- *Basic Research*

Queue Management system and its relation with Patient Satisfaction of Outpatient Clinics

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Abstract

Background: Patient satisfaction with nursing care has become increasingly important to healthcare providers in recent years. The patient paying a visit to any health facility is expecting to be served in the very shortest time possible and in an efficient manner. **Aim**: This study aimed to assess the queue management system and its relation with patient satisfaction of outpatient clinics. **Design**: A descriptive correlational design was employed in this study. **Setting:** The study was conducted at outpatient clinics affiliated with Banha University Hospital, at Al-Kalubia Governorate. **Subjects:** The study sample was selected 317 patients out of the total number of 1800 patients. They were chosen by a simple random sampling technique. **Data collection tools:** Two tools were used for data collection: A queue management practices structure questionnaire and a patient satisfaction questionnaire. **Results:** The study result revealed that 50% of patients were satisfied with total queue management system practices in the outpatient clinics but only 27% of them were dissatisfied with total queue management system practices in the outpatient clinics. The result also indicated that the patients rated overall satisfaction at 59.5%. **Conclusion**: The results demonstrated that there were significant strong positive correlations between the dimensions of queue management in terms of service quality, waiting time, and waiting environment with patient satisfaction. **Recommendations**: Hospital management and staff should continuously be up-to-date technologically and they also be reminded of the value and mission of serving their patients.

Keywords: Patient satisfaction**,** Queue management, outpatient Clinics.

Introduction

As the burden increases on public health systems worldwide, a possibility significance is transferred to patients in the form of longer waiting times to receive Health care (**McIntyre and Chow,2020**). Many people are becoming increasingly apprehensive about long wait times in hospitals due to their several undesirable effects as crowding, patients leaving hindrance without receiving care, patients, and their relatives' irrational behavior, as well as anxiety among both staff and patients **(Megha & Alam, 2022)**. The waiting time spent at health care offers a potential barrier to health care system access. Patients wait at numerous points of their interaction with health systems as time patients wait at home for an initial healthcare provider appointment, time to diagnosis, or for an elective procedure. However, waiting time may also contain time spent in waiting rooms on the day that patients are accessing a clinic or an emergency (**Australian Institute of Health and Welfare,2018).**

The queue management system can significantly reduce the waiting time of the patients at the hospitals (**Titarmare & Yerlekar, 2018**). Queuing systems can occur any time 'customers demand 'service' from some facility; usually, both the arrival of the customers and the service times are assumed to be random. If all the 'servers' are busy when new customers arrive, they will generally wait in line for the next available server. Simple queueing systems are defined by specifying the following the arrival pattern, the service mechanism, and queue discipline. From the probabilistic point of view, the properties of queues are usually derived from the properties of stochastic processes associated with them **(Luo, et al.,2020).**

The queue management systems permit the staff to excellently manage patient waiting times and unify the entire patient flow, speed delivery of care is emphasized and can be partly qualified to increase competition and the value a patient places on time. Furthermore, a satisfied patient leaves the hospital with an optimistic impression and is less likely to criticize or file suits against the institution. In addition to these marketing roots, patient satisfaction has been indicated to increase with fulfilling instructions. Therefore, physicians can positively influence their patients' outcomes **(Bidari, Jafarnejad &Faradonbeh,2021).**

There are various types of queue management such as structured queues in which People stand in a predictable stance, and they are organized. The most frequent locations for these lines to form are grocery store checkouts and airport safety, Unstructured queues which People stand at various angles and positions, and they are typically unpredictable, Mobile when People use their mobile devices to queue up for services by making appointments online and arriving at the service facility just when they are scheduled to be served and last type are queues include customers fill out their contact information and the reason for their visit at this self-service kiosk. In banking and medical facilities, these lines are typical **(Baballe,2022).**

Patient satisfaction is the major factor in the hospital running which helps in enhancing the quality of health care services, improved quality of nursing care and patient satisfaction,

and attract new patients to the hospital rather than another hospital. Satisfaction of patients is a crucial healthcare outcome, clinical safety, and clinical effectiveness across healthcare settings. Thus, healthcare organizations focus on improving patient satisfaction. Also, there is a strong link between staff experience, patient satisfaction, staff job satisfaction, and work engagement **(Sahni & El-Sharkawy,2021).** Furthermore, the only factor that had a significant influence on overall satisfaction was waiting time, with those waiting for over 30 minutes reporting that they were dissatisfied with the service provided ((**Med et al., 2015).**

