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ORIGINAL ARTICLE

PREDICTORS OF DIGITAL HEALTH TECHNOLOGY ADOPTION AMONG NURSES AT PUBLIC HOSPITALS IN BANGLADESH

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KEYWORDS

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ABSTRACT

Background: Digitalizing the healthcare system presents significant challenges in nations like Bangladesh, where resources are extremely limited and there is a general hesitancy in technology adoption. The study aimed to assess the status of digital technology (DT) adoption among nurses in public hospitals across Bangladesh and to identify its predictors using the theory of planned behavior (TPB).

Methods: A cross-sectional study using a mixed-methods design was conducted in three levels of Bangladeshi hospitals during the first half of 2025. Quantitative data were gathered from 380 randomly selected nurses through face-to-face interviews. Qualitative data were collected via 16 in-depth interviews (IDIs) and 4 focus group discussions (FGDs) with various stakeholders.

Results: More than 80% of the surveyed nurses were female and Muslim, with a mean age of 39.1 years; 71.1% worked in a tertiary-level hospital. More than half of the nurses demonstrated poor knowledge (56.3%), attitude (54.2%), and practice (54.5%) regarding DT adoption, and 46.4% reported poor self-control. Statistical analysis using hierarchical regression and pathway analysis revealed that knowledge, attitude, motivation, and self-control had significant positive effects on DT practices ($p < 0.05$). Key barriers to DT adoption included poor attitudes of nurses, inadequate organizational support, and a lack of policy-level emphasis on digital health. The poor capacity of nurses to adopt DT and inadequate logistics hindered services.

Conclusion: An integrated approach is essential to build nurses' capacity for DT adoption. Implementing a robust digital health policy and ensuring technology adoption at the user level is crucial for digital transformation in public healthcare settings.

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INTRODUCTION

Digital transformation in healthcare is widely accepted globally for improving the quality and accessibility of health services.¹⁻³ Almost every industry has seen a shift from paper-based to technology-based labor. Rapid globalization and the astounding advancements in information and communication technology (ICT) have led to a remarkable decade of change in the healthcare services sector across many countries worldwide. The use of digital technologies (DT), such as electronic health records (EHRs), telemedicine, and patient monitoring platforms, is increasing to ensure high-quality healthcare services. Health professionals can integrate digital health technologies from prevention to patient management.^{4,5} Nurses are pivotal in the successful implementation of digital health services in a hospital to operate digital technology that directly links with user needs.⁶

Despite considerable progress in some countries, many remain at the primary level of digital health transformation due to inadequate resources and weak capacity for technology acceptance.⁷ Digitalizing healthcare systems is much more difficult in countries like Bangladesh, where resources are scarce and both people and leaders are reluctant to adopt new technologies and take risks. Although Bangladesh has made significant progress in many areas of digitalization, the healthcare services framework has seen less improvement. Nevertheless, with the right setups, partnerships, resources, and foundations, ICTs can be a huge asset for those working to improve healthcare services in Bangladesh.^{8,9}

Nursing is an essential pillar of healthcare, moving beyond just assisting doctors to active participation in patient management, not only to ensure quality care but also to play a role in disease prevention and health promotion.^{10,11} Nursing practice is rapidly evolving towards digital transformation from traditional healthcare provision. Adaptation to digital health technologies among nurses needs to be addressed through an evidence-based, rational approach. Knowledge, attitudes, and skills have been emphasized in previous studies on technology

adoption.¹²⁻¹⁴ Moreover, structural factors are also important in the digital transformation process. Insufficient nurses and poor digital health competencies can delay the adoption of DT. Organizational culture and the availability of necessary tools and stable IT systems are also needed for sustainable digital health transformation.¹⁵

The use of DT in nursing practice is increasing in public hospitals in Bangladesh; however, its adoption remains slow.⁹ Nursing services are more frequent and closer to the patients most of the time, and their services have been updated in the current context of digital transformation across the world.¹⁰ To effectively implement digital health transformation in Bangladesh, a comprehensive capacity assessment survey of nurses across different healthcare settings is critically needed. Although few studies have examined digital transformation in Bangladesh's health sector,^{16,17} the rational use of DT among nurses has not been emphasized. The theory of planned behavior (TPB) emphasizes a rational decision-making process, focusing on three psychological determinants: attitude, motivation, and self-control. These three behavioral determinants influence practice through intention, and, in most cases, intention is reflected in practice when there are no significant issues between them.^{18,19} The Knowledge, Attitude, and Practice (KAP) model is widely used to describe practice or behavioral issues, and knowledge-based studies have used attitude as the mediator in those cases.^{20,21} The Technology Acceptance Model (TAM) also identifies attitude and intention as key factors in the use of DT.²²

This study aimed to identify the major determinants of digital health technology adoption among nurses working in public hospitals of Bangladesh through the theoretical lens of the TPB.

