

STUDY THE IMPACT OF PATIENT APPOINTMENT SYSTEMS ON SERVICE
QUALITY AT THUMBAY UNIVERSITY HOSPITAL'S OUTPATIENT
DEPARTMENT IN AJMAN

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfillment forthe award of the degree of

Master of Business Administration (MBA)

in

Hospital and Health Management

by

Nandini Mehendiratta

Under the Supervision and Guidance of

Dr. Susmit Jain

2023

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DECLARATION BY STUDENT

I hereby declare that this dissertation titled **Study the Impact of Patient Appointment Systems on Service Quality at Thumbay University Hospital's Outpatient Department in Ajman** is the bonafide record of my original researchwork. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

Name of Student: Nandini Mehandiratta

Date: June 19, 2023

Completion Certification

CERTIFICATE

This is to certify that **Nandini** in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur has successfully completed her internship at THUMBAY UNIVERSITY HOSPITAL, Thumbay Medicity Al Jurf, Ajman- U A E. during March 13 – June 13, 2023.

Place: TUH, Ajman U.A.E

Date: 19/06/2023



Dr. Gurjit Singh Monga

Chief operating officer

Name of the Organization:

Thumbay University Hospital, Ajman



مستشفى ثومبي للعلاج
الطبيعي وإعادة التأهيل
THUMBAY PHYSICAL THERAPY
AND REHABILITATION HOSPITAL
THUMBAY UNIVERSITY HOSPITAL COMPLEX



15th June 2023

To Whom It May Concern

This is to certify that **Ms. Nandini** holder of Indian Passport Number P4848286 was working in our institution in the department of Quality Assurance as Management Trainee from 13th March 2023 to 13th June 2023.

We wish her all the best in her future endeavors.

For **Thumbay Physical Therapy and Rehabilitation Hospital**

Dr. Thumbay Moideen
President



مجمع
مستشفى جامعة ثومبي - ذ.م.م
THUMBAY UNIVERSITY HOSPITAL
COMPLEX - L.L.C.

Certificate from Faculty Guide and School Dean

CERTIFICATE

This is to certify that dissertation titled **Study the Impact of Patient Appointment Systems on Service Quality at Thumbay University Hospital's Outpatient Department in Ajman** is a record of the research work undertaken by **Nandini** in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and her approach to the research study sincere, scientific, and analytical.

Faculty Guide: Dr. Susmit Jain

IIHMR University, Jaipur

Date

School Dean

IIHMR University, Jaipur

Date

Abstract

Introduction:

A patient appointment system in the outpatient department (OPD) is crucial for efficient and effective healthcare services. Traditional walk-in systems often result in long waiting times, overcrowding, and patient dissatisfaction. The need for a patient appointment system arises to provide timely access to care, optimize resource allocation, reduce waiting times, enhance patient satisfaction, and improve overall healthcare access and safety. Implementing a patient appointment system enables efficient workflow management, facilitates data collection and analysis, and promotes informed decision-making. The importance of a patient appointment system lies in its ability to streamline operations, improve patient experience, and meet the evolving needs and expectations of patients.

With this backdrop the study was carried out to make available a detailed analysis of the association between service quality and the patient appointment systems, with focus on critical examination and observation-based outcomes.

Methodology:

The study is descriptive and cross-sectional. Data was collected through analyzing key demographic parameters, conducting patient surveys through designed questionnaire, and observing outcomes. The study was carried at Thumbay University Hospital's Outpatient Department, Ajman from March 13,20223 till June 13,2023. Data was analyzed by SPSS software.

Results:

Demographic analysis of patients visiting Thumbay University Hospital, revealed that majority of patients were male, with age groups. Patient appointment system findings indicated that most appointments were made through phone calls rather than online.

The study examines specific elements of the appointment system, such as waiting times and appointment reminders, in addition to service quality. According to the analysis, the patient appointment system successfully deployed this functionality, as 44.4% of patients received

appointment reminders using it. As a large fraction of patients (46.2%) reported waiting 20 to 30 minutes after arriving at the hospital before seeing a doctor, the findings indicate that there is room for improvement in terms of waiting times.

The research inferred the outcomes of descriptive analyses by conducting an inferential assessment of the relationship between the service quality and the appointment systems used for the patients. By using chi-square testing, a significant Pearson Chi-Square value (768.512) with a p-value of .000 was obtained. This validates strong link between Thumbay University Hospital's patient appointment system and service quality.

Discussion:

The findings discussed in the results highlight the need for improvements in various areas, such as implementing an effective and automated online appointment system, staff training, efficient management of waiting times, and creating a welcoming and tidy waiting area. The study emphasizes the importance of addressing patient concerns and enhancing service quality to meet patient expectations.

Conclusion:

The research study concludes that the patient appointment system at Thumbay University Hospital's Outpatient Department requires improvements to enhance service quality. The study emphasized the significance of improving the existing patient appointment system to meet the increasing needs and expectations of patients. The results also bring out the necessity of improvements in a number of areas, including the implementation of an online appointment system, staff training, efficient waiting time management, and the creation of a warm and tidy waiting area. The goal of these recommendations is to raise the caliber of service and patient experience at Thumbay University Hospital.

Keywords:

Patient Appointment System, Quality of Service, Out-Patient Department, long waiting time, staff training, waiting area, appointment reminders

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My greatest gratitude goes to the organization's **HR department**, the **front desk administrator**, and the **OPD In-charge** for their cooperation and support in making the data gathering process go well. Their help was critical in ensuring a smooth study experience.

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Abbreviations

OPD	Out-Patient Department
TUH	Thumbay University Hospital
UAE	United Arab Emirates
PAS	Patient Appointment System
PSS	Patient Satisfaction Score
SPSS	Statistical Package for the Social Sciences
DF	Degrees of Freedom
N	Number
SD	Standard Deviation
CI	Confidence Interval
NIL	None
MOA	Mode of Appointment
KPI	Key Performance Indicators
SQ	Service of Quality
IC	Inclusive Criteria
EC	Exclusive Criteria
MoH	Ministry of Health
PHC	Primary Health Care Centres
ME	Margins of Errors

Chapter 1

Introduction:

Thumbay University Hospital situated in Ajman is a highly-regarded healthcare organization that is deeply rooted in the Thumbay Group's vision statement and unwavering dedication to comprehensive medical care. Beginning as Gulf Medical College back in 1998, it has evolved into an internationally recognized hospital by the year 2019, delivering exceptional medical treatment, education opportunities, as well as research.

One of its major contributions to providing easily-accessible and specialized healthcare services lies with its OPD department which plays a crucial role here. With various diverse departments strengthened by skilled professionals, this sector makes sure patients receive speedy diagnosis along with customized treatment plans apart from complete post-treatment care follow-up phase included. Due to their faultless commitment towards excellence coupled with patient-centric methodology made them one of the most admired hospitals available within & beyond UAE region's healthcare landscape.

1.1 Introducing the Hospital's Patient Appointment System:

A patient appointment system in a hospital is a digital tool or software that facilitates the scheduling and management of patient appointments. It simplifies the scheduling of appointments, shortens wait times, boosts patient happiness, and increases overall facility efficiency. Hospitals may efficiently manage their resources, assign time slots, and guarantee the best possible use of their medical staff with the aid of a patient appointment system.

1.1.1 Patient Appointment System Types:

1. **Phone-based Appointment System:** With the assistance of hospital employees, patients can contact the hospital's hotline to make appointments. Although this strategy enables face-to-face communication between patients and hospital staff, it can still be labor-intensive and could prolong phone hold times.

2. **Online appointment system:** With the use of this system, patients can schedule their appointments online via the hospital's website or by using a distinct online portal. This allows the patients to identify the available timeslots, book an appropriate appointment date and time, and receive an electronic confirmation over email/SMS. This service, on one hand, benefits the patients, while on the other hand, minimizes the administrative work for the employees of the hospital.
3. **Mobile Appointment System (MAS):** The MAS is used to allow patients to choose and book their appointments using their smartphones by using the mobile applications(1).

