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Healthcare Professionals' Perceptions of Hospital Information Systems: A Cross-Sectional Study at Ibn Rochd University Hospital, Casablanca.

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Abstract. This study aims to describe how healthcare professionals at the Ibn Rochd University Hospital in Casablanca perceive the hospital information system (HIS), in order to identify factors that facilitate or restrict its daily use. We conducted a quantitative cross-sectional survey using a questionnaire among 140 healthcare professionals (53 doctors and 87 nurses) at the Ibn Rochd University Hospital. The participants were recruited through stratified random sampling by profession, working across 7 hospital departments. The data were collected over a 3-month period and then analyzed using SPSS version 21. In total, 42.7% of the healthcare professionals expressed a positive attitude, while 57.3% expressed a negative attitude. Nurses were more reserved than doctors. The obstacles cited included network outages, the complexity of the system, data security, and the fear of becoming distanced from patients. The advantages cited were time savings, rapid access to information, and data reliability. In conclusion, the results concern only the Ibn Rochd University Hospital and cannot be generalized to all Moroccan hospitals. They provide real-world data on perceptions of the HIS at a major Moroccan university hospital, which is useful for guiding user training and the deployment of the HIS.

Keywords: *hospital information system (HIS), perception, healthcare professionals, digitization, healthcare facilities, university hospital, Morocco.*

1. Introduction

On an international scale, the healthcare system is undergoing a profound digital transformation, leading to the use of computerized tools to replace paper records and manual registries. This transformation affects all countries, regardless of their income level. The World Health Organization (WHO, 2019) urges countries to implement digital interventions to strengthen their health systems, adapting them to local contexts.

Scientific research shows that health information technologies aim to improve the quality of care, efficiency, and patient safety (Chaudhry and al., 2006; Buntin and al., 2011). A literature review by Buntin and al. (2011) reveals generally positive results. Other authors emphasize that the benefits are not universal; they depend on how the tools are deployed and used (Kaplan and Harris-Salamone, 2009; Menachemi and Collum, 2011).

The hospital information system combines tools for collecting, storing, processing, and disseminating administrative, financial, and clinical data (Haux, 2006; El Bouzidi et al., 2024). It supports daily patient care and also helps management oversee hospital operations, costs, and predictions.

Morocco is joining this movement and has implemented a reform of its healthcare system, accompanied by the expansion of social protection. Public healthcare facilities are encouraged to modernize their operations and digitize their medical and technical data. The Ibn Rochd University Hospital (CHU) in Casablanca is a tertiary-care facility that treats a large number of patients and offers a wide range of medical and surgical specialties. It serves as a relevant case study for observing how a digital reform is implemented.

Nevertheless, the viability of an information system depends on its adoption by users. Healthcare professionals enter data, access it, and verify its accuracy (Bondé, 2010). Healthcare professionals' acceptance of the information system is among the key determinants of a digital health project's success (Boonstra and Broekhuis, 2010; Gagnon and al., 2012).

However, studies on this topic in Moroccan public hospitals remain limited. To the best of our knowledge, few published studies document healthcare professionals' perceptions of the hospital information system in this context. This study helps to fill that gap. Therefore, we aim to address the following research question: How do healthcare professionals at Ibn Rochd University Hospital perceive the hospital information system, and what factors explain their favorable or unfavorable attitudes toward it?

2. Litterature Review

The hospital information system comprises all the resources, procedures, and tools used to manage a hospital's information (Haux, 2006). It addresses three major needs: administrative, financial, and clinical. Thus, it manages patient admissions, patient medical records, billing for services, bed occupancy, and the monitoring of the performance of care and services.

The benefits of the hospital information system are well documented. A study by (Chaudhry and al., 2006) showed that health information technologies improve compliance with best-practice guidelines, enhance monitoring, and reduce certain medication errors. Thus, according to (Alotaibi and Federico, 2017), the digitization of medical data helps ensure patient safety. Furthermore, according to (Faridah and al., 2020), a well-designed HIS facilitates epidemiological analysis.

