ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VIII August 2025

"Measuring Waste of Patient Time in Health Care at Non-Digitized Hospital: An Observational Study in Bangabandhu Sheikh Mujib Medical University, Bangladesh"

***Mohammad Jashim Uddin Mozumder., Md. Fazlul Karim Patwary., Dr. M Mesbahuddin Sarkar**

IIT, Jahangirnagar University, Savar, Bangladesh

DOI: https://doi.org/10.51244/IJRSI.2025.120800006

Received: 07 July 2025; Accepted: 23 July 2025; Published: 28 August 2025

ABSTRACT

Background: Health Information and Communication Technology (HICT) is an interdisciplinary field that integrates computer science and information technology with healthcare delivery. It involves the design, development, and implementation of IT-based systems such as electronic health records, patient scheduling systems, and online appointment platforms. These technologies can enhance the accessibility and flexibility of patient information, reduce costs, and minimize time waste for both patients and healthcare providers.

Methods: This observational study was conducted at a non-digitized hospital in Bangladesh. The researcher recorded patient activities from arrival to completion of treatment. Key timestamps included ticket collection, consultation start time, and total time spent in the hospital. A total of 100 patients were observed. The average waiting time and total time wasted were calculated and compared with the expected time saved using digital systems such as online appointment scheduling.

Results: In the traditional system, patients arrived early in the morning and experienced prolonged waiting periods at multiple stages—ticketing, doctor consultation, and treatment—resulting in a time loss of 3 to 8 hours per visit. In contrast, the use of digital health systems, particularly online appointments, significantly reduced waiting times. Patients who used such systems typically spent only 5 to 10 minutes waiting for the doctor after arriving at the hospital at their scheduled time, thereby saving several hours of productive time.

Conclusions: The findings suggest that adopting health information technology can significantly reduce time waste for patients. This study highlights the need for a national health server-based system in Bangladesh to streamline healthcare services and enhance efficiency. Widespread implementation of HICT in hospitals could substantially improve patient satisfaction and overall healthcare delivery.

Keywords: Health Information Technology, Time Management, Patient Scheduling, Digital Health, Bangladesh

INTRODUCTION

Information systems are essential enablers of operational processes across various sectors, including healthcare. These systems support interactive processes by updating, storing, retrieving, and sharing data efficiently (Laudon & Laudon, 2020). In healthcare, the integration of computers and information technology (IT) has transformed how patient data is managed and how services are delivered.

Health Information and Communication Technology (HICT) is a hybrid discipline comprising physical infrastructure—such as computer hardware, software, communication networks, and medical devices—and the trained personnel who operate and manage these systems (Wager, Lee, & Glaser, 2017). This integration supports clinical and administrative processes, aiming to improve healthcare outcomes, reduce costs, and save time.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VIII August 2025

A major challenge in healthcare is handling the increasing volume of patient data. Computer-based systems, such as Electronic Health Records (EHR), improve accessibility, enable clinical decision support, and provide data for research (Blumenthal & Tavenner, 2010). The healthcare sector globally, especially in developed nations, has adopted HICT widely, resulting in improved documentation, reduced medical errors, enhanced quality of care, and better communication between patients and providers (Pollak & Lorch, 2007; Buntin et al., 2011).

A fundamental HICT application is the **patient appointment system**, designed to streamline scheduling. Historically, these systems prioritized minimizing doctor idle time, often neglecting patient waiting time (Wijewickrama & Takakuwa, 2005). However, modern systems aim to balance the needs of both patients and healthcare staff. Efficient scheduling improves service quality, reduces delays, and enhances patient satisfaction (Gupta & Denton, 2008).

Mathematical queuing models have been used to optimize appointment schedules and minimize waiting times (Harper & Gamlin, 2003). Dexter (1999) noted that healthcare centers without structured scheduling systems experience higher patient waiting times, contributing to dissatisfaction and perceptions of unfair treatment.

The internet further enhances access to healthcare information. It plays a vital role in medical education, diagnosis, teleconsultation, and research. Healthcare providers and students use online platforms for accessing up-to-date information, conducting remote learning, and managing health records (Tan & Payton, 2010).

Despite global advancements, many healthcare facilities in developing countries like Bangladesh still rely on manual systems. These non-digitized setups often result in time inefficiencies, patient frustration, and resource underutilization. Therefore, implementing HICT-based solutions, especially in patient scheduling, is crucial for improving healthcare service delivery in such contexts.

METHODOLOGY

This study employed a **comparative observational research design** to examine patient time usage and the efficiency of hospital information systems in both a public and a private hospital in Dhaka, Bangladesh. The institutions selected for this study were **Bangabandhu Sheikh Mujib Medical University (BSMMU)**, a leading public hospital, and **Ibn Sina Hospital**, a prominent private healthcare facility.