Patient satisfaction regarding health care is a multidimensional concept that has now become a very crucial healthcare outcome. A meta-analysis of satisfaction with medical care revealed the following aspects of patient satisfaction and the overall performance of an organization: overall quality, trust, reputation, continuity, competence, information, organization, facilities, attention to psychosocial problems, and outcome of care. All of these factors have a high influence on the service quality of healthcare organizations and at the same time can influence the satisfaction level **(Thomas et al.,2022).**

Significance of the study

The actual time patients spend waiting in waiting rooms for treatment, clinics, or procedures is an important barrier to care. Patient satisfaction is an important indicator for assessing the quality of health care because it affects the timely, efficient, and patient-centered delivery of quality health care, and patient satisfaction is associated with clinical outcomes(**Al-Harajin, Al-Subaie Elzubair,2019).** Additionally, several studies documenting patient dissatisfaction with long waiting times revealed that a pervasive problem in hospital practice and a common source of anxiety and dissatisfaction among patients **(Guarte, Elsayed& Khalil, 2022).** Accordingly, the impact of the queuing system on patient satisfaction is a very critical issue. So, the researchers are interested in studying Queue management and its relation with patient satisfaction of outpatient clinics.

Aim of the Study

This study aims to assess the queue management system and its relation with patient satisfaction of outpatient clinics.

Research Question:

What is the relation between the queue management system and patient satisfaction of outpatient clinics?

Subject and methods

Research Design:

A descriptive correlational design was employed in this study. It is the type of research concerned with the characteristics of a particular individual, group, event, or situation and

determines the association between patient satisfaction as the dependent variable and queue management system as an independent variable (**Kothari, 2019).**

Study Setting:

The study was conducted at outpatient clinics affiliated with Banha University Hospital in Al-Kalubia Governorate. These clinics serve many adult patients in various specialties of surgery, medicine, cardiology, orthopedics, and (ENT) ear, nose, and throat, their number is 38 clinics, and they employ 80 nurses. These clinics operate daily for two periods, morning from 9 AM to 2 PM and in the evening from 3 PM to 8 PM.

Subjects

The study subjects include patients visiting the outpatient clinics, their total number is about 1800 patients per month according to statistics of the last year, during the morning and evening periods.

Sample Size:

The study sample was selected by simple random sampling technique, during the data collection period according to the criteria adults, had a full level of consciousness, visited the clinic during both morning and evening periods, and frequented there more than 3 times. The study sample was selected from 317 patients out of the total number of 1800 patients, using an equation to calculate the sample size from the next formula (Thompson,2012).

N= Population (1800)

Z= confidence level 95% (1.96)

P= probability (50%)

d= margin of error (0.05)

$$n = \frac{Np(1-p)}{(N-1)(d^2/z^2) + p(1-p)}$$

So, sample size (n) = (317)

Tools of data collection

Data for this study was collected by two tools namely; a Queue management practices structure questionnaire and patient satisfaction questionnaire (PSQ).

First tool: Queue management practices structure questionnaire
It consists of two parts as follows:

Part I: Patient demographic characteristics:

It was designed to collect personal data including age, gender, level of education, marital status, and employment status.

Part II:

This part aimed to assess queue management practices, it was developed by researchers based on (Burodo & Suleiman,2021). It includes 28 items grouped into three main dimensions:

1- **Service quality**: It consists of 5 sub-dimensions including 14 items as follows:
   - **Tangible:** It comprises 3 items (e.g., Hospital gives access to information about its services).
   - **Reliability:** It comprises 3 items (e.g., the Hospital keeps its promises to patients).
   - **Responsiveness:** It comprises 2 items (e.g., Hospital staff tell patients when services will be performed).
   - **Assurance:** It comprises 3 items (e.g., The behavior of hospital staff inspires confidence in patients).
   - **Empathy:** It comprises 3 items (e.g., Hospital has convenient working hours).

2- **Waiting time for service:** It includes 7 items (e.g., Have you ever turned away due to the longer time taken to be serviced?

3- **Waiting environment conditions**: It contains 7 items (e.g., there are enough chairs and/or benches in the room for patients to sit while waiting for service.