Therefore, the implementation of the HIS aims to achieve several objectives: to facilitate access to healthcare services, to update medical information in real time, to maintain copies of records, to reduce certain costs, and to support epidemiological analysis. It consists of inputs (information resources), processes (indicators, data sources, data management), and outputs (information products, dissemination, and use). The implementation of the HIS follows well-established steps, from analyzing the current system to monitoring and continuous improvement (Bondé, 2010).

However, simply implementing the tool is not enough. Critical studies show that poorly designed or poorly implemented information systems can generate new errors and difficulties (Ash and al., 2004; Kushniruk and al., 2010). The success of HIS implementation therefore depends on the specific characteristics of the healthcare facility and the perceptions of its users.

Our analytical framework was based on several models. The technology acceptance model explains technology adoption in terms of perceived usefulness and perceived ease of use (Davis, 1989). Its unified version adds facilitating conditions and social influence (Venkatesh and al., 2003). When applied to healthcare, this model has been widely used but also debated for its limitations (Holden and Karsh, 2010; Shachak and al., 2019). The Information Systems Success Model distinguishes between system quality, information quality, and service quality (DeLone and McLean, 2003). Finally, the HOT-fit model links three dimensions: human, organizational, and technological (Yusof and al., 2008). It is this model that provides the

framework for our analysis. We identify one central variable and four groups of explanatory factors (Table 1).

Table 1. Study ariables

Variable	Definition used in the study	References
Attitude toward the HIS (dependent variable)	The professional's overall judgment, whether favorable or unfavorable, regarding the computerization of medical and technical data.	Davis, 1989 ; Venkatesh and al., 2003 ; Holden and Karsh, 2010
Professional function	Membership in the group of doctors or nurses.	Rathert and al., 2019
Technological Factors	System complexity, network stability, risk of data loss in the event of a failure.	DeLone and McLean, 2003 ; Boonstra and Broekhuis, 2010 ; Kruse and al., 2016
Human factors	Familiarity with computer tools, digital skills, and concern about becoming distant from patients.	Gagnon and al., 2012 ; Ash and al., 2004 ; Safi and al., 2018
Organizational Factors	Coordination among teams, generalization of use, training, and change management.	Ammenwerth and al., 2006 ; Ludwick and Doucette, 2009 ; Cresswell and Sheikh, 2013
Security and Privacy	Access control, patient data protection, and storage reliability.	Kushniruk and al., 2010 ; Sittig and Singh, 2010

Source : Compiled by us.

a. Attitude toward the system

Attitude is the variable we seek to explain. In Davis's (1989) model, it stems from two beliefs: Is the system useful? Is it easy to use? Venkatesh and al. (2003) show that the intention to use a system also depends on the environment: technical support, organizational factors, and peer influence. In healthcare, these mechanisms are present, but the clinical context adds its own unique challenges, such as responsibility toward the patient (Holden and Karsh, 2010).

b. The professional function

Healthcare professionals don't use the EHR in the same way. Doctors write prescriptions and consult patient records. Nurses record a lot of data, often on an ongoing basis. Studies of both groups suggest that the experience of using an electronic health record can vary depending on one's role (Rathert and al., 2019).

c. Technological factors

Boonstra and Broekhuis (2010) propose a taxonomy of barriers to physicians' acceptance of the HIS. These include technical difficulties, the time required, financial considerations, organizational aspects, and change management. Furthermore, (Kruse and al., 2016) confirm the following barriers: the burden of technical problems, cost, and resistance to change. In our study, we focus primarily on the complexity of the system and network instability. These relate to system quality as defined by DeLone and McLean (2003).

d. Human Factors

(Gagnon and al., 2012) emphasizes the role of individual characteristics, such as skills and attitudes. Additionally, (Safi and al., 2018) describes resistance to new digital technologies in healthcare. Furthermore, researchers have shown that computerization can alter communication and care routines, sometimes with unintended consequences (Ash and al., 2004). This sheds light on the fear expressed by healthcare professionals that they will become distanced from their patients.