METHODS

STUDY DESIGN AND STUDY SITE

A facility-based, cross-sectional study was conducted using a mixed-methods data collection technique. This approach combined a quantitative survey with qualitative data collection through in-depth interviews (IDIs) and focus group

Table 1: Socio-demographic Factors of the Participants (n=380)

Variables	Number	Percentage
Age of the participants (years)		
≤35	13	3.7
36-45	114	32.1
≥46	228	64.2
$\bar{x} \pm SD = 39.1 \pm 6.8$ years (min-max: 28-55 years)		
Gender		
Male	63	16.6
Female	317	83.4
Religion		
Islam	310	81.6
Hindu and others	70	18.4
Monthly family income (Taka)		
≤40,000	50	13.1
40,001-60,000	185	48.7
>60,000	145	38.2
$\bar{x} \pm SD = 60,218 \pm 16,969$ (min-max: 32,000-120,000)		
Educational status		
Bachelor	315	82.9
Masters	65	17.1
Hospital level		
Primary	40	10.5
Secondary	70	18.4
Tertiary	270	71.1

discussions (FGDs). Data collection took place from March to May 2025 across three levels of public hospitals in Bangladesh. The settings included Dhaka Medical College Hospital (DMCH) at the tertiary level, two district hospitals in Munshiganj and Narayanganj at the secondary level, and three Upazila Health Complexes (UHCs) representing the primary healthcare level.

SAMPLING AND SAMPLE SIZE

A multi-stage sampling technique was used for the study. One hospital from the tertiary level, two hospitals from the secondary level, and three primary level hospitals were selected. Then 380 nurses were randomly selected from the designated public hospitals for the quantitative part. For the qualitative part, 16 IDIs and 4 FGDs were conducted with various stakeholders, including nurses, hospital managers, and public health experts, to gain deeper insights into the topic.

DATA COLLECTION TOOL

Data were collected through face-to-face interviews using a validated and pretested questionnaire. All TPB-related constructs (attitude, motivation, self-control, and practice) were measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). In addition to TPB constructs, socio-demographic factors and knowledge of digital health services were included in the questionnaire. Latent variables within the TPB model were categorized into three groups based on their scores: poor ($\leq 60\%$), fair (61-80%), and good ($> 80\%$).²³ Content validity was confirmed by a panel of five public health experts, with a Content Validity Index (CVI) ranging from 0.80 to 1.00. The Cronbach's alpha for the latent variable scales was approximately 0.9, while the knowledge scale was 0.7.

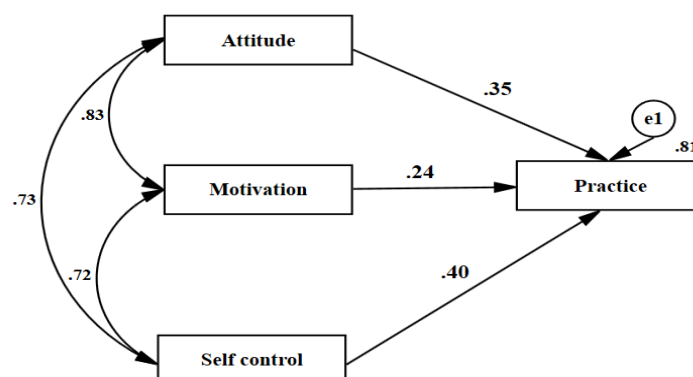


Figure 1: Initial Causal Model of Practice of Nurses regarding Use of Digital Technology