1.1.2 About Thumbay University Hospital Appointment System:

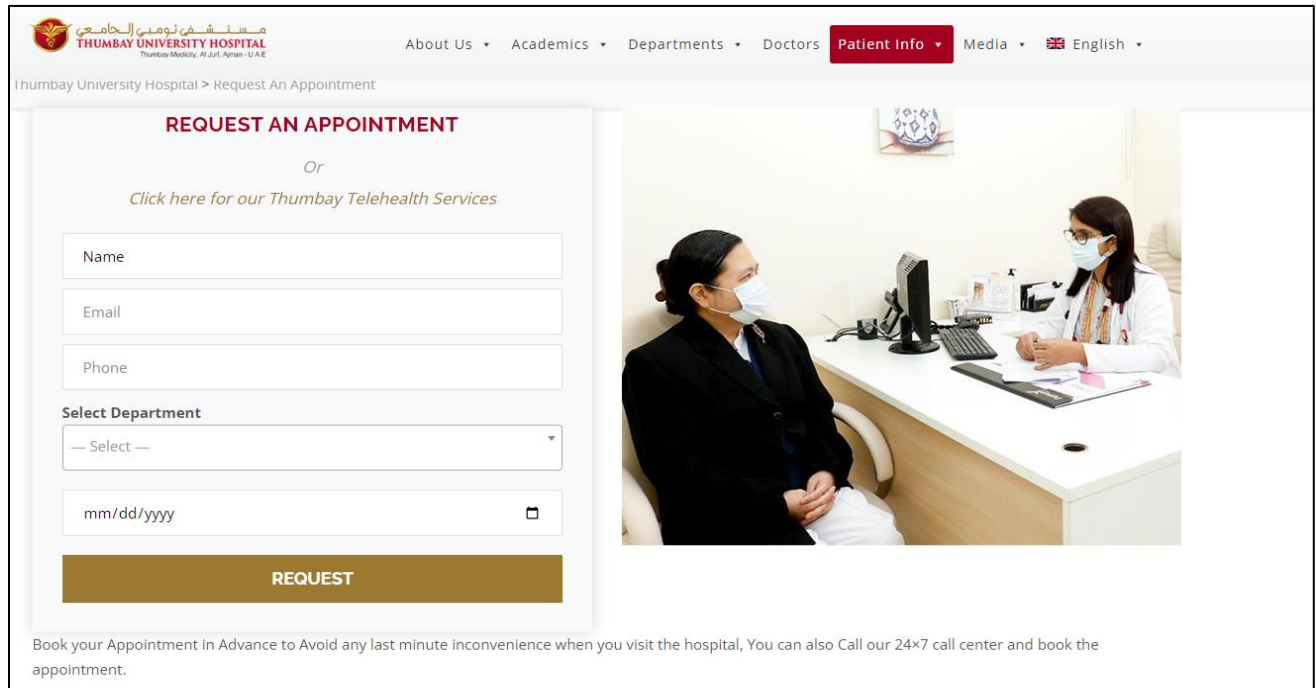
Thumbay University Hospital is a trustworthy health care facility, offering a wide range of medical facilities. The hospital's innovative web-based appointment booking system for patients was crafted to make the process of appointment booking quicker and easier. The system has a number of features and functions that improve patient experience and streamline operations.

The appointment system has been used by patients to book appointments with Thumbay University Hospital by using a dedicated smartphone application or the official website of the hospital. This enables easy management of appointments via a patient account and secure login process. In addition, patients can use the phone-based appointment booking facility by calling the hospital helpline for their convenience.

The online appointment system at Thumbay University Hospital offers patients the convenience of scheduling their appointments electronically, avoiding the need for traditional phone calls or in-person visits. Patients have the option to access the system through the hospital's website, where they can log in and select their preferred date and time for the appointment.

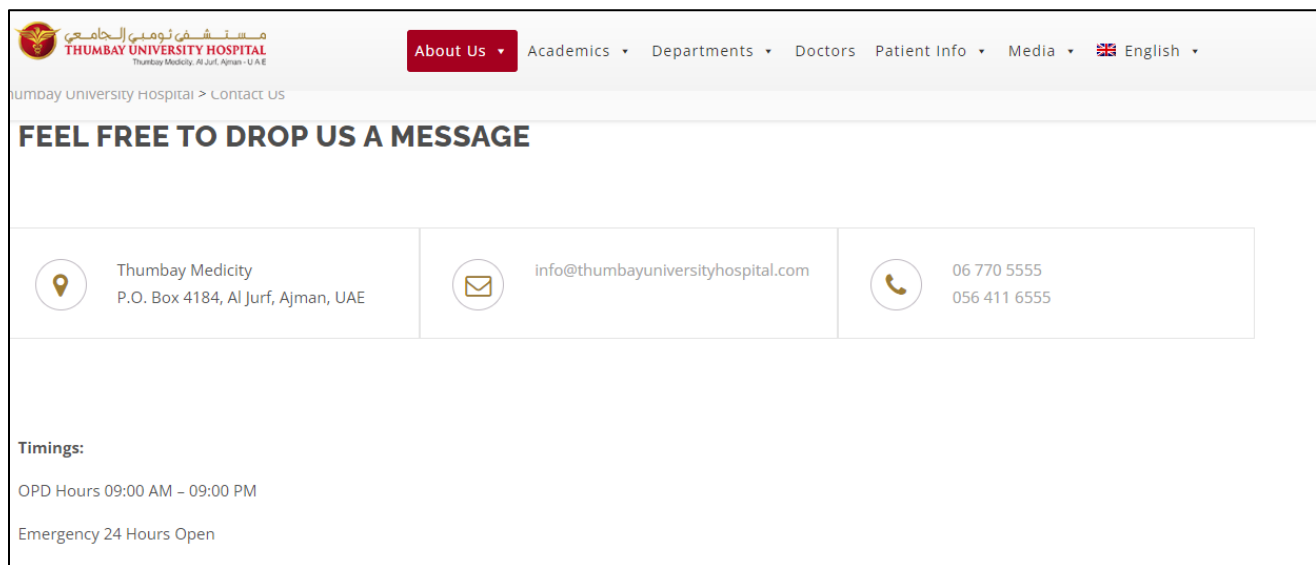
However, despite the benefits and convenience offered by the Thumbay Online Appointment System, there are several challenges that patients encounter while using this system. One of the major challenges is the lack of awareness and familiarity with the online platform. Many patients may not be technologically proficient or may not have easy access to the internet, making it difficult for them to utilize the online appointment system effectively.

These challenges include limited awareness, complex interface navigation, and technical issues. Understanding these challenges is crucial for identifying potential areas of improvement and enhancing the overall user experience of the online appointment system.



The screenshot shows the 'REQUEST AN APPOINTMENT' page of the Thumbay University Hospital website. The page features a navigation bar with links to 'About Us', 'Academics', 'Departments', 'Doctors', 'Patient Info', 'Media', and 'English'. Below the navigation bar, there is a breadcrumb trail: 'Thumbay University Hospital > Request An Appointment'. The main content area is divided into two sections. On the left, there is a form titled 'REQUEST AN APPOINTMENT' with a sub-header 'Or Click here for our Thumbay Telehealth Services'. The form includes input fields for 'Name', 'Email', and 'Phone', a 'Select Department' dropdown menu, and a date/time picker labeled 'mm/dd/yyyy'. A prominent orange 'REQUEST' button is at the bottom of the form. On the right, there is a photograph of a doctor in a white coat and mask sitting at a desk, interacting with a patient who is also wearing a mask. Below the form and photo, there is a note: 'Book your Appointment in Advance to Avoid any last minute inconvenience when you visit the hospital, You can also Call our 24x7 call center and book the appointment.'

Figure 1 Hospital's Official Website Online Appointment Request Application f



The screenshot shows the 'CONTACT US' page of the Thumbay University Hospital website. The page features a navigation bar with links to 'About Us', 'Academics', 'Departments', 'Doctors', 'Patient Info', 'Media', and 'English'. Below the navigation bar, there is a breadcrumb trail: 'Thumbay University Hospital > Contact Us'. The main content area is titled 'FEEL FREE TO DROP US A MESSAGE'. Below this title, there is a table with contact information. The table has three columns: 'Location', 'Email', and 'Phone'. The 'Location' column contains a location pin icon and the text 'Thumbay Medicity, P.O. Box 4184, Al Jurf, Ajman, UAE'. The 'Email' column contains an email icon and the text 'info@thumbayuniversityhospital.com'. The 'Phone' column contains a phone icon and the text '06 770 5555' and '056 411 6555'. Below the table, there is a section titled 'Timings:' with the text 'OPD Hours 09:00 AM - 09:00 PM' and 'Emergency 24 Hours Open'.

Figure 2 Phone-based Appointment System

1.2 Problem Statement:

In recent years, the OPD at Thumbay University Hospital has undergone significant changes aimed at enhancing patient experiences and streamlining operations. However, the appointment booking system has been criticized for establishing inefficient appointment booking system, resulting in long wait hours at OPD, patient dissatisfaction, and degraded service quality. These problems have underlined the need of researching the influence of present Patient Appointment Systems (PAS) on service quality in order to develop effective solutions. As the current system fails to keep up with the increasing needs and expectations of patients.