A total of 100 **patients were purposively observed** at BSMMU. Patients were selected based on their availability and willingness to participate during their routine visits to the hospital. The objective was to evaluate patient flow and identify time lost during the care process in a non-digitized public hospital setting, compared to a private hospital implementing health information and communication technology (HICT) systems.

The study used **non-participant observation** to collect data. Researchers recorded the time each patient:

- Entered the hospital premises
- Received a ticket or registration number
- Was called for consultation
- Completed treatment

From this data, **average waiting time and total time spent** in the hospital were calculated for each patient. Observations at Ibn Sina Hospital (private) were also used for **comparative purposes**, particularly focusing on the benefits of using digital health systems like electronic patient records, online appointments, and automated patient flow management.

This cross-sectional comparison between a public and a private hospital aimed to highlight the **differences in time efficiency**, patient experience, and operational workflow based on the presence or absence of HICT systems

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VIII August 2025

(Buntin et al., 2011). The study thus offers insights into how health digitization can improve service delivery and reduce patient time waste in healthcare institutions in Bangladesh.

RESULTS

1. Time Consumption in General (Non-digitized) Healthcare System

Observation at **Bangabandhu Sheikh Mujib Medical University (BSMMU)** revealed that patients in the general outdoor services typically experience long delays in the care process. The patient journey generally follows a single-server queuing system, where one must sequentially queue for registration and then again for doctor consultation.

On average:

- **Waiting time for ticket (Queue D_1):** 87.3 minutes
- **Ticket service time (S_1):** 5.4 minutes
- **Waiting time for doctor (Queue D_2):** 64.7 minutes
- **Doctor consultation time (S_2):** 8.25 minutes

Thus, the **total average time** a patient spends from arrival to the end of consultation is:

$W = D_1 + S_1 + D_2 + S_2 = 87.3 + 5.4 + 64.7 + 8.25 = 165.65$ minutes ≈ 2.76 hours

In some cases, patients reported spending more than **3 to 4 hours**, especially if the queue moved slowly or if doctors were unavailable. During field observation, it was estimated that **over 8,000 patients** visit BSMMU outdoor units daily, distributed across multiple buildings and counters.

Case Study 1: Mr. Rashed at BSMMU

Mr. Rashed arrived at BSMMU at 7:00 AM. After seeking help from an attendant, he queued for a ticket. The counter opened after one hour, and he received his ticket after waiting **1 hour and 20 minutes**. He then waited another **1 hour and 10 minutes** in front of the doctor's room. His consultation lasted only **10 minutes**, but his total time spent was over **3 hours**—a clear example of excessive patient time waste due to the absence of a digitized system.

2. Time Efficiency in Digital Healthcare System (Using HICT)

In contrast, patients accessing healthcare services via **Health Information and Communication Technology (HICT)** experience significant time savings.

Patients at **Ibn Sina Hospital**, which employs an online appointment system, can book appointments via mobile or computer. Booking typically takes **1 to 2 minutes**, and patients are advised to arrive at the scheduled time. Upon arrival, they wait briefly near the designated doctor's chamber and are consulted within **5 to 10 minutes**.

Case Study 2: Mr. Alam at Ibn Sina Hospital

Mr. Alam had been suffering from fever. His wife, Mrs. Shahana, searched online for hospitals and contacted Ibn Sina Hospital. Over a phone call, she secured an appointment, and the hospital instructed her on when to arrive. At the hospital, they were promptly attended to, with the entire process completed within a short time. The HICT-enabled system ensured minimal waiting and efficient care.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VIII August 2025

Summary of Observed Times

Process Step	**BSMMU (General)**	**Ibn Sina (Digital)**
Appointment Booking	Not available	1–2 minutes (online)
Waiting for Ticket (D_1)	87.3 minutes	Not applicable
Ticket Service Time (S_1)	5.4 minutes	Not applicable
Waiting for Doctor (D_2)	64.7 minutes	5–10 minutes
Doctor Consultation (S_2)	8.25 minutes	5–10 minutes
Total Time (W)	**165.65 minutes**	**~15–20 minutes**

Interpretation

The comparative analysis clearly shows that the **digitized health system significantly reduces patient waiting time**, improves service flow, and enhances overall satisfaction. In contrast, **non-digitized hospitals lead to time waste, inefficiency, and patient frustration**.

DISCUSSION

This study reveals that patients in **general healthcare settings** without digitization spend significantly more time navigating the healthcare process compared to those using **Health Information and Communication Technology (HICT)** systems. The findings support existing research that highlights how digital transformation in healthcare improves operational efficiency, patient satisfaction, and service accessibility (Buntin et al., 2011; Wager et al., 2017).