e. Organizational factors

A hospital information system (HIS) is implemented in an existing organization. The task-technology-person fit model underscores this point: adoption is successful when the tool aligns with the actual tasks and the people who use it (Ammenwerth and al., 2006). Experience from seven countries highlights the importance of clinician involvement and training (Ludwick and Doucette, 2009). Finally, (Cresswell and Sheikh, 2013; Kaplan and Harris-Salamone, 2009) emphasize that organizational issues play a major role in the success or failure of projects. These include coordination among teams and the widespread adoption of the technology by all professionals.

f. Security and Privacy

The protection of health data is a key factor in building trust. (Kushniruk and al., 2010) recommend selecting and deploying tools based on security criteria. A socio-technical model proposed by Sittig and Singh (2010) illustrates that security depends on technology, people, processes, and the organization. In our study, we examine concerns regarding multiple access points to data and the risk of data loss in the event of a system failure.

g. Perceptions of the HIS: An overview of its implementation

Most studies categorize healthcare providers as "for" or "against." We propose a different perspective. We group the reasons cited (both positive and negative) according to the three dimensions of the HOT-fit model (Yusof and al., 2008). This framework makes it possible to see whether a single theme—for example, the speed of access to information—is cited both as a strength and as a weakness when the network goes down. It also helps distinguish between issues related to technology and those related to organization. This distinction is useful for decision-makers, as it directs corrective actions toward the right target. A symbol can also be added to these dimensions: in certain contexts, information technology is adopted as a sign of modernity rather than as a genuinely useful tool (Noir and Walsham, 2007). Our framework allows us to cautiously test this hypothesis.

3. Research Methodology

We conducted a quantitative, descriptive, cross-sectional study. It took place at the Ibn Rochd University Hospital in Casablanca over a period of 3 months.

a. Study Setting

This is a quantitative, descriptive, and cross-sectional study conducted at the Ibn Rochd University Hospital in Casablanca.

The Ibn Rochd University Hospital is a major public university hospital in Casablanca. According to key figures from 2018, it comprises three hospitals (Ibn Rochd, Abderrahim Harouchi Mother-and-Child Hospital, and August 20, 1953), has a total of 1,685 beds, and employs 3,896 professionals, including 1,726 nursing staff (45%) and approximately 1,290 medical staff (33%). That year, it recorded 158,394 admissions and 594,435 patient visits. These figures show that the volume of information to be managed is very high, making the quality of the hospital information system particularly important.

In terms of digital technology, the electronic health record was first implemented in the rheumatology department and was later implemented in other departments.

b. Population

The targeted population consists of doctors and nurses at Ibn Rochd University Hospital who use the HIS in their work. They constitute the largest category of staff working at the hospital and are the primary users of the HIS. We selected these two categories because they directly feed data into the HIS and rely on it for their clinical decisions. Participation was voluntary, and responses remained anonymous. No data that could identify a respondent is presented.

The sample comprises 140 healthcare professionals. It was selected using a random sampling method.

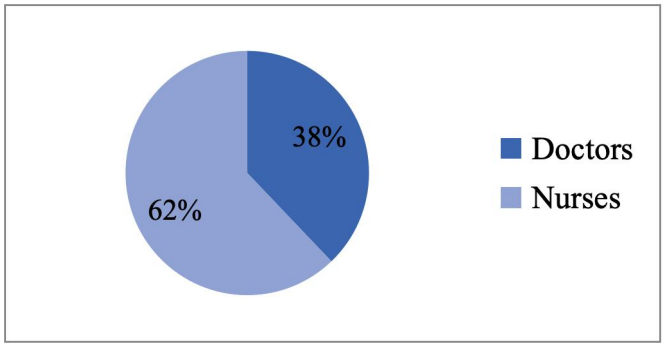
c. Data Collection

Data were collected using a self-administered paper-based questionnaire distributed to healthcare staff. This tool allows for the rapid surveying of a large number of people with the same set of questions. The questionnaire focused on general attitudes toward the HIS, followed by the reasons behind those attitudes. The results of this study were analyzed using SPSS software.