To gain deeper insights into the problem statement regarding the Patient Appointment System, intensive investigation is undertaken by studying Hospital's Google reviews and thoroughly inspecting patient complaints regarding booking of appointments with doctors and towards service of quality after visiting within the Hospital's out-patient department.

This study intends to shed light on the underlying problems in the current Patient Appointment System at Thumbay University Hospital by examining the concerns that patients have voiced through Google reviews and their complaints about appointment scheduling and service quality. The study will make it easier to pinpoint the appointment system's particular pain areas, inefficiencies, and service quality gaps while also revealing important information that can be used to create solutions that are both focused and efficient.

1.2.1 The purpose of this research study is to look into the fundamental causes of appointment scheduling problems and examine the effects of implementing an effective patient appointment system on service quality. The research intends to give solutions for enhancing the Patient Appointment System to increase patient satisfaction and service quality by analyzing previous patient satisfaction score, taking feedback from patients, and reviewing current appointment scheduling methods.

The study strives to find practical solutions for improving the appointment booking process. It aims to establish a patient appointment system that aligns with the hospital's goals of providing timely and high-quality care to its patients. By identifying the specific problems and their underlying causes, the research will offer valuable information that can be used to implement

necessary improvements. This thesis report will use a variety of research methodologies, including survey through questionnaire and data analysis, to effectively answer the problem statement. The study attempts to find solutions for improving the appointment booking process and establishing a patient appointment system that matches the hospital's goals of providing timely and high-quality care to its patients by studying the issues and their underlying causes.

By highlighting the importance of questionnaire analysis in enhancing patient appointment systems, the findings of this dissertation will add to the body of information already in existence. The study will give useful information on the particular problems that need addressing and potential improvements that could be made. It will also show how these advancements have affected the appointment system and patient satisfaction today, assisting healthcare organizations in their attempt of patient-centric care.

By focusing on the appointment system, this study aims to highlight its significance in facilitating patient-centered care. The appointment system serves as a critical touchpoint between patients and healthcare providers, shaping their overall experience and influencing their perception of the quality of care received.

Understanding the importance of patient-centered care is crucial as it has been shown to improve patient satisfaction, treatment outcomes, and overall healthcare delivery. It promotes active patient involvement in decision-making, fosters effective communication between patients and healthcare providers, and enhances patient engagement and empowerment.

Through this study, the aim is to explore the impact of the appointment system on the delivery of patient-centered care and identify opportunities for improvement. By analyzing patient satisfaction scores, gathering patient feedback, and evaluating the current appointment scheduling methods, the study seeks to propose solutions for enhancing the appointment system to better align with the principles of patient-centered care. Ultimately, the research aims to contribute to the advancement of patient-centered care by highlighting the importance of an effective appointment system. By improving the appointment system, healthcare organizations can enhance the overall patient experience, foster patient engagement and satisfaction, and ultimately deliver high-quality care that is tailored to the individual needs and preferences of each patient.

Dissatisfaction shown by Patients towards Appointment Scheduling System and after visiting hospital, with the service of quality provided at the Thumbay University Hospital's Outpatient Department, Ajman.



 **Ahmed Elazrak**
10 reviews

★ ★ ★ ★ ★ a month ago

Very bad experience and very poor service, Frist delay for xry appointments (insurance approved)and delay from end side , however I tried to call to get appointment and finally booked , I went on time to hospital and no parking available taken much time , so I approached the reception for payment and they informed only 10 minutes there is other patient but they lie and I waited more than 2 hours, really very poor experience and they do not care about patient. Only receptionist (Sukina)she tried to help but no response from X-ray team.

 **Khaleel Madridista**
4 reviews

★ ★ ★ ★ ★ 2 months ago

When you book appointment with doctor few days ago And when you reach the hospital you still have to wait few hours and they don't care you had appointment You just have to sit and wait in line with whoever came that day without any appointments Very disappointing Please fix these Talked with staff even they agree it's messed up and can't do anything about it

 **Shahul Hameed**
7 reviews

★ ★ ★ ★ ★ a year ago

Worst experience in taking appointment. Unqualified staff in call center. They will never answer our call. And if we needs to talk to an department, they will connect after half an hour waiting they will cut the call. Even they dont have current update with call center team. They will say one rate patient affairs will say different rate. Still i didn't know what is the current price for Circumcision for my 3 year old boy.With my many years experience i am writing this,. i have complained several times regarding this also. No action has been taken. Worst and extremely worst. No answer after waiting 30 minutes on call. to connect to the department

Patient Reviews

Figure 3 Showing Patient's Google reviews related to Appointment System.

Months	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
RATINGS	CALL CENTER: Ease of Appointment				
Excellent	54%	65%	46%	65%	67%
Good	27%	32%	30%	27%	20%
Average	6%	2%	7%	5%	3%
Below Average	6%	0%	10%	1%	2%
Poor	6%	1%	7%	2%	8%
Satisfaction Score %	81%	97%	76%	92%	87%

Table 1 Representing patient ratings to Ease of appointment service

Rating scale:

Excellent=5 (Above 95%)	Good=4 (Between 85-95%)	Average=3 (Between 75-85%)	Below Average=2 (Between 65-75%)	Poor=1 (Below 65%)
----------------------------	----------------------------	-------------------------------	-------------------------------------	-----------------------

The analysis of the table suggests that the patient appointment system at Thumbay University Hospital's Call Center has generally received positive ratings in terms of ease of appointment service. However, there are some areas for improvement, as a small portion of patients have expressed average or below-average satisfaction with the system.

To gain a comprehensive understanding of the impact of the patient appointment system on service quality, it would be valuable to consider other factors such as wait times, staff behavior, and the overall patient experience. This data will provide a more holistic view and help in formulating

recommendations to enhance the appointment system and improve service quality at Thumbay University Hospital.

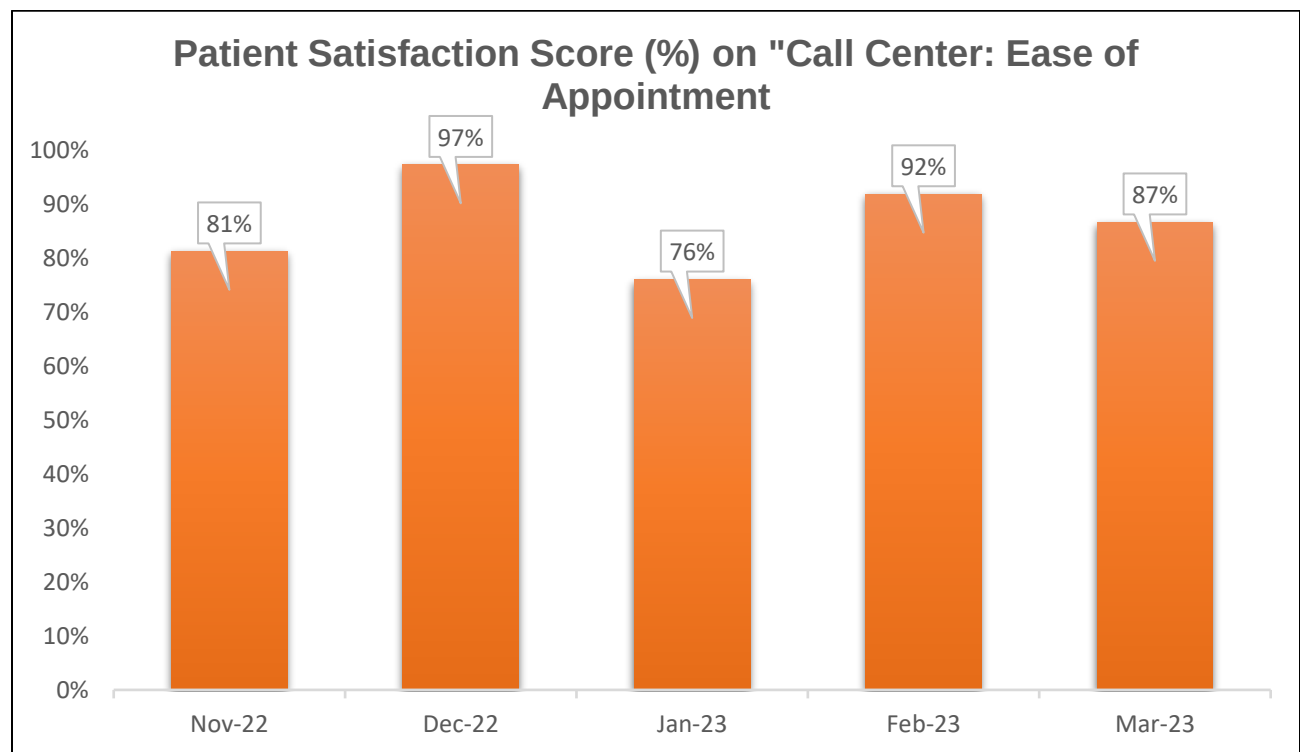


Figure 4 Patient Satisfaction Score (%) on "Call Center: Ease of Appointment"

