



Determinants of Patient Acceptance of E-Health Services Enabled by Electronic Health Records: Evidence from Tripoli Central Hospital, Libya

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Abstract

This paper investigates what drives patients' acceptance of EHR-enabled e-health services in Libya. A cross-sectional survey was conducted at Tripoli Central Hospital in June 2017 using a structured 44-item questionnaire, and 70 respondents provided usable data (N = 70). Patient acceptance (the dependent variable) was measured as willingness to use online health services and applications, such as booking appointments online, accessing laboratory results online, and receiving medical advice or prescriptions online. Three determinants were examined: privacy-related perceptions about sharing personal information, perceptions of online health-information exchange, and the patient-doctor relationship. Results show strong positive associations between acceptance and all three determinants. When the determinants were analyzed jointly using a standardized regression model, the patient-doctor relationship and perceived online exchange remained the strongest contributors to acceptance, while privacy-related perceptions added less unique explanatory power once overlap among determinants was considered. The findings suggest that improving trust in clinical relationships and strengthening credible, secure information exchange are central to increasing patient acceptance of e-health services in the Libyan healthcare context.

Keywords: EHR; e-health acceptance; privacy; trust; patient-doctor relationship; health information exchange; Libya.

1 Introduction

Electronic Health Records (EHRs) provide a backbone for digital health services such as electronic registration, online appointment booking, online access to laboratory results, and digitally mediated clinical advice. In principle, such services can improve continuity, reduce administrative burden, and expand patient access. In practice, however, many EHR initiatives deliver less value than expected because uptake by end users is constrained by socio-technical barriers, limited institutional readiness, and persistent concerns about privacy and security.

Technology acceptance research offers a robust starting point for explaining why individuals adopt (or resist) new technologies. The Technology Acceptance Model (TAM) emphasizes perceived usefulness and perceived ease of use as central predictors of acceptance (Davis, 1989). The Unified Theory of Acceptance and Use of Technology (UTAUT) integrates multiple models and highlights performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). In healthcare contexts, acceptance is also shaped by the sensitivity of health data and by relationship-intensive service delivery. Consequently, trust and confidentiality perceptions are often decisive, and evidence from digital health

repeatedly identifies privacy and trust as major determinants of adoption (Dhagarra et al., 2020; Alhammad et al., 2024).

In Libya, where health-system digital maturity and governance have been characterized as uneven, localized evidence on patient acceptance is important for implementation strategy. This study focuses on Tripoli Central Hospital and examines three explanatory domains that are directly actionable in implementation planning: (1) privacy-related perceptions about personal information sharing, (2) perceived online health-information exchange, and (3) the patient–doctor relationship. The paper contributes by

clarifying which of these domains are most strongly associated with acceptance and by interpreting the results through a socio-technical, trust-centered lens relevant to resource-limited settings.

1 Literature Review and Hypotheses

1.1 Acceptance, privacy, and trust in digital health

While usefulness and ease-of-use are important, healthcare adoption decisions are commonly influenced by perceived confidentiality and trust in institutions that manage sensitive data. Empirical evidence suggests that trust and privacy concerns can directly shape technology acceptance in healthcare settings (Dhagarra et al., 2020). In addition, systematic evidence on patients' perspectives indicates that confidentiality, privacy, and security concerns are among the most frequent barriers to adopting digital and mobile health services (Alhammad et al., 2024). In this study, privacy-related perceptions are conceptualized as a determinant of acceptance because willingness to use online health services is likely to depend on whether patients believe personal and clinical information will remain protected.

1.2 Perceived online health-information exchange

Online health-information exchange (HIE) can increase service value by enabling faster access to results and improving continuity across encounters. However, exchange can also increase perceived risk when consent and accountability are unclear. Evidence on EHR implementation shows that organizational and infrastructural constraints influence adoption and shape confidence in exchange functions (Tsai et al., 2020). Research in developing settings similarly highlights that perceived risk and governance weaknesses can undermine adoption of electronic records and exchange services (Akwaowo et al., 2022). Therefore, favorable perceptions of online exchange are expected to be positively associated with patient acceptance of EHR-enabled services.

1.3 Patient–doctor relationship

Acceptance of new digital services in healthcare is embedded in clinical interactions. The patient–doctor relationship influences trust formation, satisfaction, and perceived credibility of care processes. Health IT interventions can reshape communication and workflow, and relationship-centered implementation is often recommended to preserve confidence and engagement (Weiner and Biondich, 2006). Accordingly, patients who report stronger relationship perceptions may be more willing to accept digital services provided through EHR-enabled channels.