DATA COLLECTION AND DATA ANALYSIS

Quantitative data were collected through face-to-face interviews with randomly selected nurses from the selected hospitals, while qualitative data were obtained through IDIs and FGDs with purposively selected respondents to gain in-depth insights into the subject matter. Data were processed and analyzed immediately after the collection phase. Quantitative data were processed and analyzed using Statistical Package for Social Sciences (SPSS) version 25 software and causal model analysis was performed using the software of Analysis of Moment Structures (AMOS) to find out the path relationships among the latent variables. Firstly, Hierarchical regression analysis was performed to identify significant predictors of digital technology use among nurses. The causal models were constructed based on TPB. The adjusted causal model integrated knowledge into the TPB framework across three blocks: Block 1 (knowledge, motivation, and self-control), Block 2 (attitude), and Block 3 (practice as the final outcome)[Figure 2]. Qualitative data underwent thematic analysis, and both data sets were triangulated to ensure a comprehensive outcome.

ETHICAL CONSIDERATIONS

Trained data collectors collected information from the participants after taking their informed consents

and maintaining privacy as much as possible. IDIs and FGDs were conducted after obtaining verbal consent from the participants. Ethical issues were strictly followed throughout the research process. The Ethical Review Committee of Dhaka Medical College Hospital approved the study as a hospital-based survey (Ref: ERC-DMCH/20/115, 09/02/2025).

RESULTS

The mean age of the nurses was 39.1 years. Among 380 nurses, the majority were female (83.4%). Average monthly family income was about 60,000 Taka. The majority (81.6%) of participants were Muslim, and 71.1% of nurses were selected from a tertiary-level hospital. Only 16.8% nurses had graduated with a master's degree [Table 1]. The mean knowledge score among nurses regarding the digital health system was 3.6 (SD = 1.4) [Table 2]. More than half of the participants (56.3%) had poor knowledge of digital health services. The average attitude score was 13.9 (SD = 3.9). About half of the nurses (54.2%) showed a poor attitude, and only 10.5% were well motivated to use digital health services. The mean motivation score among nurses to use digital health services was 12.8 (SD = 3.5). The average score for nurses' self-control regarding the use of digital health services was 11.4 (SD=3.1)

Table 2: Distribution of Latent Variables regarding Using Digital Technology by Nurses (n=380)

Characteristics	Category of scores			$\bar{x} \pm SD$	Min-Max	Cronbach's α
	Poor	Fair	Good			
Practice	54.5	31.8	13.7	10.6(3.3)	4-18	0.9
Knowledge	56.3	33.6	10.1	3.6(1.4)	1-8	0.7
Attitude	54.2	27.1	18.7	13.9(3.9)	5-24	0.9
Motivation	56.1	33.4	10.5	12.8(3.5)	5-22	0.9
Self-control	46.4	35.4	18.2	11.4(3.1)	5-18	0.9

$\bar{x}$ = Mean, SD = Standard deviation

Around half of the nurses had poor self-control towards the use of DT (48.4%). The mean practice score for digital health systems and data management was 10.6 (SD = 3.3). More than half of the nurses (54.5%) showed poor practice in using digital health services, and only 13.7% demonstrated good practice. A two-step hierarchical regression was conducted to identify significant predictors of nurses' practice regarding the use of digital health services. Background factors were kept in the first step, and age, educational status and level of hospital showed significance with outcomes at the primary stage. Knowledge, attitude, motivation, and self-control were added in the second step, and all added factors were determined as significant predictors of the outcomes ($p < 0.01$). Only educational status and hospital-level from the background issues were significant at the second stage ($p < 0.05$) [Table 3]. The first causal model was developed based on the TPB model using three major psychological determinants of behavior [Figure 1]. Attitude ($\beta = 0.35$, $p < 0.001$), motivation ($\beta = 0.24$, $p < 0.001$), and self-control ($\beta = 0.40$, $p < 0.001$) had significant direct effects on nurses' practice regarding the use of the digital health system. Knowledge was added in the initial model to make the final causal model more comprehensive [Figure 2]. The final model of nursing practice regarding DT use was sufficiently well fit to

conduct the path analysis. All the determinants in the causal model were found to be significant with the practice ($p < 0.05$). Self-control showed the highest level of significant direct effect ($\beta = 0.39$, $p < 0.001$) on practices. Attitude ($\beta = 0.28$, $p < 0.001$) and motivation ($\beta = 0.20$, $p < 0.05$) were also found to be highly significantly related to practices. Knowledge had both direct and indirect effects on practices. Knowledge also had a significant direct effect ($\beta = 0.80$, $p < 0.001$) on attitude. The significant findings supported the causal model of digital health service use, grounded in the KAP and TPB frameworks.