The graph depicts patient ratings of the ease of the appointment system, revealing a disturbing pattern of dropping scores on a monthly basis. The current situation raises major concerns and highlights the importance of conducting a thorough investigation to resolve the underlying issue. The current appointment booking options provided by Thumbay University Hospital's Outpatient Department (OPD) are: 1. either call the hospital's contact number, 067705555, or use the Online Appointment System available on the hospital's website. However, it has been observed that the hospital does not have an automated system in place to send appointment reminders to patients immediately after booking confirmation. This absence of automated reminders has resulted in a significant increase in the number of patients who fail to show up for their appointments, commonly known as "no-shows." Addressing this issue and finding solutions to reduce no-shows will be a crucial aspect of the dissertation report.

The study aims and objectives are stated as:

1.3 AIM: The aim of this study is to investigate how effective the present patient appointment system is and if it is enhancing service quality and patient satisfaction.

1.4 OBJECTIVES: The study aims to achieve the following objectives:

1. To investigate the effectiveness of the patient appointment system at Thumbay University Hospital's outpatient department in Ajman.
2. To determine the impact of the patient appointment system on service quality at Thumbay University Hospital's outpatient department.
3. To suggest methods for enhancing the Thumbay University Hospital's outpatient department's scheduling process and level of service.

1.5 HYPOTHESIS:

- **Null Hypothesis:** - There is no significant relationship between patient appointment systems and service quality at Thumbay University Hospital's outpatient department in Ajman.
- **Alternative Hypothesis:** - There is a significant relationship between patient appointment systems and service quality at Thumbay University Hospital's outpatient department in Ajman.

Chapter 2

Review of Literature:

Authors	Study Location	Sample Size	Sampling Techniques	Salient Features
Author: Illhoi Yoo Reviewed by David Miller, Ping Yu, and Xiaojun Zhang Title: Web-Based Medical Appointment Systems: A Systematic Review(2)	University of Missouri Informatics Institute, Columbia, Missouri, USA	A total of 36 papers were chosen to discuss 21 Web-based appointment systems.	"MEDLINE" was searched in PubMed to find studies about the effects of Web-based appointment booking.	Web-based appointment systems are becoming more popular. The paper's findings imply that a Web-based scheduling system can improve a range of patient outcomes.
Author: Ms. Sanjeevani P.A. whale, Ms. Wrushali R. Ajabe, Ms. Pallav(3)i A. Chinchole, Ms. Puja T. Changade, Prof. N.K. Bhil Title: Doctor Appointment	Sant Gadge Baba Amravati University, India	The efficiency, accessibility, dependability, and feasibility of an existing Android-based online doctor appointment system application were evaluated.	The application includes two modules: One module is a patient-designed application that includes a login page, while another patient has the option of picking a doctor from a list of	Online appointment systems have been shown to improve patient satisfaction, lower no-show rates, and overall healthcare outcomes. Additionally, the platforms increased communication

Online Booking System(3)			doctors and viewing the doctor's details.	between patients and clinicians, resulting in greater care coordination.
Author: Mohammed Salih Mahfouz Title: Evaluation of Patient Satisfaction with the New Web-based Medical Appointment Systems “ Mawid” at Primary Health Care Level in Southwest Saudi Arabia: A cross-sectional study(4)	Level of Primary Health Care Centers in Jazan, Southwest Saudi Arabia.	424 participants aged 18 and above from 12 primary health care sites in the Jizan region of Southwest Saudi Arabia were chosen at random.	Multi-stage stratified random sampling was used, with the first stage selecting 2 PHCCs from the Jazan region's six health sectors. Patients were chosen at random from each of the PHCCs in the second stage using systematic random sampling.	The web-based medical appointment system "Mawid" increased patients' perceptions and happiness with registration while also reducing wait times. Patient satisfaction can be measured on a regular basis and utilized as a quality and benchmarking tool in primary care.
Author: Adebayo Peter Idowu, Olajide Olusegun Adeosun, Kehinde Oladipo Williams Title: Dependable Online Patient’s Appointment System for NHIS Outpatient in	Three Nigerian teaching hospitals within South western Nigeria.	In each teaching hospital, four physicians and ten patients were questioned.	Convenience Sampling Method used	Evaluation of appointment systems' effectiveness in enhancing service quality. The influence of several appointment system models on service quality

Nigerian Teaching Hospitals.(5)				measures is compared.
Author: K.W.D. Silva Title: Online Appointment System for Kotelawala Defense University Hospital(6)	At Kotelawala Defense University Hospital	No sample size defined.	System was categorized into two parts- online doctor appointment system as a user requirement, system and a hardware requirement.	Examine the problems and barriers of implementing appointment systems, as well as their impact on service quality. The association between appointment system use rates and service quality measurements is being studied. The influence of appointment systems on resource allocation.

Chapter 3

Methodology:

1. Key Research Question- How does the implementation of Patient Appointment Systems impact the service quality at Thumbay University Hospital's Outpatient Department in Ajman?

-This research question is important because it will help the outpatient department at Thumbay University Hospital in Ajman provide better healthcare services. My research attempts to solve a practical issue encountered by this medical facility by examining the impact of patient appointment systems on service quality. The results of this study can offer useful advice and insights for managing and implementing appointment systems optimally, which will ultimately result in higher service quality, better patient experiences, and greater patient satisfaction. By doing this study, I have the chance to advance our understanding of healthcare administration and have an advantageous impact on how Thumbay University Hospital provides healthcare services.

2. Research Design- The quantitative research approach used in this study includes a cross-sectional survey. As part of the data collection method, patients who made appointments through the patient appointment system and proceeded to the Thumbay University Hospital's outpatient department answered a prepared standard questionnaire.

3. Study Setting- The study was conducted in Ajman at the outpatient department of Thumbay University Hospital.

4. Study Population-

Inclusion Criteria: Adult patients (18 years and older) who have used the online patient appointment system and have visited the outpatient department at Thumbay University Hospital meet the inclusion criteria.

Exclusion criteria: Patients who did not meet the study's inclusion requirements or who did not give their informed consent were not included in the research study.(2)

5. Research Procedures/ Approaches:

The cross-sectional study's data collection process included the following steps: -

Step 1: Consent/Involvement of Participants: Patients who had used the Thumbay University Hospital's patient appointment system were approached. They were informed of the study's targets and encouraged to participate.

Step 2: Questionnaire administration: The structured questionnaire was distributed to participants who had granted consent to it. The survey had been intended to be self-administered, with assistance available if needed.

Step 3: Data Collection: From March 13 through June 13, 2023, data was collected. The completed questionnaires were stored securely.

Step 4: Data cleaning and preparation: checking the data for accuracy, consistency, and completeness. Entered the data into the SPSS computer application for analysis.

Step 5: Data analysis: Descriptive and Inferential statistics were used to analyze the data. Descriptive statistics have been used to characterize participant demographics, appointment system utilization, and patient satisfaction with the system. The relationship between appointment system usage and service quality has been identified using inferential statistics.

6. Sample Size Calculation: A sample size of 385 patients was chosen based on a 95% confidence level, a 5% margin of error, and an expected population of 15,000 patients (3 months) who used the outpatient's department appointment system.(1)

The formula for calculating sample size based on a power analysis calculation is:

$$n = (Z^2 * p * (1-p)) / E^2$$

Where:

n: Sample size

Z: Z-score corresponding to the desired confidence level (e.g., for a 95% confidence level, Z = 1.96)

p: Estimated proportion of the population with a certain characteristic (if unknown, assume p = 0.5 for maximum sample size)

E: Margin of error

Information Given:

Confidence level (CL) = 95% (Z = 1.96)

Margin of error (E) = 5% = 0.05

Estimated population (N) = 15,000

Using the formula, the calculation for sample size (n) is as follows:

$$n = (Z^2 * p * (1-p)) / E^2 = (1.96^2 * 0.5 * (1-0.5)) / 0.05^2 = (3.8416 * 0.25) / 0.0025 = 0.9604 / 0.0025 = \mathbf{384.16}$$

Since the sample size cannot be a fraction, I decided to round it up to the next whole number in order to guarantee a sufficient sample size. Consequently, a sample size of up to **385** patients was chosen.