1.4 Evidence from Libya: readiness, barriers, and trust conditions

Libyan scholarship emphasizes that adoption of digital health systems depends not only on perceived benefits but also on readiness, governance, and confidence in institutions. National-level assessments describe uneven health-information infrastructure and continuing reliance on paper-based processes, with limited standardization and interoperability (World Health Organization, 2017). Readiness research in the Libyan National Health Service (LNHS) argues that progress requires coordinated training, engagement, and adoption incentives (Ahwidy, 2016a; Ahwidy and Pemberton, 2016). Facility-level evidence reports persistent

barriers such as insufficient training, limited technical support, and privacy/security concerns, alongside perceived operational benefits (Elharish et al., 2021). Broader evidence on HIS use suggests organizations may recognize the value of HIS while facing obstacles tied to infrastructure and governance capacity (Aki et al., 2023). Additional Libyan work on electronic record system development reiterates the need to address training and privacy/security concerns alongside workflow redesign (Ibrahim et al., 2025). Finally, experience with telehealth in Libya reinforces that trust and privacy remain pivotal to uptake (Elhadi et al., 2021; El Aribi et al., 2024).

This Libyan evidence strengthens the theoretical framing of the present study: acceptance should

be interpreted as a socio-technical outcome shaped by confidentiality perceptions, credible information exchange, and relationship-centered care within the constraints of local readiness.

1.5 Conceptual framework

Figure 1 summarizes the study framework linking the three determinants to patient acceptance. Dashed controls are included as exploratory covariates (demographics and hospital attendance frequency), consistent with common adoption research practice and the survey design.

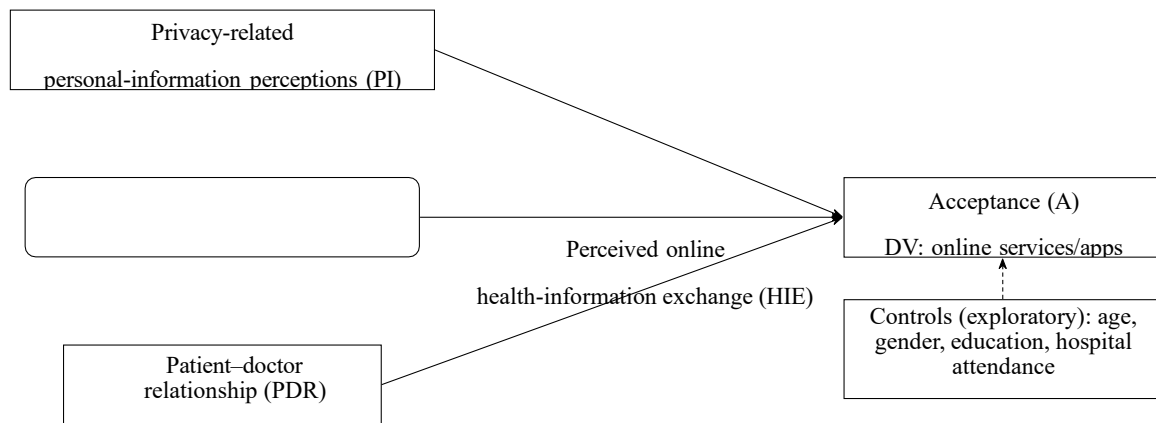


Figure 1: Conceptual framework linking privacy perceptions, perceived online exchange, and patient–doctor relationship to acceptance of EHR-enabled e-health services.

1.6 Model specification and hypotheses

Let A_i denote Acceptance for respondent i , and let PI_i , HIE_i , and PDR_i denote standardized construct scores for privacy-related perceptions, perceived online exchange, and patient–doctor relationship. The primary model is:

$$A_i = \alpha + \beta_1 PI_i + \beta_2 HIE_i + \beta_3 PDR_i + \varepsilon_i.$$

(1) The directional hypotheses are defined as positive partial effects:

- **H1:** $\beta_1 > 0$ (more favorable privacy-related perceptions are associated with higher acceptance).
- **H2:** $\beta_2 > 0$ (more favorable perceived online exchange is associated with higher acceptance).
- **H3:** $\beta_3 > 0$ (stronger patient–doctor relationship perceptions are associated with higher acceptance).