4. Results

The 140 participants consist of 53 doctors and 87 nurses. Nurses therefore constitute the largest group. Figure 1 shows this distribution.

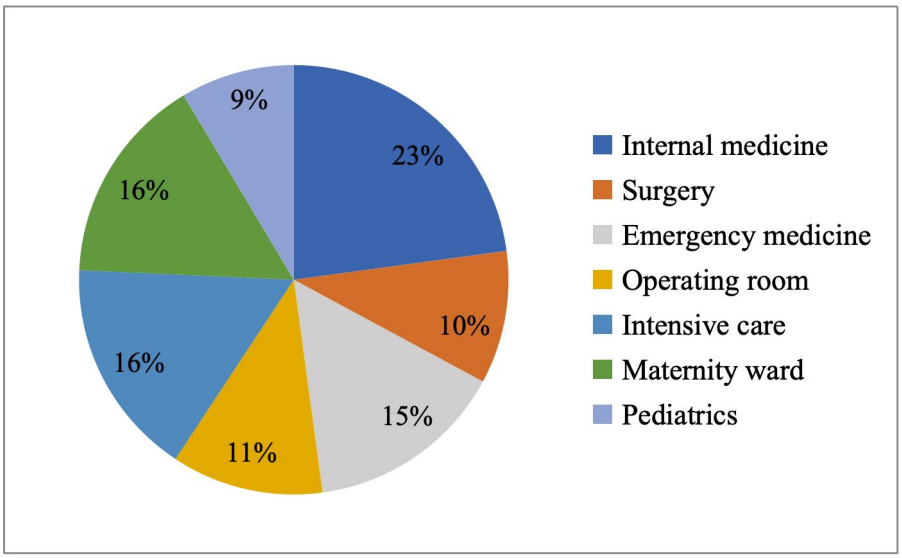
Figure 1. Distribution of participants by functions



Source: Compiled by us

Figure 2 shows the distribution of healthcare professionals by department. The medical department is the most represented, accounting for 23% of the sample. Next, the intensive care and maternity departments each account for 16% of the participants, followed by the emergency department at 15%. The operating room (11%), surgery (10%), and pediatrics (9%) are the least represented departments. Thus, more than half of the respondents (54%) work in three departments (internal medicine, intensive care, and maternity). The sample covers seven departments, providing a diverse view of the practices and conditions surrounding the use of the hospital information system within the facility. (Figure 2).

Figure 2. Distribution of services using the HIS



Source: Compiled by us

We notice that more than half of the professionals (57.3%) express a negative attitude. In contrast, a significant minority (42.7%) say they are in favor. Table 2 breaks down these results by job function. (Table 2)

Table 2. Attitude toward the HIS by professional function

Function	Positive attitude	Negative attitude
Doctors	18,3 %	21,4 %
Nurses	24,4 %	35,9 %
Total	42,7 %	57,3 %

Source: Compiled by us

Doctors accounted for 39.7% of these responses (18.3% + 21.4%), and nurses for 60.3% (24.4% + 35.9%). Based on these figures, we calculated the proportion of negative opinions within each group. It stands at approximately 53.9% among doctors and 59.5% among nurses. The difference is 5.6 percentage points. This aligns with the overall trend: the majority of members in both groups are reserved, with nurses being slightly reserved.

Professionals who oppose the HIS justified their position with nine reasons. We have grouped them according to our framework (Table 3). Technical and organizational reasons are the

most numerous. They include network outages, the complexity of the system, limited use of the HIS, and a lack of coordination. Data security also plays a significant role.