7. Sampling Technique: The study participants were chosen using a convenience sampling technique. Patients who scheduled appointments online with the outpatient department were included in the study.

8. Study Instruments: A structured questionnaire was part of the study tool. The purpose of the questionnaire was to gather information on how satisfied patients were with their appointment schedules and the level of the services they received. It included questions about the duration of

the wait, the ease of making an appointment, the behaviors of the employees, communication, and general satisfaction.

Created Goggle form URL: <https://forms.gle/HdGVtEdmm2ZdHWd58>

**How satisfied you are with the
present Patient Appointment
System?**

**Scan the QR Code to
share your
appointment
experience with us!**



Dear Respondent,
Myself Nandini, I am conducting research for my dissertation on the topic of "Patient Appointment System." Your feedback will be crucial in helping me understand how satisfied you are with the current appointment system.

The purpose of this questionnaire is to gather information about your experiences with the present appointment system. The information you provide will be kept confidential and will be used solely for academic purposes. Please answer the questions after scanning the above QR code to the best of your knowledge and experiences.

Please help us in serving you better!

Figure 5 Study Instrument: Designed Questionnaire (QR Code Scanner)

9. Operational Definition: Operational definitions are provided for key terms used in the study to ensure clarity and consistency. For example:

a. Patient appointment systems: The electronic appointment system used by Thumbay University Hospital's outpatient department to schedule appointments for patients.

b. Service quality: The overall level of quality of service provided by the hospital through patient appointment system, including easiness in booking appointment through existing system, waiting

time after coming to hospital on booked appointment time, communication & reminders sent and overall satisfaction.

10. Statistical Methods: The data gathered from the intended survey questionnaire was subjected to descriptive and inferential statistical analysis using SPSS software. Here is further information on the statistical techniques I employed to demonstrate the outcomes using SPSS:

a. Descriptive Statistics: These statistics enumerate and defines the characteristics of the data, for the purpose of calculating metrics like frequencies, percentages, means, and standard deviations. To determine the mean, standard deviation, minimum and maximum values for continuous variables, used the "Descriptives" command as this provided an overview of the data's variability and central tendency.

b. Inferential Statistics: On the basis of the data gathered from the sample questionnaire, drawn inferences and conclusions about the population using inferential statistics. To test hypotheses and ascertain the relationship between patient appointment systems and service quality, employed chi-square tests.

Chi-square analysis was done to determine the relationship between two categorical variables. The "Crosstabs" command in SPSS used to create a contingency table and run the chi-square test. Chi-square statistics, degrees of freedom, p-values, and expected frequencies are all included in the output.

In order to determine whether there is a significant association between the variables by interpreting these data.

11. Ethical Considerations:

a. Confidentiality: Maintained confidentiality of the information provided by participants while eliminating any identifiable information and safely storing the information.

b. Data protection: Complied with data protection policies and regulations, stored personal information safely, and only allowed authorized people access.

c. Research Integrity: Followed ethical guidelines, accurately disclose findings, and conduct the study with honesty, integrity, and respect for participants.

d. Voluntary Participation: Ensured voluntary participation by letting individuals declined or leave the study without consequences.

Chapter 4

Results: The study's findings, highlighting the analysis performed with the SPSS software. The use of SPSS allowed for an in-depth review of the obtained data, providing comprehensive insights into the impact of patient appointment systems on service quality at Ajman's Thumbay University Hospital's Outpatient Department. Both descriptive and inferential analyses were performed using several statistical techniques within the SPSS tool to give a robust assessment of the research study objectives and hypotheses. The findings of these analyses provide useful information about the effectiveness of the appointment system and its impact on service quality at Thumbay University Hospital.

Table 4.1: Demographics Variables: -

Variable	Frequency	Percentage
1. Gender		(%)
- Male	281	73
- Female	104	27
- Others	0	0
2.Age (years)		(%)
-18-25 years	33	8.6
- 26-35 years	148	38.4
-36-45 years	41	10.6
-Over 45 years	163	42.3
3.Hospital Visit		(%)
-First-time visitor	120	31.2
-Occasionally	39	10.1
-Frequently	32	8.3
-Regularly	194	50.4

Table 2 Demographic Variables Responses

Table 4.2: Patient Appointment System Usage Variables: -

Variable	Frequency	Percentage
1. Mode of Appointment Booking		
- Online Appointment through hospital website	16	4.2
- Call the hospital @067705555	369	95.8
2. Overall Patient Appointment System Experience		
1- Very dissatisfied	NIL	NIL
2- Dissatisfied	30	7.8
3- Neutral	194	50.4
4- Satisfied	11	2.8
5- Very Satisfied	150	39

*Table 3 Patient Appointment System Usage Variables Responses***Tables: Impact of Patient Appointment System on Service Quality: -**

Table 4.3 How satisfied are you (1-5 scale) with the service quality of Thumbay University Hospital's Outpatient Department in terms of staff behaviour and communication, waiting time, cleanliness and hygiene, medical equipment and facilities, privacy, and confidentiality?

Variables	Frequency	Percentage
1- Very Dissatisfied	NIL	NIL
2 – Dissatisfied	197	51.2
3- Neutral	166	43.1
4- Satisfied	NIL	NIL
5- Very Satisfied	22	5.8

Table 4 Impact of Patient Appointment System on Service Quality

Table 4.4 Did you receive a reminder for your appointment through the patient appointment system?

Variable	Frequency	Percentage
No	214	55.6
Yes	171	44.4

Table 5 Impact of Patient Appointment System on Service Quality

Table 4.5 How long did you wait to see the doctor after arriving at the hospital for your appointment?

Variables	Frequency	Percentage
Less than 10 minutes	124	32.2
10-20 minutes	7	1.8
20-30 minutes	178	46.2
30-60 minutes	30	7.8
More than 60 minutes	46	11.9

Table 6 Impact of Patient Appointment System on Service Quality

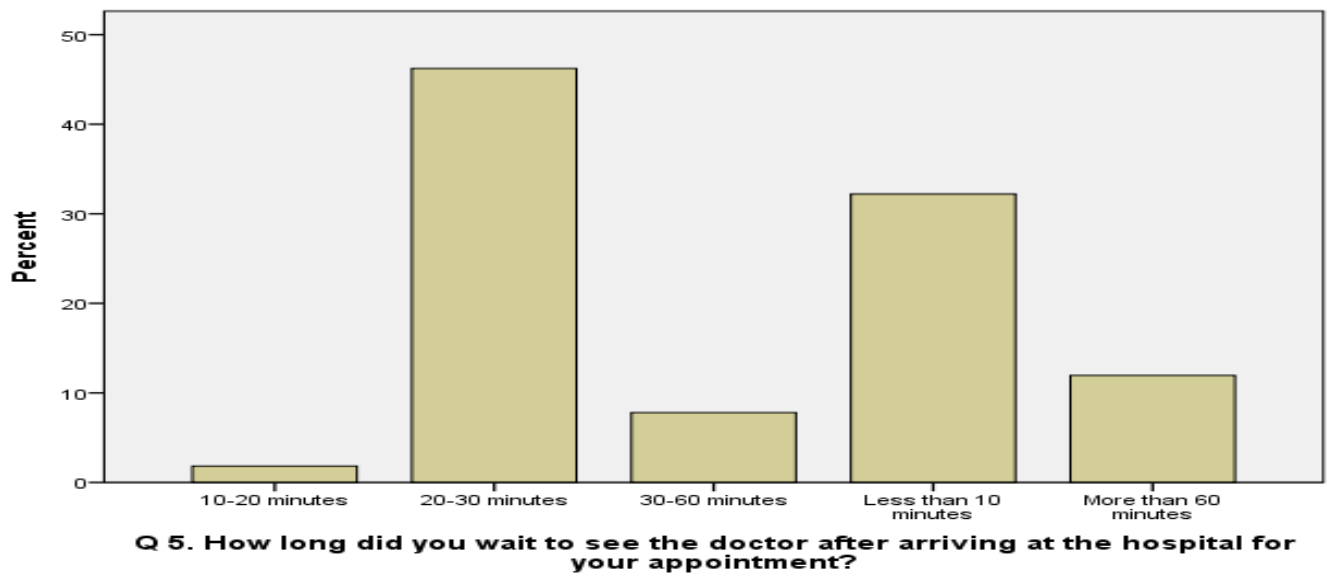


Figure 6 Waiting time to see the doctor for appointment patients

Table 4.6 Was the waiting area comfortable and clean?