Scoring system:

The studied patients' responses indicate their agreement with items of a self-reporting five-point Likert-type scale in questions form demanding information for each in any of the five options: (strongly agree, agree, neutral, disagree, and strongly disagree). The items were scored as 5, 4, and 3,2,1 respectively, with higher mean scores indicating agreement level regarding more satisfaction with queue management system practices and vice versa All answers are summed to produce a total score, from 28 to 140, with high-level (> 4.25 mean score, => 85%), average level range from (3.5-4.25 mean score, = 70 – 85%), and low level (< 3.5 mean score, =< 70 % (Burodo & Suleiman,2021).

Second tool: Patient Satisfaction Questionnaire (PSQ)

This questionnaire was developed by (Ayele,2020) and adopted from (Hegazy et al.,2021). It is used to assess patients' satisfaction level with outpatient clinic services, and includes 18 items consisting of seven subscales that include various facets of satisfaction:

1- **The technical quality of services:** It contains 4 items (e.g., I have easy access to the medical specialist I need).

2- **General satisfaction:** It contains 2 items (e.g., I can get medical care whenever I need it).
3- **Communications:** It contains 2 items (e.g., I have to pay for my medical than I can afford).
4- **Interpersonal behavior**: It contains 2 items (e.g., my medical care sometimes hurry too much when they treat me).
5- **The financial aspect**: It contains 2 items (e.g., I feel confident that I can get the medical care I need without being set back financially).
6- **Accessibility and convenience**: It contains 4 items (e.g., the medical care I have been receiving is just about perfect).
7- **Times spent with the doctor**: It contains 2 items (e.g., doctors sometimes ignore what I tell them).

Scoring system:

The responses were tallied using a 5- -Likert scale, with a high score of 5 signifying a high degree of satisfaction with the outpatient clinic services. Some responses of patients of certain Items were scored in descending order from strong agreement (score 5) to strong disagreement (score 1), whereas some items had negative responses of directions that had irreversible scores, in ascending order from strong agreement (score 1) to strong disagreement (score 5). A scale from 1 to 5 was used to calculate the mean of the scores. Based on the ratings given by the participants for each item in the various outcome variables, the satisfaction score was generated. The total satisfaction score was separated into two categories: dissatisfaction (below 60%) and satisfaction (equal to or above 60%) (Hegazy, et al.,2021).

Ethical consideration:

Before the study was conducted, approval was obtained from the scientific research ethical committee in the faculty of nursing/Banha University. In addition, the researcher met the heads of the hospital and outpatient clinic departments to explain the aim of the study to gain their written approval. Additionally, the researcher met the study subjects in clinic rooms and explained the aim of the study to them to get written consent before conducting the data collection. The study subjects were assured that anonymity and confidentiality would be guaranteed, and they were informed that their participation was voluntary and that they had the right to withdraw from the study at any time.

Tools validity and reliability:

These two tools were translated back-to-back into Arabic language by researchers to achieve the criteria of trustworthiness of the tools of data collection, the tools were tested and evaluated for their face and content validity by a panel of 5 experts (2 professors in the nursing administration department at Ain Shams University and 2 assistants professors in

nursing administration department and 1 professor in community health nursing department at Banha University). The experts reviewed the tools for its content, clarity, simplicity, relevance, comprehensiveness, appropriateness, and applicability. Minor modifications were done in some items to be simple and then the final forms of the tools were developed.

Reliability

The tools were tested for their reliability of the Arabic version, internal consistency tests and item-scale correlations were also carried out by Cronbach's Alpha Coefficient test, which was 0.89, for the Queue management practices structure questionnaire and 0.91 for the patient satisfaction questionnaire, these scores indicating a high degree of internal consistency.

Pilot study:

The pilot study aimed to determine the applicability of the tools, determine the time consumed for filling in the questionnaire sheets, and test the clarity of language. The pilot study was conducted two weeks before collection of the data. It was carried out on 32 patients which denotes (10%) of the study sample. These subjects were excluded from the main study sample, data obtained from the pilot study was analyzed and no modifications were made. According to the pilot study, the completion of each questionnaire sheet ranged between 35 – 45 minutes. This stage took two weeks.