Bangladesh, like many developing countries, faces numerous challenges in healthcare delivery. These include overcrowded public hospitals, insufficient infrastructure, and a lack of coordination, all of which were exacerbated during the COVID-19 pandemic. The importance of digitized healthcare systems became increasingly evident during this crisis—not only for infection control but also for ensuring continuity of care despite mobility restrictions (WHO, 2021).

At **BSMMU**, positive changes have been observed with the introduction of ICT-based tools such as mobile communication, internet access, and video conferencing. These tools help patients access services remotely, receive timely consultation, and avoid unnecessary hospital visits. The reduction in travel time, waiting time, and associated costs represents a critical benefit to patients, especially those from rural or underserved areas.

The study highlights that a properly implemented **Hospital Information Management System (HIMS)** can streamline core processes like patient registration, appointment scheduling, and medical record keeping. These systems provide centralized access to patient data, improve administrative coordination, and allow physicians to retrieve historical health records instantly—leading to faster, more accurate diagnosis and treatment (Tan & Payton, 2010).

Many earlier studies focused on the **development of healthcare information systems** based on user requirements and institutional needs. These systems were designed to handle various components, such as patient demographics, medical history, doctor schedules, financial records, and reports. In contrast to manual systems, the digital systems offer numerous advantages: reduced human error, better data security, improved efficiency, and data accessibility across departments.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VIII August 2025

Moreover, by implementing **sophisticated queuing models** and **automated appointment systems**, hospitals can optimize patient flow and minimize idle time for both patients and providers (Gupta & Denton, 2008). This allows for a fairer and more transparent system where patient time is valued as much as the provider's time.

CONCLUSION

Information systems are integral to modern healthcare management. They help deliver the right information to the right person at the right time, ensuring efficient and effective decision-making. In a healthcare context, **Hospital Information Management Systems (HIMS)** incorporate technologies such as computer hardware, networking infrastructure, application software, and telecommunication tools to manage patient information securely and accessibly.

These systems are especially valuable in preserving individual patient records, scheduling appointments, and improving workflow efficiency. By reducing patient waiting times and ensuring timely consultations, HICT empowers hospitals to provide **quality care with minimal resource waste**.

A well-integrated hospital information system enables timely and accurate retrieval of medical records, reduces administrative errors, and enhances data security. Additionally, it strengthens financial oversight, helping to minimize malpractice and promote transparency. Thus, the adoption of digital technologies in healthcare is not only a **time-saving innovation** but also a **strategic necessity** for improving the **quality, safety, and equity** of healthcare services in Bangladesh and similar contexts.

REFERENCES

1. Blumenthal, D., & Tavenner, M. (2010). The "meaningful use" regulation for electronic health records. New England Journal of Medicine, 363(6), 501–504. https://doi.org/10.1056/NEJMp1006114
2. Buntin, M. B., Burke, M. F., Hoaglin, M. C., & Blumenthal, D. (2011). The benefits of health information technology: A review of the recent literature shows predominantly positive results. Health Affairs, 30(3), 464–471. https://doi.org/10.1377/hlthaff.2011.0178
3. Dexter, F. (1999). Operating room utilization: Information management systems that support scheduling decisions. Anesthesiology Clinics of North America, 17(1), 75–95.
4. Gupta, D., & Denton, B. (2008). Appointment scheduling in health care: Challenges and opportunities. IIE Transactions, 40(9), 800–819. https://doi.org/10.1080/07408170802165880
5. Harper, P. R., & Gamlin, H. M. (2003). Reduced outpatient waiting times with improved appointment scheduling: A simulation modelling approach. OR Spectrum, 25(2), 207–222. https://doi.org/10.1007/s00291-003-0123-0
6. Laudon, K. C., & Laudon, J. P. (2020). Management information systems: Managing the digital firm (16th ed.). Pearson.
7. Pollak, K. I., & Lorch, S. C. (2007). Health information technology: Its effects on primary care. Pediatrics, 119(1), e207–e213. https://doi.org/10.1542/peds.2006-1970
8. Tan, J., & Payton, F. C. (2010). Adaptive health management information systems: Concepts, cases, and practical applications (2nd ed.). Jones & Bartlett Learning.
9. Wager, K. A., Lee, F. W., & Glaser, J. P. (2017). Health care information systems: A practical approach for health care management (4th ed.). Jossey-Bass.
10. Wijewickrama, A. K., & Takakuwa, S. (2005). Simulation analysis of appointment scheduling in an outpatient department of internal medicine. Proceedings of the 2005 Winter Simulation Conference, 2264–2273. https://doi.org/10.1109/WSC.2005.1574516
11. World Health Organization (WHO). (2021). Digital health systems: Strengthening health services for universal health coverage. https://www.who.int/publications/i/item/9789240020936