Variables	Frequency	Percentage
No, very uncomfortable and unclean	280	72.7
Yes, somewhat comfortable and clean	37	9.6
Yes, very comfortable and clean	68	17.7

Table 7 Impact of Patient Appointment System on Service Quality

Table 4.7 Did the staff at the hospital treat you with respect and kindness?

Variables	Frequency	Valid Percent
Neutral	23	6.0
No, never	63	16.4
Yes, always	299	77.7

Table 8 Impact of Patient Appointment System on Service Quality

Table 4.8 How likely are you to recommend Thumbay University Hospital's Outpatient Department to others?

Variables	Frequency	Valid Percent
Very Likely	265	68.8
Somewhat Likely	3	.8
Neutral	9	2.3
Somewhat Unlikely	107	27.8
Very Unlikely	1	.3

Table 9 Impact of Patient Appointment System on Service Quality

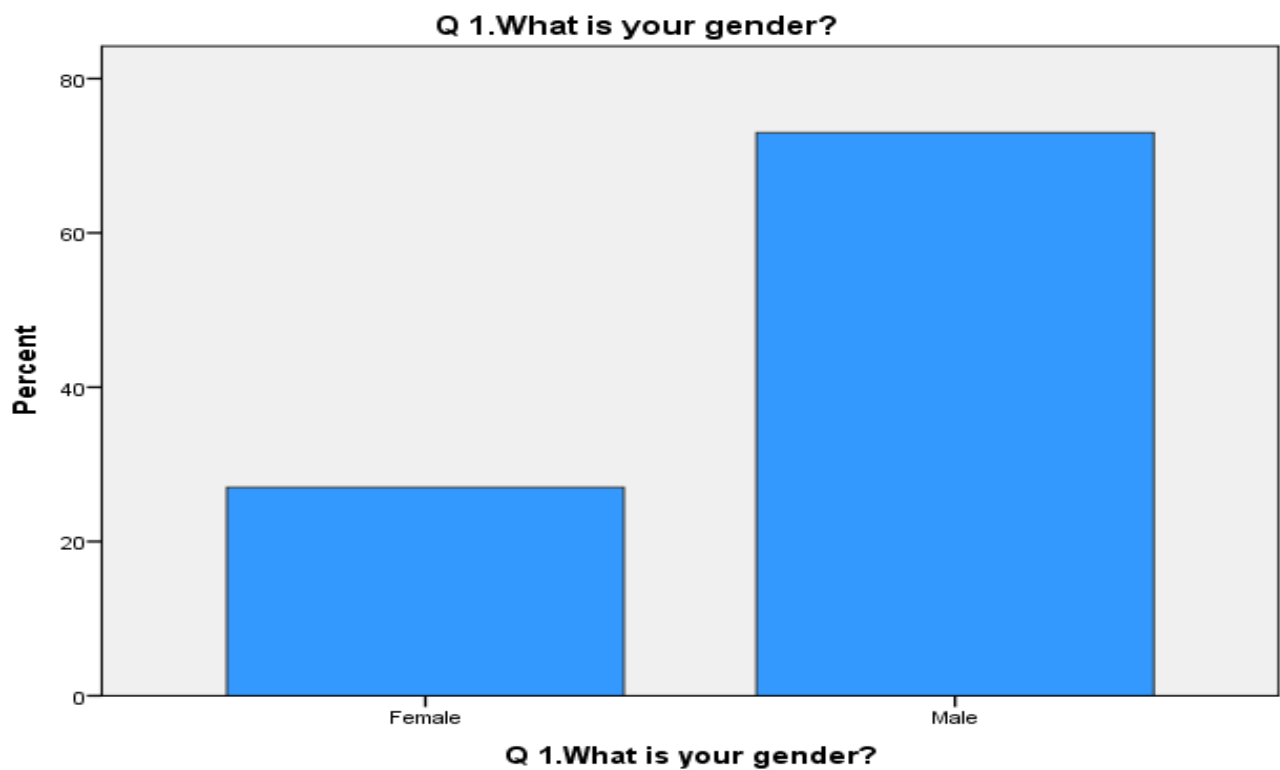


Figure 7 Male respondents were more than female



Figure 8 Majority of the respondents didn't receive reminders after appointment booking

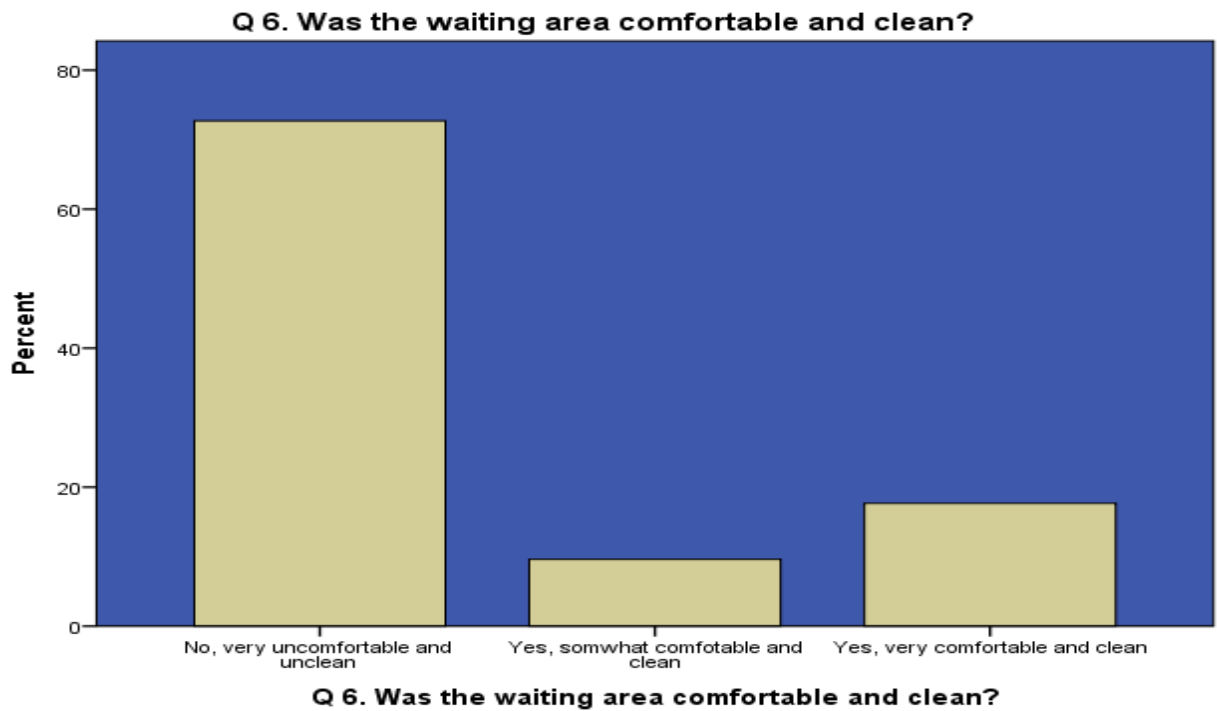


Figure 9 More than half of respondents rated that waiting area was not comfortable and clean