Fieldwork:

The data collection phase of the study lasted five months, from the beginning of September 2021 to the end of January 2022, three days per week during two periods, morning from 9 AM to 2 PM and evening from 3 PM to 8 PM. Before distributing the questionnaire, the purpose of the study and the components of the tools were explained to the participants in the study settings. Then, the investigators distributed the data collection sheets to the respondents individually at the places designated for patients' restrooms and other places to receive them in outpatient clinics, investigators were present all the time for any needed clarification. The researchers checked the completeness of each sheet to ensure the absence of any missing data.

Statistical Design:

Data entry and statistical analysis were done using the SPSS 25.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies, percentages, mean, and standard deviation for quantitative variables. Cronbach alpha coefficient was calculated to assess the reliability of the tools through its internal consistency. Quantitative continuous data was compared using the non-parametric t-test. Spearman rank correlation was used for the assessment of the inter-relationships between

quantitative variables and ranked ones. To identify the independent Queue Management system and dependent Patient Satisfaction, multiple linear regression analysis was used and analysis of variance for the full regression models was done. Statistical significance was considered at p-value <0.05.

Results:

Table 1: shows that 37.8% of the studied patients' ages ranged between 41- 60 years old with Mean± SD (44.45±9.93). While, only 7.3% of them their age ≤ 20 years old. Moreover, slightly less than two-thirds 60% of them were female. Additionally, slightly more than half 51% of the studied patients had been educated at Secondary school, 67% of them had married, meanwhile, 26.8% were retired.

Table 2 shows that patients were not satisfied in great mean with the tangibility services. Patients were not satisfied with the reliability of the hospital services except that the hospitals are dependable and consistent in solving their problems with a mean = 3.90. Patients were moderately satisfied with the responsiveness of the hospital's services since agreed with one item of hospital staff willingly attending to patients' inquiries and problems with a mean of 3.49 and disagreed with the other Hospital staff telling patients when services will be performed. Patients were not satisfied with the assurance of the hospital's services except that the patients have reasonably agreed that the hospital staff can fix patients with a mean of 3.85. Patients were not satisfied with the empathy of the hospital's services except that the patients have to some extent agreed that the hospital has convenient working hours with mean= 3.33.

Table 3 presents the perception of the patients on waiting time for service, the majority of patients with(mean=3.90) described the time spent waiting for service at the hospital as too long, It also indicates that patients with(mean= 3.52) have not ever balked after they entered hospital and found out there are a lot of people waiting for services, and agree with there is a queue management practice seen at the hospital with (mean= 3.49), while patients with (mean =1,99) were happy with the service time in the clinics, and patients with (mean= 2.45) rated service time fast.

Table 4 shows the perception of the patients on waiting environment conditions, this indicates that the majority of patients with(mean=4.73) described the queue discipline as following a fair pattern mostly, It also indicates that patients with(mean=3.83) agreed that the hospital staff are of great help in helping patients in queues. meanwhile as noticed that patients with (mean =1,45) described the waiting room as well ventilated.

Table 5 reveals that there are significant strong positive correlations between the dimensions of queue management in terms of service quality, waiting time, and waiting environment with patient satisfaction. The correlations between waiting time, waiting environment, and

service quality with patient satisfaction with(r=0.632, 0.655and 0.721)respectively, and p<0.001.

In multivariate analysis, table (6), demonstrates the best-fitting multiple linear regression model for score. The table indicates lower patient' views on queue management scores of unmarried patients than married. And higher patients' views on queue management scores of genders as female patients than male.

In the multivariate analysis table (7), the best fitting multiple linear regression model for predictors of studied patients' characteristics on their satisfaction scores. The single statistically significant factor was high school patients' higher satisfaction scores than other levels of education.

Table 1: Percentage distribution of the studied patients' characteristics (N=317)

Characteristics	No.	Percent
Age:		
≤ 20	23	7.3
21-40	94	29.6
41-60	120	37.8
Above 60	80	25.3
Mean ± SD	**44.45±9.93**	
Gender:		
Female	189	60
Male	128	40
Level of education:		
Illiterate	20	6.3
Primary School	42	13.4
Secondary school	162	51
High school	93	29.3
Marital Status:		
Married	213	67
Unmarried	104	33
Employment status:		
Civil servant	67	21.4
Retired	85	26.8
Self-employed	32	10
Student	28	8.8
Other specify	105	33