2 Methods

2.1 Design and setting

A cross-sectional questionnaire survey was administered to hospital visitors at Tripoli Central Hospital (Tripoli, Libya) in June 2017.

2.2 Instrument and measures

The questionnaire consisted of 44 items, including demographics and four study constructs:

1. **Personal information (PI):** privacy-related perceptions of sharing personal and health information.
2. **Online health-information exchange (HIE):** perceived value and confidence in online exchange.
3. **Patient–doctor relationship (PDR):** trust, satisfaction, and physician influence.
4. **Acceptance (A; DV):** willingness to use online health services and applications (e.g., booking appointments online, accessing lab results online, receiving health advice/prescriptions online).

Items were coded on a 3-point response scheme (Yes/No/Don't know). Construct summaries were treated as continuous composite variables for correlation and regression analysis.

2.3 Reliability

The full instrument demonstrated excellent internal consistency (Cronbach's $\alpha = 0.968$). Because this statistic was reported at the instrument level, construct-level reliability and validity testing (e.g., EFA/CFA) are prioritized for future work.

2.4 Analysis

Descriptive statistics summarized demographics and construct distributions. Pearson correlations assessed bivariate relationships between Acceptance and each determinant. To align the model with the research question (Acceptance as DV), a standardized multiple regression predicting Acceptance from the three determinants was estimated from the reported correlation matrix. For standardized variables, coefficients can be obtained as:

$$\beta = R_{xx}^{-1} r_{yx} \quad (2)$$

where R_{xx} is the predictors' correlation matrix and r_{yx} is the vector of correlations between Acceptance and each predictor.

3 Results

3.1 Sample characteristics

The dataset includes $N = 70$ valid cases. Table 1 summarizes demographic characteristics.

Table 1: Sample characteristics ($N = 70$).

Characteristic	Category	<i>n</i>	%
Gender	Male	40	57.1
	Female	30	42.9
Age	15–25	20	28.6
	26–30	10	14.3
	31–35	30	42.9
	35+	10	14.3
Education	BSc	45	64.3
	MSc	19	27.1
	PhD	6	8.6
Hospital attendance (last year)	Two or three times	20	28.6
	Four or five times	50	71.4

3.2 Descriptive statistics

Table 2 reports construct-level descriptive statistics. Means near 1.8–1.9 on the 1–3 scale suggest broadly favorable responses toward online services, information exchange, and relationship perceptions.

Table 2: Descriptive statistics of study constructs ($N = 70$).

Construct	Mean	SD
Personal information (PI)	1.7589	0.1989
Online exchange (HIE)	1.8839	0.1871
Patient–doctor relationship (PDR)	1.7982	0.3512
Acceptance (A; online services/apps)	1.8875	0.3530

3.3 Correlations

Table 3 presents Pearson correlations. Acceptance is strongly and positively associated with PI ($r =$

.944), HIE ($r = .852$), and PDR ($r = .941$). The determinants are also highly correlated with one

another (e.g., PI with PDR $r = .937$), indicating substantial overlap and a risk of multicollinearity in multivariable modeling.

Table 3: Pearson correlations among constructs ($N = 70$).

	(1) PI	(2) HIE	(3) PDR	(4) A
(1) PI	1.000	0.789	0.937	0.944
(2) HIE	0.789	1.000	0.696	0.852
(3) PDR	0.937	0.696	1.000	0.941
(4) A (DV)	0.944	0.852	0.941	1.000

1.1 Multiple regression predicting Acceptance

Using the correlation matrix in Table 3, standardized regression coefficients were obtained as:

$$\beta_{PI} = 0.116, \quad \beta_{HIE} = 0.351, \quad \beta_{PDR} = 0.587,$$

with $R^2 \approx 0.962$ (adjusted $R^2 \approx 0.960$). Because determinants are highly correlated, the high R^2 should be interpreted as reflecting both unique effects and substantial shared variance.

Approximate multicollinearity diagnostics derived from \mathbf{R}^{-1} indicate high collinearity for PI (VIF ≈ 11.67) and PDR (VIF ≈ 8.54), and moderate collinearity for HIE (VIF ≈ 2.76).

Table 4: Regression predicting Acceptance (standardized coefficients; derived from correlation matrix).