Figure 10 Staff behavior towards patients

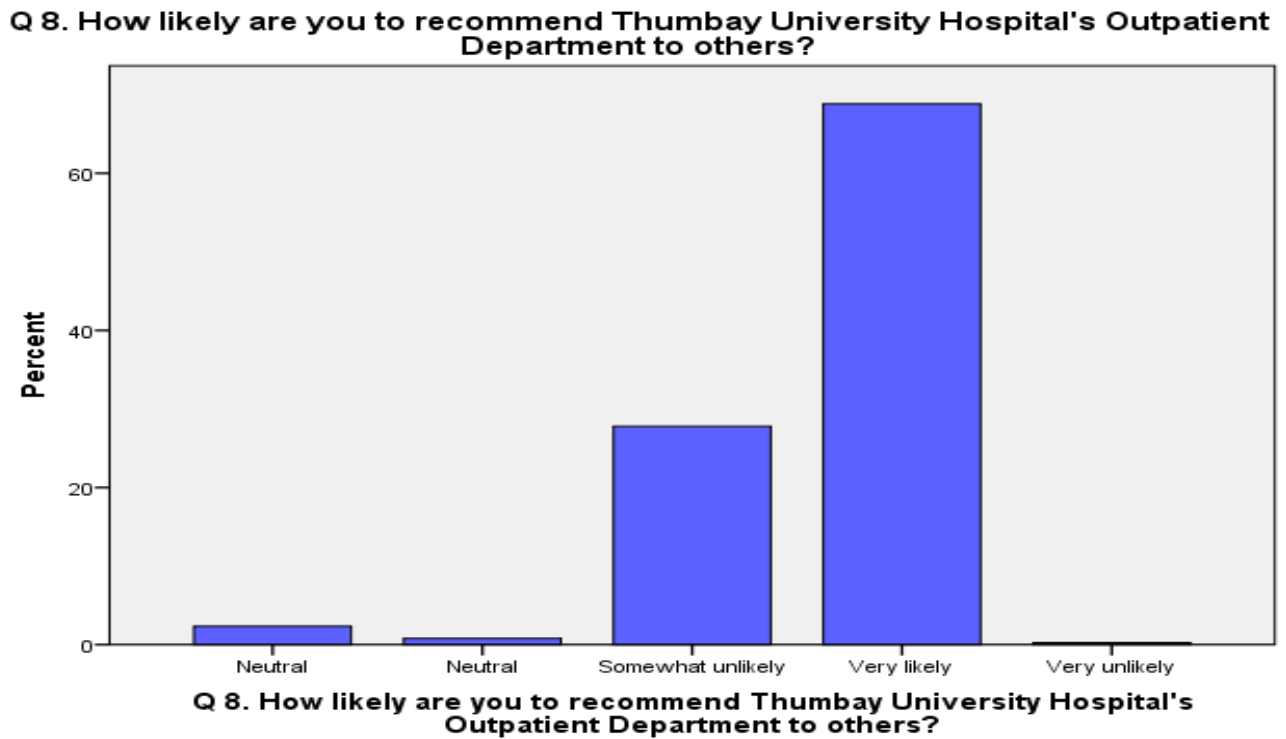


Figure 11 More than half of the respondents recommend Thumbay Hospitals to others

Inferential Analyses: The inferential analyses performed with SPSS software gave useful insights into the relationship between variables and enabled hypothesis testing to establish the importance of these correlations. I was able to gain understanding into the data and develop relevant conclusions regarding the research study objectives by using proper statistical techniques within the SPSS application. This study's inferential analyses have contributed to a thorough understanding of the impact of many factors on the outcome of interest. In this section that follow, we will go over the specific inferential analyses that were performed and their implications for the research findings.

Table 4.9: Chi-Square Tests Results:

Chi-Square Test	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	768.512 ^a	24	.000
Likelihood Ratio	360.147	24	.000
N of Valid Cases	385		

Table 10 Chi-Square Test Results

Table 4.10: Symmetric Measures: Contingency Coefficient

Inferential Analysis	Value	Approx. Sig.
Nominal by Nominal Contingency Coefficient	.816	.000
N of Valid Cases	385	

Table 11 Contingency Coefficient

Table 4.11 Symmetric Measures: Phi & Cramer's V

Inferential Analysis	Value	Approx. Sig.
Nominal by Nominal Phi	1.413	.000
Cramer's V	.706	.000
N of Valid Cases	385	

Table 12 Phi & Cramer's V

Chapter 5

Discussions:

The **descriptive analyses** performed in this study using SPSS software provided valuable insights into the demographic characteristics of the study participants, as well as their experiences with the patient appointment system and service quality at Thumbay University Hospital's Outpatient Department in Ajman.

In terms of demographics, the study discovered that men (73%) outnumbered women (27%). In terms of age distribution, a large proportion of participants (42.3%) were over 45 years old, followed by those aged 26 to 35 years (38.4%). When the frequency of hospital visits was examined, a significant percentage of subjects (50.4%) reported frequent hospital visits.

Moving on to the patient appointment system usage characteristics, it was discovered that the most popular method of appointment booking was by contacting the hospital (95.8%), while a lower percentage (4.2%) used online appointments through the hospital website. When asked about their overall experience with the patient appointment system, the majority of participants (50.4%) reported a neutral experience, followed by very satisfied (39%) and satisfied (2.8%) responses.

Participants' satisfaction with the hospital's outpatient department's service quality in various aspects, such as staff behavior and communication, waiting time, cleanliness and hygiene, medical equipment and facilities, privacy, and confidentiality, revealed that a significant number (51.2%) were dissatisfied or had a neutral opinion (43.1%). However, a small percentage (5.8%) reported being really satisfied.

The investigation also examined factors pertaining to appointments, such as getting reminders and how long it takes to see a doctor. The waiting time varied, with the majority (46.2%) waiting between 20 and 30 minutes, while a significant portion of participants (55.6%) reported not receiving reminders. A large percentage of participants (68.8%) stated they would recommend the hospital to others, while the majority of participants (77.7%) said the hospital staff treated them with respect and care.

A comprehensive understanding of the respondents' demographics and their opinions of the Out Patient Department at Thumbay University Hospital in terms of the use of appointment system is reached by conducting descriptive analyses.

The SPSS analysis of the data offered valuable insights into establishing the relevance of such relationships by testing the hypothesis with correlation among variables. The chi-square tests establish a robust relationship between the service quality and patient appointment systems at Thumbay University Hospital's Outpatient Department in Ajman, UAE.

There is a high relationship established between the appointment system and hospital service quality based on the 768.512 value derived from the Pearson chi-square that has a 24 degree of freedom and 0.000 p-value. The probability ratio of chi-square value of 360.147 with 24 degrees of freedom supports this observation.

In addition, the symmetric measures analysis yields a contingency coefficient of 0.816 with an estimated significance value of 0.000. This implies a strong relationship between the variables. The phi coefficient and Cramer's V, with values of 1.413 and 0.706, likewise show a substantial association. These findings give strong support for rejecting the null hypothesis, which indicated that there is no significant association between the patient appointment system and service quality. Instead, the alternative hypothesis is supported, showing that these variables have a significant connection.

The results of the inferential analyses indicate the appointment system's effectiveness in impacting service quality at Thumbay University Hospital's Outpatient Department. It implies that improvements to the appointment system can lead to higher levels of service quality for patients. The statistical tests' substantial relationships highlight the relevance of evaluating the patient appointment system as a critical aspect in enhancing overall service quality.

These findings give useful insights for Thumbay University Hospital's healthcare professionals and administrators, allowing them to make informed decisions and conduct focused interventions to improve the appointment system and, ultimately, service quality.

Chapter 6

Conclusions:

The collective findings of the inferential analyses and descriptive studies conducted using the SPSS offered comprehensive insights into the positive effect of the patient appointment systems at Thumbay University Hospital's Outpatient Department in Ajman with respect to service quality.

The assessment ascertained key demographic parameters of the respondents, including age groups, gender and the frequency of visits to the hospital. An enhanced understanding of the patient experiences with the appointment booking system and service quality of the hospital has been ascertained with this research's findings. Moreover, it was inferred from the descriptive study that a majority of the research participants made use of the appointment booking system by calling the hospital helpline, where their experience with the system as a whole was found to be neutral. The respondents derived different levels of satisfaction from different parameters of service quality at the hospital, with a considerable number of patients demonstrating displeasure or lack of satisfaction.

Inferential studies contributed additional comprehension by evaluating the significance of relationships between variables. The chi-square tests revealed a statistically significant relationship between the patient appointment system and the service quality. The findings provided strong evidence to reject the null hypothesis and support the alternative hypothesis, thereby demonstrating that these variables indicate a substantial connection.

These findings highlight the significance of an efficient and competent appointment system in determining the service quality outcomes of a facility. These emphasize the need for improvements in areas that include staff behavior and communication with the patients, waiting time, sanitation and hygiene, and general waiting room comfort. The findings further revealed a favorable opinion of the hospital's outpatient department and a high likelihood of recommending the services to friends or peer group. Hence, the combined analyses' findings indicate that improving the patient appointment system and addressing the highlighted areas for improvement would considerably improve the service quality and the overall patient experience at Thumbay University Hospital's Outpatient Department.