Table 3. Reasons for the negative attitude, grouped according to the dimensions of the HOT-fit model

Dimension	Motifs exprimés par les professionnels
Technological	Complexity of the HIS; very frequent network outages; potential for data loss in the event of an outage
Human	Lack of experience working with computerized data, especially among older staff; concern that the HIS will distance healthcare providers from patients
Organizational	Lack of coordination among medical teams; not all healthcare professionals use the hospital information system
Security and Privacy	Access to patient data by multiple people; security not guaranteed

Source: Compiled by us

Professionals who support the initiative identified nine reasons, as shown in Table 4. These reasons primarily focus on the quality of care and the quality of information. Healthcare providers also value the time saved and the direct connection with other services.

Table 4. Motifs de l'attitude positive, regroupés selon les dimensions du modèle HOT-fit

Dimension	Motifs exprimés par les professionnels
Technological	Improved data readability; improved data reliability; effective monitoring of vital signs; quick access to information
Human	Saves time; fewer oversights
Organizational	Use of a common language; direct liaison with other departments
Quality of Care	Improving the quality of care

Source: Compiled by us

In fact, two key findings emerge. First, the same themes recur on both sides: access to information and data reliability are praised, but network outages and data loss are feared. Second, no negative sentiment calls into question the very idea of digitizing data. Criticisms focus on how the system operates and how it is deployed.

The results show a majority of reservations: 57.3% negative attitudes versus 42.7% positive attitudes. Support exists, but it is not in the majority. Slightly more nurses than doctors express a negative attitude within their respective groups. The gap is small and remains purely descriptive.

The reasons are well distributed across several dimensions. The barriers are technical, human, organizational, and safety-related. The strengths relate primarily to the quality of information and work efficiency. No single dimension alone captures the perceptions of healthcare professionals.

5. Discussion

Our study reveals a mixed perception. A majority of 57.3% of healthcare professionals express a negative attitude, while 42.7% of them express a positive attitude.

First, the reasons cited by healthcare professionals align with the barriers described in the literature. Boonstra and Broekhuis's (2010) taxonomy refers to technical difficulties, organizational challenges, and change management. Kruse and al. (2016) emphasize technical problems and resistance to change. Respondents cited an unstable network, complexity, and uneven use of the HIS. We therefore find the same categories of barriers in a Moroccan context. This finding validates the value of the HOT-fit framework (Yusof and al., 2008). The barriers span all three dimensions. They are not solely technical in nature. This aligns with the idea that a system's success depends on the fit between the tool, the people, and the organization (Ammenwerth and al., 2006) and not solely on software quality (DeLone and McLean, 2003).

Second, healthcare professionals who are in favor mention the quality of care, time savings, and the clarity and reliability of the data. These benefits correspond to those described in the literature reviews: better adherence to guidelines, enhanced monitoring, and a lower risk of errors (Chaudhry and al., 2006; Buntin and al., 2011; Alotaibi and Federico, 2017). Respondents also cited a reduction in oversights, which reflects the ability of computerized systems to remind users and track information. This convergence is reassuring. It suggests that healthcare providers at Ibn Rochd University Hospital clearly recognize the potential benefits of the HIS. Their reservations, therefore, do not stem from a lack of conviction regarding the usefulness of computerization. Rather, they stem from their daily experiences.

Third, some respondents—particularly older staff members—are concerned that they will not know how to use the HIS. Others fear that the screen will distance them from patients. These concerns are well known. The literature describes resistance to digital technologies in medicine (Safi and al., 2018) and unintended effects on communication and care routines (Ash and al., 2004). A review also highlights the importance of individual characteristics in adoption (Gagnon and al., 2012). These fears must be taken seriously, but they are not inevitable. They can be addressed through training, hands-on support, and a system design that respects the time spent interacting with patients.

Fourth, nurses appear to be slightly more reserved than physicians (59.5% negative opinions versus 53.9% in our analysis). This modest difference is consistent with the idea that experiences with the system vary depending on one's role (Rathert and al., 2019). Nurses often enter more data and are therefore more directly affected by system failures and cumbersome interfaces. However, we can't conclude that there is a statistically significant difference, as no association test was conducted. This is an avenue worth exploring.