Table 2: Mean and SD of the patient's perception levels regards service quality dimension (n=317)

Sub dimensions	Items	Mean (max=5)	±SD
Tangible	The hospital waiting environment is good (big enough) with nice equipment and materials	2.04	4.87
	The appearance of the working staff is attractive	2.45	6.84
	Hospital gives access to information about its services	2.09	5.79
Reliability	Hospital services are delivered timely	1.5	7.13
	The hospital keeps its promises to patients	2.95	7.21
	The hospital is dependable and consistent in solving patients' problems	3.90	6.5
Responsiveness	Hospital staff willingly attend to patients' inquiries and problems	3.49	7.13
	Hospital staff tell patients when services will be performed	1.33	8.32
Assurance	The behavior of hospital staff inspire confidence in patients	1.50	6.83
	Hospital staff can fix patients Problems	3.85	7.21
	Hospital services are of high quality.	1.90	6.5
Empathy	Hospital staff are approachable and easy to communicate	2.21	7.11
	The hospital has convenient working hours	3.33	8.36
	The attitude of the nursing personnel is good	2.50	6.72

Table 3: Mean and SD of the patient's perception levels regards waiting time for service dimension (n=317)

Items	**Mean** (max=5)	**±SD**
I am happy with the service time	1.99	8.24
I rate the service time is fast	2.45	7.55
I turned away due to the longer time taken to be serviced	3.09	5.79
I have never balked after they entered the hospital and found out there were a lot of people waiting for services	3.52	7.55
I am satisfied with how patients are handled at the hospital while waiting for service	2.95	7.98
The time you spend waiting for service at the hospital is too long	3.90	8.66
There is a queue management practice seen at the hospital	3.49	7.45

Table 4: Mean and SD of the patient's perception levels regards waiting environment conditions dimension (n=317)

Items	**Mean** (max=5)	**±SD**
The waiting room is spacious and big enough	2.31	7.66
The waiting room is well-ventilated	1.45	5.32
There are enough chairs and/or benches in the room for patients to sit while waiting for service	2.35	5.79
Queues are managed properly at the hospital.	3.44	6.23
There are barriers to guiding patients in queues.	2.88	5.98
Hospital staff are of great help in helping patients in queues.	3.83	8.64
Queue discipline follows a fair pattern mostly (i.e the first to arrive will be serviced first	4.73	7.45

Table 5: The correlations between waiting time for service, waiting environment conditions, and service quality with patient satisfaction.

Variables	Spearman's rank correlation coefficient	
	Patient Satisfaction	
	R	P
service quality	0.632	0.001**
waiting time for service	0.655	0.001**
waiting environment conditions	0.721	0.001**

R: Pearson coefficient **: statistically significant at (p =0.001).

Table 6: Best fitting multiple linear regression model for predictors of studied patients' characteristics on their views on queue management

	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Constant	33.42	6.55		5.103	<0.001	20.48	46.36
Unmarried	-11.15	4.48	-0.19	-2.491	0.014	-20.00	-2.30
Gender as Female	15.30	3.95	0.30	3.877	<0.001	7.50	23.09

R-square=0.12 Model ANOVA: f=9.81, p<0.001

Variables entered and excluded: age, Level of education: and Employment status.

Table (7): Best fitting multiple linear regression model for predictors of studied patients' characteristics on their satisfaction

	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Constant	45.87	2.26		20.271	<0.001	41.40	50.34
level of education as high school	7.10	3.52	0.16	2.016	0.046	0.14	14.05

r-square=0.02 Model ANOVA: F=4.07, p=0.046

Variables entered and excluded: age, gender, marital status and employment status.

Figure 1: The responses of patients' views on queue management dimensions (n=317)