Chapter 7

Recommendations:

Recommendation	Description
Implement an online appointment system based on mobile applications	Introduce an easy-to-use online appointment booking system to make scheduling appointments more convenient and less reliant on phone calls. Ensure that the hospital's website is integrated seamlessly.
Enhance Staff Training	Hold frequent training sessions to improve staff conduct and communication abilities, placing a focus on patients' needs and emphasizing empathy, respect, and effective patient communication.
Improve Waiting Time Management	Implement initiatives to reduce waiting times, such as simplifying patient flow, improving scheduling algorithms, and maintaining effective communication amongst medical staff members.
Prioritize Appointment Booked Patients over Walk-in-Patients	Appointment booked should be prioritized over walk-in-patients. Should not book for those appointment slots.
Strengthen sending automated generated reminders after booking appointments	To lower no-show rates and boost patient punctuality, set up a system to deliver appointment reminders to patients via several channels (such as SMS and email).
Consolidate Feedback Mechanisms	Create a reliable approach for collecting patient feedback on their experiences with the appointment system and the level of service. Utilize this input to pinpoint areas that want improvement and make the appropriate adjustments.
Encourage ongoing quality improvement	By routinely analysing procedures, comparing them to best practices, and applying creative ideas to improve the appointment system and overall service quality, you may cultivate a culture of continuous quality improvement.

Encourage coordination and cooperation	To guarantee seamless patient experiences and effective operations, encourage collaboration and coordination between all departments and staff members involved in the appointment system and service delivery.
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Suggestions:

Based on the findings of the study and in collaboration with the IT team at Thumbay University Hospital, the following software recommendations is provided to enhance the existing online appointment system and address the identified challenges:

SwiftAppointments: This software offers a user-friendly interface and efficient appointment scheduling features. It allows for automated reminders to be sent to patients before their scheduled appointments, reducing the likelihood of missed appointments.

AppointEase: With its intuitive design, AppointEase simplifies the appointment booking process for patients. It can integrate with the hospital's existing system to send automated reminders and optimize the scheduling process.

SimpleBook: This software provides a straightforward and easy-to-use platform for patients to schedule appointments. Its automated reminder feature helps patients stay informed about their upcoming appointments.

CareConnect: CareConnect offers a comprehensive appointment scheduling solution, integrating seamlessly with other hospital systems. It allows for automated reminders, reducing no-show rates and improving overall patient satisfaction.

MedicalEstablish: This software focuses on streamlining the appointment scheduling process, minimizing waiting times for patients. It can be customized to fit the specific needs of Thumbay University Hospital.

aclinicScheduler: With aclinicScheduler, patients can book appointments online, and the system can send automated reminders to patients prior to their scheduled appointments. This helps in reducing no-shows and optimizing the utilization of healthcare resources.

TimeSaverMD: TimeSaverMD aims to minimize waiting times for patients by optimizing the appointment scheduling process. It can be integrated with the existing system to send automated reminders and manage appointment slots efficiently.

By implementing one of these software solutions in collaboration with the IT team, Thumbay University Hospital can enhance its online appointment system. The automated reminder feature will help reduce missed appointments, while optimizing the scheduling process can minimize waiting times for patients who book appointments online. These improvements will contribute to an enhanced patient experience and improved service quality at Thumbay University Hospital.

The suggested software options not only improve the patient appointment system but also offer benefits such as enhanced data collection, improved patient satisfaction, streamlined operations, an enhanced hospital image, and access to valuable analytics and reporting features. By leveraging these software solutions, Thumbay University Hospital can stay at the forefront of technological advancements, deliver excellent patient experiences, and continuously improve its services.

Annexure-1

Filled OPD Feedback Form:



مستشفى ثومبي الجامعي
THUMBAY UNIVERSITY HOSPITAL
Thumbay Medcity, Al Jurf, Ajman - U A E

OUTPATIENT FEED BACK FORM

Thank you for choosing **Thumbay University Hospital**, Ajman for your treatment. Your feedback is valuable to us. Kindly provide us with your suggestions for future improvements.

Patient Full Name :	Ram Bahadur Gharti Magar (Lamprell)
Hospital No :	176890
Email ID :	ramyoon885@gmail.com
Mobile No :	056326085

Sl No	Services	Excellent 5	Good 4	Average 3	Below Average 2	Poor 1
1.	Call Center : Ease of Appointment			✓		
2.	Registration & Billing :			✓		
3.	Insurance Approvals :			✓		
4.	Nursing Care , Support & Assistance :			✓		
5.	Diagnostic Services: (Laboratory & Radiology)			✓		
6.	Pharmacy Services:			✓		
7.	Doctor Consultation :			✓		
8.	Hospital Cleanliness & Hygiene standards			✓		

Suggestions / Recommendations/ Staff Appreciations:

Ryger

Thank you Miss Maryam

Would you like to refer Thumbay University Hospital to your Friends / Relatives / Colleagues: Yes ☒ No ☐

TUH-GEN-FRM-018-1.0

P.O. Box: 4184, Thumbay Medcity, Al Jurf, Ajman, UAE, Tel: +97167705555
Email: info@thumbayuniversityhospital.com Web: www.thumbayuniversityhospital.com

Annexure-2

For Collection of Data- Designed Structured questionnaire:

How satisfied you are with the present Patient Appointment System?

Dear Respondent,

I am conducting research for my dissertation on the topic of "Patient Appointment System." Your feedback will be crucial in helping me understand how satisfied you are with the current appointment system.

The purpose of this questionnaire is to gather information about your experiences with the present appointment system. The information you provide will be kept confidential and will be used solely for academic purposes. Please answer the questions to the best of your knowledge and experiences.

Instructions:

- Please answer the following questions with your personal experiences in mind.
- Please tick the box that best represents your response.

Part 1: Demographics

Q 1. What is your gender?

- a. Male b. Female c. Others

Q 2. What is your age?

- a. Under 18 b. 18-25 c. 26-35 d. 36-45 e. Over 45

Q 3. How often do you visit Thumbay University Hospital's Outpatient Department?

- a. First-time visitor b. Occasionally c. Frequently d. Regularly

Part 2: Patient Appointment System Usage

Q 1. How do you book your appointment with the hospital?

- a) Online appointment system through hospital website
b) Call the hospital @ 067705555
c) Visit the hospital in person
d) Other (please specify)

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Q 2. On a scale of 1 to 5, how easy is it for you to schedule an appointment at your preferred date & time?

- a) 1- Very difficult
- b) 2- Somewhat Difficult
- c) 3- Neutral
- d) 4- Easy
- e) 5- Very easy

Q 3. On a scale of 1 to 5, how satisfied are for you with the overall patient appointment system experience?

- a) 1 - Very dissatisfied
- b) 2 - Dissatisfied
- c) 3 - Neutral
- d) 4 - Satisfied
- e) 5 - Very satisfied

Part 3: Impact of Patient Appointment System on Service Quality

Q 1. On a scale of 1 to 5, how satisfied are you with the following aspects of service quality at Thumbay University Hospital's Outpatient Department?

(Services include - Staff behaviour and communication, waiting time, Cleanliness and hygiene, Medical equipment and facilities, Privacy and confidentiality)

- a) 1 – Very dissatisfied
- b) 2 – Dissatisfied
- c) 3 – Neutral
- d) 4 – Satisfied
- e) 5 – Very satisfied

Q 2. On a scale of 1 to 5, how long does it take for you to get an appointment at Thumbay University Hospital's Outpatient Department?

- a) 1 - Very long time (More than 5 hours)
- b) 2 - Somewhat long time (Around 2-5 hours)
- c) 3 - Neither long nor short time (1-2 hours)
- d) 4 - Somewhat short time (Within an hour)
- e) 5 - Very short time (Immediately)

Q 3. Did you receive a reminder for your appointment through the patient appointment system?

- a) Yes
- b) No

Q 4. Did the reminder help you remember your appointment?

- a) Yes, it was very helpful
- b) Yes, somewhat helpful
- c) No, not helpful at all

Q 5. How long did you wait to see the doctor after arriving at the hospital for your appointment?

- a) Less than 10 minutes
- b) 10-20 minutes
- c) 20-30 minutes
- d) 30-60 minutes
- e) More than 60 minutes

Q 6. Was the waiting area comfortable and clean?

- a) Yes, very comfortable and clean
- b) Yes, somewhat comfortable and clean
- c) Neutral
- d) No, somewhat uncomfortable and unclean
- e) No, very uncomfortable and unclean

Q 7. Did the staff at the hospital treat you with respect and kindness?

- a) Yes, always
- b) Yes, most of the time
- c) Neutral
- d) No, some of the time
- e) No, never

Q 8. How likely are you to recommend Thumbay University Hospital's Outpatient Department to others?

- a) Very likely
- b) Somewhat likely
- c) Neutral
- d) Somewhat unlikely
- e) Very unlikely

Q 9. Is there any other feedback or suggestion you would like to share regarding your experience with the patient appointment system and service quality at Thumbay University Hospital's Outpatient Department?

Response-

Thank you for taking the time to complete this questionnaire!

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