support the hospital administration developing the HIMS further to provide high-quality service and narrow the gap between patients' expectations and benefits.

This study also found that the majority were satisfied with services provided in the consultation area and had high satisfaction towards the doctor-patient relationship. Regarding consultation services, 53.3% of participants expressed that they did not need to present previous medical reports, while 38.4% of patients expressed needed. If physicians have access to computerized medical records, they can go through the patient's medical history in subsequent visits. The current study showed a high acceptance of the use of computers by doctors in consultation rooms (97.5%), and 65.2% of patients expressed that the use of computers improves doctor-patient relationships. Similarly, another qualitative study conducted in the United States of America has also shown that using computers for documentation and assessing patients contributes to improve physician-patient



communication and collaborations [14].

The current study revealed that 97.0% of participants were satisfied regarding the availability of medicines in the pharmacy, while a similar study done in the Panadura Base Hospital in Sri Lanka revealed only 57.0% satisfaction on the same [4]. In the current study, almost all study participants were satisfied regarding the promptness of issuing medicines and overall services provided at the pharmacy. Although the percentage of satisfied respondents was high, out of 362 participants, only 183 responded to all questions, including pharmacy-related questions, as they had other investigations or clinics after the consultation. This was one of the limitations of the current study.

Regarding the association of demographic characteristics to patient satisfaction, marital status expressed a significant association with overall satisfaction ( $p=0.021$ ), and education level was significantly associated ( $p=0.002$ ) with patient satisfaction and the overall OPD services. However, a recent study conducted in Malaysia noted that marital status was not associated ( $p=0.288$ ) with patient satisfaction on OPD services, but education level was ( $p=0.004$ ) [11]. These findings reveal that satisfaction is affected by the level of education. The possible reason may be the expectations of patients that vary according to their level of education, and highly educated patients may have more expectations than patients with lower education levels.

According to the qualitative data analysis, all sentiments provided regarding the HIMS implementation were positive. This qualitative result tally well with the findings of the quantitative analysis. All respondents had expressed positive comments regarding the current setting of the OPD implemented with the HIMS. Certain respondents had suggested that the implementation should be developed further and introduced to other government institutions of the

country. On the other hand, the subsequent visitors' comment, "current services at the OPD are more efficient than past", reflects the improvement of services at the CSHW after implementing the HIMS. The suggestion made by certain respondents to display instructions at the OPD in all three main languages used in the country reflects that all patients are not competent with the English language. Hence, it is suggested to overcome the language barrier in order to enhance the outcomes of the HIMS.

### Conclusions

According to the findings, we can conclude that the majority of the patients were satisfied with the overall re-engineered OPD and integrated pharmacy services. The implementation of the HIMS has improved the services provided at the OPD. Providing information in all three languages while announcing the patient's OPD number at the waiting area are needed to be considered as future implementations.

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