QUALITATIVE ASSESSMENT

THEME 1: POSITIVE PERCEPTION AND ATTITUDE TOWARD DIGITAL HEALTH TECHNOLOGIES

There is a general belief among hospital nurses that digital health systems can improve healthcare delivery. Staff members understand the benefits, even if they aren't yet active users.

"Digital technology can improve patient care by minimizing errors and it can also reduce the waiting time. Digital transformation is urgently needed for record-keeping and data management." (FGD_Nurses) This indicates a high perceived usefulness and positive attitude, despite a lack of proficiency. The nurses are not resistant to change but need structured support to engage effectively.

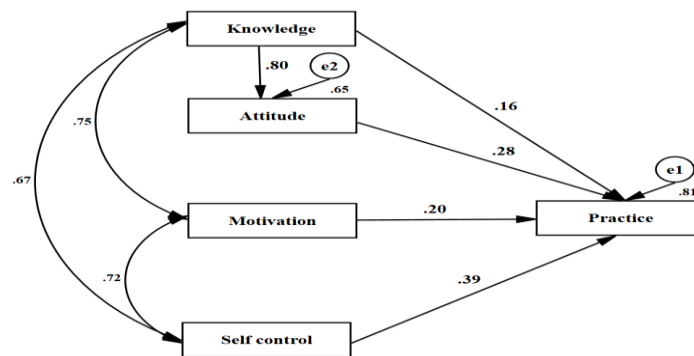


Figure2: Modified Causal Model of Practice of Nurses regarding Use of Digital Technology

THEME 2: INADEQUATE TECHNICAL SKILLS AND SHORTAGE OF NURSES

Digital transformation cannot succeed without adequate human capital. Inadequately trained nurses act as a structural barrier to digital health adoption. Despite recognizing potential benefits, healthcare workers struggle with low digital literacy, limited hands-on training, and limited experience with digital systems such as electronic health records (EHRs) and telemedicine.

“Nursing workforce at the hospital lacks requisite experience, technical knowledge, and training in digital health environments like EHR, telemedicine, etc., constraining the implementation of DT in routine clinical practice.”

(IDI_Public health specialist)

Digital tools are perceived as hard to use, not because of resistance but due to a lack of training and exposure. This affects actual usage despite positive attitudes.

THEME 3: GAPS IN READINESS AND UNDERUTILIZATION OF AVAILABLE DIGITAL HEALTH SERVICES

Although tertiary-level hospitals are in an advantageous position compared to other hospitals, the overall readiness to provide digital health services is not very satisfactory. Hospitals have some digital infrastructure, such as automation, drug inventory management, and

telemedicine platforms, but these are often unused or underused due to a lack of trained staff. Even with infrastructure and awareness, actual engagement with digital systems like EHR remains limited. Ongoing capacity building and quality improvement are essential for successful digital transition among hospital nurses.

“It’s very difficult to make a sustainable digital transformation in healthcare with the limited budget and without continuous support.”

(IDI_Hospital manager)

There is a gap between intention and behavior, commonly seen in early stages of technology adoption. Without institutionalizing usage and providing routine support, scale-up is unlikely.

THEME 4: LEADERSHIP AND POLICY FOR DIGITAL TRANSFORMATION

Hospital managers showed commitment to digital change, contingent on receiving technical and policy support.

Public-private partnerships could be promoted to enhance staff capacity building and to develop infrastructure for better outcomes readiness.

“Leader should be technically sound in the current context of globalization. Leadership is a critical enabler—their openness creates an opportunity for top-down support and policy-driven capacity development.”