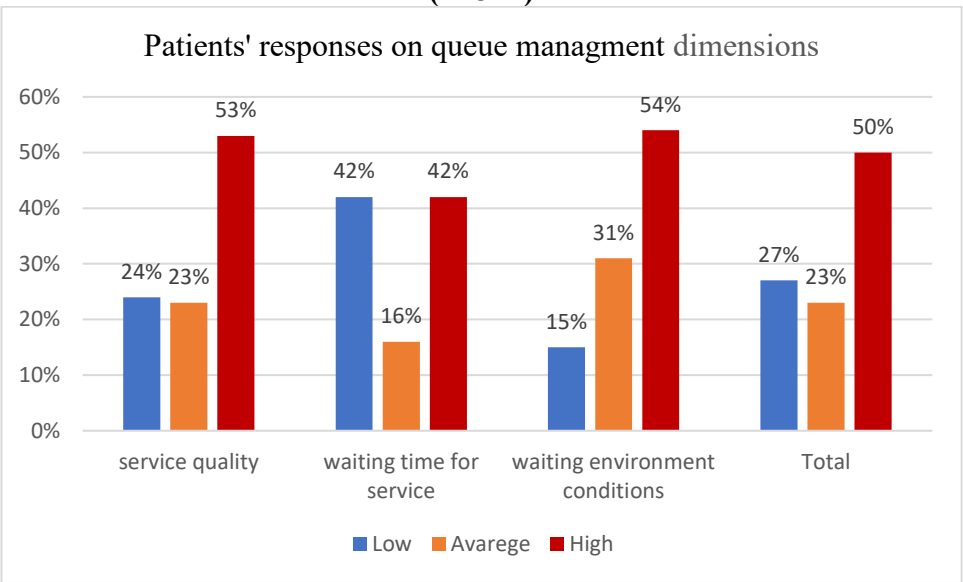

Figure 1 demonstrates the responses of patients' views on queue management dimensions, as noticed in this figure slightly more than half of them are satisfied with service quality and waiting environment conditions. Meanwhile, only 42% of them were satisfied with the waiting time of service, hence 42% of them were not satisfied with the waiting time of service. It also indicates that half of the patients were satisfied with total queue management

system practices in the outpatient clinics but only 27% of them were not satisfied with total queue management system practices in the outpatient clinics.

Figure 2: Patients' responses to subscales and total levels of satisfaction (n=317)

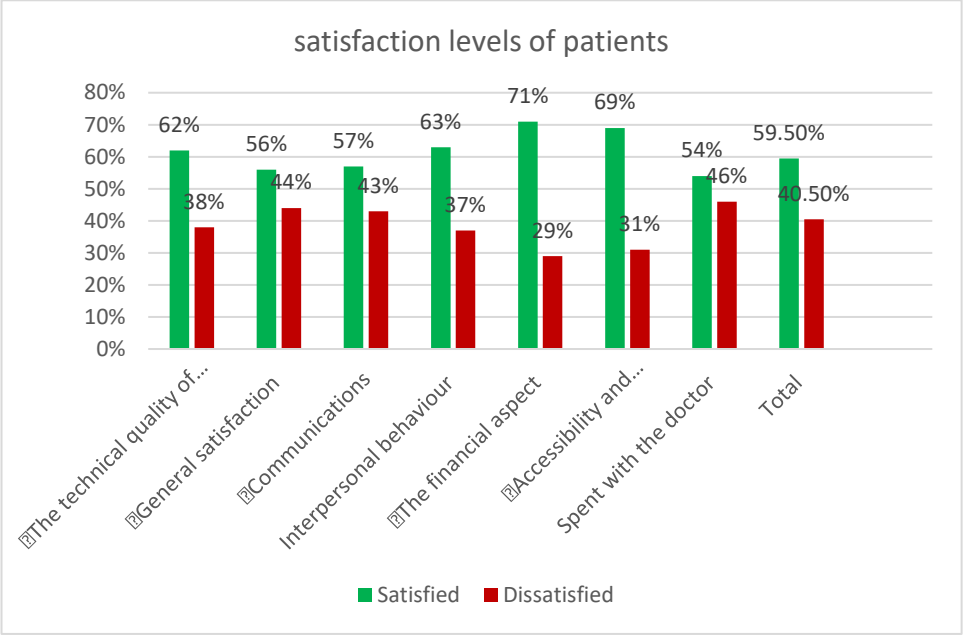

Figure 2 patients' responses to subscales and total levels of satisfaction. As sighted, they are satisfied with the financial aspect which received a high rating (71%), accessibility and convenience (69%), and the subscale technical quality (62%). Additionally, 63% and 57%, respectively, were assigned to interpersonal components and communication. while general satisfaction with medical care and the amount of time spent with the doctor, had a lower rating56% and 54%, respectively. Therefore, they rated overall satisfaction at 59.5%.