Fifth, professionals are concerned about multiple points of access to data and security that is deemed insufficient. This concern aligns with recommendations on the secure selection and deployment of health information systems (Kushniruk and al., 2010). It also aligns with the sociotechnical perspective of Sittig and Singh (2010): security results from a set of practices, rules, and skills, not from a single technical solution. It requires, for example, differentiated access rights based on job role and the ability to track data access.

Sixth, we find that nearly one in two respondents expressed opposition, even though computerization is a key reform priority. This discrepancy raises a pressing question: Is the HIS perceived as a work tool or as a requirement imposed from above? In the Indian healthcare sector, Noir and Walsham (2007) described how information technologies can play a symbolic role in legitimizing the system, beyond their actual use. Our data do not allow us to reach a definitive conclusion. However, they do justify examining, in future research, the extent to which the system is actually used versus the extent to which support is merely superficial.

Seventh, these results must be viewed within the context of a large public university hospital. Teams there often work under heavy workloads, with high patient volumes. In this setting,

every minute lost in front of a screen or due to a system failure carries significant weight. The literature notes that digital health projects are more successful when they take into account workload and existing routines (Ammenwerth and al., 2006; Cresswell and Sheikh, 2013). It therefore makes sense that our respondents evaluate the HIS in light of their daily constraints.

It should also be noted that 42.7% of healthcare professionals in favor is not a negligible figure. It indicates a base of support to build upon. Teams that are in favor can serve as advocates among their colleagues, provided they are supported and recognized.

Finally, from a theoretical perspective, our study demonstrates the value of a multidimensional approach to perception. Traditional acceptance models focus on perceived usefulness and ease of use (Davis, 1989; Venkatesh and al., 2003). However, our results show that network reliability, coordination between services, and security also play a role in healthcare providers' judgments. This supports the view of authors who call for moving beyond purely individual acceptance models (Shachak and al., 2019).

From a practical perspective, hospital administrators have clear guidance. Before trying to convince staff, they must first address system failures. Healthcare providers judge the system based on their day-to-day experiences on the job. A stable network, a clear interface, and straightforward access rules are often more valuable than an awareness campaign. Change management must be based on listening to users, as recommended by research on the success of digital health projects (Kaplan and Harris-Salamone, 2009; Ludwick and Doucette, 2009).

These findings may inform the deliberations of public health decision-makers. The digitization of the healthcare system is advancing rapidly. It would benefit from incorporating, from the outset, a component dedicated to listening to healthcare professionals and regularly monitoring their perceptions.

6. Conclusion

This study evaluated healthcare professionals' perceptions of the hospital information system at the Ibn Rochd University Hospital in Casablanca. Based on 140 respondents, 42.7% had a positive attitude and 57.3% had a negative attitude. Nurses are slightly more reserved than doctors. The obstacles cited include an unstable network, complexity, data security, limited use of the system, and the fear of becoming distanced from patients. On the other hand, the advantages include time savings, rapid access to information, and data reliability.

Our study provides two key contributions. Empirically, we contribute to a field that has received little attention. Conceptually, we propose interpreting perception as a judgment regarding the conditions under which the HIS is implemented, using a three-dimensional framework. In fact, healthcare professionals do not reject digitization; rather, they demand that computerized tools function properly.

Improving the HIS requires a reliable infrastructure, enhanced data protection, and training tailored to the needs of healthcare professionals (Ludwick and Doucette, 2009; Sittig and Singh, 2010). Involving healthcare providers in its development, combined with standardized practices across departments, would promote user acceptance and the coordination of care (Yusof and al., 2008; Cresswell and Sheikh, 2013). Regular evaluation of quality, satisfaction, and usage would allow for adjustments to the system (DeLone and McLean, 2003). Finally, multicenter research combining statistical analyses, interviews, and longitudinal follow-up would provide a better understanding of perceptions and how they evolve following improvement initiatives.

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