Determinant	β	VIF (approx.)
PI (privacy-related perceptions)	0.116	11.67
HIE (perceived online exchange)	0.351	2.76
PDR (patient–doctor relationship)	0.587	8.54
Model fit	$R^2 \approx 0.962$; Adj. $R^2 \approx 0.960$	

Hypotheses: H1–H3 are supported at the bivariate level (Table 3). In the multivariable model, PDR and HIE show stronger unique associations with Acceptance than PI once overlap among determinants is taken into account.

2 Discussion

This study provides evidence that patient acceptance of EHR-enabled e-health services in Tripoli Central Hospital is strongly associated with privacy-related perceptions, perceived online exchange, and the patient–doctor relationship. The magnitude of bivariate associations suggests that these constructs may reflect a common trust-oriented disposition: respondents who feel confident in confidentiality and exchange mechanisms and who perceive stronger clinical relationships are more willing to engage with online services.

When modeled jointly, patient–doctor relationship and perceived online exchange exhibit the strongest unique associations with acceptance. This aligns with relationship-centered informatics arguments that health IT can influence patient–physician interactions and that implementation should protect communication and confidence (Weiner and Biondich, 2006). It also aligns with broader acceptance theory: facilitating conditions and perceived benefit matter (Davis, 1989; Venkatesh et al., 2003), but healthcare-specific concerns about trust and privacy frequently shape adoption (Dhagarra et al., 2020; Alhammad et al., 2024). The Libyan context adds an important interpretive layer: readiness and governance constraints can shape user confidence in exchange services (World Health Organization, 2017; Ahwidy, 2016a; Ahwidy and Pemberton, 2016; Aki et al., 2023), meaning that acceptance judgments may embed perceptions of institutional capability and accountability.

An important implication of the strong overlap among determinants is that privacy may not operate as a separate mechanism for patients. Instead, privacy confidence may be formed through the relationship with clinicians and through credible exchange experiences. From an implementation perspective, improving privacy policy statements alone is unlikely to be sufficient without visible safeguards, reliable service delivery, and relationship-preserving workflows.

4 Conclusion

This study examined determinants of patient acceptance of EHR-enabled e-health services in Tripoli Central Hospital. Acceptance was strongly associated with privacy-related perceptions, perceived on-line health-information exchange, and patient–doctor relationship perceptions. When modeled jointly, patient–doctor relationship and perceived online exchange showed the strongest unique contributions to acceptance, while privacy-related perceptions provided less incremental explanatory power once shared variance among determinants was considered. Overall, the findings reinforce that acceptance of digital health services is fundamentally socio-technical and trust-centered.

4.1 Implications for policy and practice

Three implementation implications follow. First, acceptance appears tightly connected to the patient–doctor relationship. EHR-enabled services should be introduced in ways that protect relationship-centered workflows by supporting clinician communication and avoiding screen-first interaction patterns (Weiner and Biondich, 2006). Second, confidentiality and transparency remain core adoption conditions. E-health services should clearly communicate consent processes, access rules, and data-use practices, and provide patient-facing explanations of safeguards (Dhagarra et al., 2020; Alhammad et al., 2024). Third, credibility of online exchange should be strengthened through reliable service delivery and visible governance. In settings where infrastructure and institutional readiness are uneven, adoption efforts should be accompanied by training, technical support, and clear accountability structures (World Health Organization, 2017; Ahwidy and Pemberton, 2016; Aki et al., 2023).

4.2 Limitations and future research

Several limitations guide interpretation. First, construct validity requires further development: while overall reliability was high, construct-level reliability and validity (EFA/CFA and convergent/discriminant validity) were not reported. Second, the cross-sectional design limits causal inference; longitudinal or experimental designs are recommended. Third, common-method bias may inflate associations because variables were collected from a single self-report instrument. Fourth, multicollinearity indicates determinant overlap, limiting interpretation of unique effects; item refinement may improve discriminant validity and model stability. Finally, single-site evidence limits generalizability; replication across multiple Libyan hospitals is needed, along with explicit measurement of readiness and governance features shaping digital service credibility (Ahwidy, 2016a; World Health Organization, 2017).

4.3 Closing statement

In summary, increasing acceptance of EHR-enabled services in Libya requires more than deploying technology. Adoption depends on trusted clinical relationships, credible and secure information exchange, and implementation strategies aligned with local readiness and governance conditions.

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