Discussion

The health care services based on contemporary information systems by accurate use of data, appropriate allocation of resources, and timely execution of processes are all necessary to maintain the patient flow within the clinics. Queuing systems decrease nurse workload to increase the quality of nursing care, and the quantity of physical and emotional support the patients receive and improve patient satisfaction. A good indicator of the quality of nursing service attained from better-quality daily activities, tasks of nurses, and nursing assessment adequacy (**Koko et al.,2019).** So, this study aimed to assess the relationship between queue management and patient satisfaction.

patients' satisfaction regarding queue management, the current study reveals that the patients were moderately satisfied with the tangibility services except for the

waiting environment which according to the respondents was not good and spacious. Patients were not satisfied in great percentage with the reliability of the hospital's services except that the hospitals are dependable and consistent in solving their problems. Patients were moderately satisfied with the responsiveness of the hospital's services since agreed with one dimension of it and disagreed with the other.

The result findings agreed with **(Sani et al., 2021)** who conducted a study entitled An Assessment of Queue Management and Patient Satisfaction of Some Selected Hospitals in North-Western Nigeria and found that the majority of the studied sample was satisfied with a great percentage of the tangibility services except waiting environment.

Concerning patients' perception levels regards waiting time for service, the result indicates that the majority of patients describe the time spent waiting for service at the hospital as too long, It also indicates that patients have not ever balked after they entered the hospital and found out there are a lot of people waiting for services, and agree with there is a queue management practice seen at the hospital with high mean, while it indicates that of patients with low mean were happy with the service time in the clinics.

From the researchers' point of view, this result might be because the hospital covers a large sector of the population, especially with the nursing shortage. The result was in agreement with ***(Biya et al., 2022)*** who conducted a study titled By Waiting Time and its Associated Factors in patients presenting to Outpatient Departments at Public Hospitals of Jimma Zone, Southwest Ethiopia, and found that more than two-thirds of respondents visited the hospital spent a longer waiting time.

patients' perception levels concerning waiting environment conditions indicates that the majority of patients describe the queue discipline as following a fair pattern mostly, It also indicates that patients agreed that the hospital staff are of great help in helping patients in queues. meanwhile as noticed that a minority of patients describe the waiting room as well-ventilated. The result was supported by **(Fard, 2022)** who conducted a study entitled Maximizing Patient Satisfaction in Systems with Time-Varying Arrival Rates and found that rooms are well-ventilated.

Regarding the perception of patients about the total dimension of queue management. Overall, the current study reveals that more than half of them were satisfied with the quality of services and waiting environment and satisfied with all dimensions of queue management. From the investigators' point of view, the previous finding could be explained by the importance of the queue management system has a clear impact on the quality of nursing care, that have directly and effectively contributed to improving the quality of nursing care and increasing the level of the patient satisfaction, where each hospital must establish an appropriate system for managing the

queues that guarantee the smooth flow, reduce waiting time, enhance nurses care due to plenty of time for patient care and lessening nurse workload.

The result agreed with (**Habbache & Maiza, 2021)** who illustrated the relationship between queue Management System and the quality of nursing service, this research revealed there is a clear and significant relationship between the queue management system and the quality of nursing service, as the queue management system allows the hospital to reduce the waiting time, in addition to reducing the frustration rate, and all this leads to an improvement in the patient satisfaction rate.

Regarding the total dimension of patient satisfaction, the current study reveals that the patients were satisfied with the financial aspects and accessibility dimension. The result findings were congruent with those **(of Bidari et al ., 2021)** who conducted a study entitled Effect of Queue Management System on Patient Satisfaction in Emergency Department; a Randomized Controlled Trial and found patients satisfied with accessibility.

In multivariate analysis, the result demonstrates the best-fitting multiple linear regression model for the score. It indicates lower patient' views on queue management scores of unmarried patients than married. And higher patients' views on queue management scores of genders as female patients than male. This expected result because unmarried patients are young and can't tolerate long waiting times, females also are more patient than males.

In multivariate analysis, the best fitting multiple linear regression model for predictors of studied patients' characteristics on their satisfaction scores. The single statistically significant factor was high school patients' higher satisfaction scores than other levels of education. This result might be due to highly educated people they have more aware of the service provided and more aware of the huge number of a patient coming to the outpatient clinic and identifying that the health members exert high efforts and offer the best service they can offer to patients.

Conclusion

Based on the findings of the present study it can be concluded that there are slightly more than half of the studied patients were satisfied with service quality and waiting environment conditions. Meanwhile, only 42% of them were satisfied with the waiting time of service, hence 42% of them were dissatisfied with the waiting time of service. It also indicates that half of the patients were satisfied with the total queue management system practices in the outpatient clinics but only 27% of them were dissatisfied with total queue management system practices in the outpatient clinics. they are satisfied with the financial aspect which received a high rating (71%), accessibility and convenience (69%), and the subscale technical quality (62%). Additionally, 63% and 57%, respectively, were assigned to

interpersonal components and communication. while general satisfaction with medical care and the amount of time spent with the doctor, had a lower rating56% and 54%, respectively. Therefore, they rated overall satisfaction at 59.5%. There are significant strong positive correlations between the dimensions of queue management in terms of service quality, waiting time, and waiting environment with patient satisfaction. The correlations between waiting time, waiting environment, and service quality with patient satisfaction with ($r= 0.632, 0.655$and 0.721) respectively, and $p<0.001$.

Recommendations

It was derived based on the findings of the study.

- Nurses have to attend patient care pieces of training frequently and be reminded of the mission and vision of serving their patients.
- Continuous assessment of patient satisfaction is vital to any hospital's success ensuring continuity of care and enhancing the overall patient experience.
- Provide adequate ventilation and ensure the waiting room is well-ventilated.
- Keeping patients informed about their real-time is crucial for managing expectations and reducing anxiety.

- Integration with details and health record systems allows clinics to access patient information quickly to retrieve medical records, update patient details, and maintain a comprehensive record of each patient’s visit.

- Reduce the wait time by ensuring that facilities have sufficient staff and scheduling platforms.

- Improvement in the waiting environment as listening to music and, the presence of a café may increase the patient’s level of satisfaction.

- Increased patient education also increases trust in providers and the healthcare system, contributing to improved patient satisfaction.

Further studies are suggested:

- Investigate the relation between patient satisfaction and competitive advantages.
- Measuring the relation between patient satisfaction and quality improvement.
- The effect of a queue management system on patient satisfaction in the emergency department.

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الملخص العربي

نظام إدارة قائمة الانتظار وعلاقته برضا المرضى في العيادات الخارجية

مقدمه: أصبح رضا المرضى عن الرعاية التمريضية ذا أهمية متزايدة لمقدمي الرعاية الصحية في السنوات الأخيرة .يتوقع المريض الذي يقوم بزيارة أي مرفق صحي أن يتم خدمته في أقصر وقت ممكن وبطريقة فعالة. الهدف: هدفت هذه الدراسة إلى تقييم نظام إدارة قائمة الانتظار وعلاقته برضا المرضى في العيادات الخارجية. التصميم: تم استخدام تصميم ارتباطي وصفي في هذه الدراسة. المكان: أجريت الدراسة في العيادات الخارجية التابعة لمستشفى جامعة بنها بمحافظة القليوبيه. الموضوعات: تم اختيار عينة الدراسة 317 مريضا من إجمالي عدد المرضى البالغ 1800 مريض. تم اختيارهم من خلال تقنية أخذ العينات العشوائية البسيطة. أدوات جمع البيانات: تم استخدام أداتين لجمع البيانات: استبيان ممارسات إدارة قائمة الانتظار واستبيان رضا المرضى. النتائج: كشفت نتائج الدراسة أن 50٪ من المرضى كانوا راضين عن ممارسات نظام إدارة قائمة الانتظار افي العيادات الخارجية ولكن 27٪ منهم فقط كانوا غير راضين عن ممارسات نظام إدارة قائمة الانتظار الكلية في العيادات الخارجية. كما أشارت النتائج إلى أن المرضى قيموا الرضا العام بنسبة 59.5٪. الخلاصة: أظهرت النتائج وجود ارتباطات إيجابية قوية ذات دلالة إحصائية بين أبعاد إدارة قائمة الانتظار من حيث جودة الخدمة ووقت الانتظار وبيئة الانتظار مع رضا المرضى. التوصيات: يجب أن تكون إدارة المستشفى وموظفوه على اطلاع دائم بالتكنولوجيا وأن يتم تذكيرهم أيضا بقيمة ومهمة خدمة مرضاهم