(IDI_Policy maker)

Table 3: Predictors related to Use of Digital Health System in Hierarchical Regression

Variable	Stage1			Stage2		
	<i>B</i>	<i>SE(B)</i>	β	<i>B</i>	<i>SE(B)</i>	β
Constant	15.01	0.95		-0.55	0.67	
Age	-0.08	0.03	-0.17**	0.01	0.01	0.01
Gender	0.30	0.42	0.03	0.09	0.21	0.01
Monthly income	5.22×10^{-6}	0.01	0.03	-1.49×10^{-6}	0.01	-0.01
Educational status	-3.84	0.39	-0.44***	-0.54	0.23	-0.06*
Hospital	1.85	0.32	0.25***	0.53	0.17	0.07**
Knowledge				0.31	0.09	0.13***
Attitude				0.23	0.04	0.27***
Motivation				0.18	0.04	0.19***
Self-Control				0.40	0.04	0.36***
<i>R</i> ²		0.31			0.83	
<i>F</i> for <i>R</i> ² change		33.7***			278.5***	

(†) Male was the reference for gender, master's level education was chosen as reference for educational status and primary and secondary level hospital was the reference for hospital variation. One star (*) for only significant ($p < 0.05$), two stars (**) for more importance ($p < 0.01$) and three stars (***) for very highly significant relationships ($p < 0.001$).

THEME 5: VARIATIONS IN TECHNOLOGY ADAPTATION

Challenges related to nurses' adaptation to digital transformation varied across different hospital levels. Primary care nurses faced more problems in technology adaptation.

“Not only implementation, but technology adaptation is also important to make it sustainable. Digital adaptation varies regarding man, money, materials and technology in three levels of hospitals.” (IDI_Public health expert)

The Significance of individual and organizational issues was explained through the triangulation of results on the use of DT among nurses, based on TPB. Nurses demonstrated poor performance in DT adoption, and their readiness for digital transformation was unsatisfactory. Triangulation highlights the critical roles of major behavioral determinants in DT use. Inadequate logistics and a poor budget for DT adoption among nurses made digital transformation in health service delivery more difficult.

DISCUSSION

This mixed-methods study explored nursing practices regarding the use of DT and the factors

influencing its use in public hospitals in Bangladesh. Inadequate knowledge about DT and a poor category of behavioral determinants, such as attitude, motivation, and self-control, were associated with poor practice. Limitations at the organizational and policy levels were identified as major concerns in DT adoption. A severe shortage of human resources, particularly among nurses and support staff, was found as a structural bottleneck in digital health implementation. The extreme shortage of doctors and nurses not only limited the delivery of basic care but also undermined the feasibility of introducing new digital workflows. Without sufficient and appropriately trained staff, including nurses, any digital health strategy remains unsustainable.²⁴⁻²⁶ One significant finding of this study was the inadequate knowledge regarding DT adoption among more than half of the participants and knowledge was determined as a highly significant predictor for practices. Knowledge and psychological and emotional aspects of DT use were also emphasized in previous studies.²⁷⁻²⁹ Despite partial infrastructure, very few healthcare workers—especially nurses—reported using digital platforms in their routine tasks. These findings support the premise that unless users

perceive a system as easy to use, knowledge or skill alone will not bring the positive outcome. Positive attitude, motivation, and self-control are major behavioral determinants in TPB. These three variables for DT adoption among nurses were also justified in the current study and were consistent with the other study's findings.³⁰⁻³² There is no doubt about the organizational support and digital environment for technology adoption.³² Self-control was also found to be a significant factor, which led them to adopt, despite many barriers, especially at primary- and secondary-level hospitals.^{33,34} Hospital managers and nursing leaders expressed belief in the feasibility of digital health under the right conditions. This aligns with TAM's notion that external variables, such as organizational leadership, can shape user attitudes and behavior. They play a vital role in planning and policy development, also continue their support in DT adoption and make it sustainable.³⁵

A notable variation exists among hospitals in implementation progress. While the Munshiganj hospital demonstrates minimal use of digital systems, the Narayanganj hospital reports partial engagement, with some nurses actively updating patient records in the EHR. The problem of technology adoption was more pronounced at UHCs, as found in a previous study.³⁶ Such variability highlights the need for a national strategy for digital health capacity building, including standardization of training and performance monitoring.

The findings of the baseline study can inform policy decisions. Bangladesh should prioritize technology adoption strategies for health workers to ensure digital transformation in health care. An integrated approach should be taken to initiate and sustain digital transformation.^{37,38} Technology adoption among health workers is a major challenge in developing countries such as Bangladesh.

The study had limitations in clarifying causal relationships because it was a cross-sectional survey. The samples were randomly selected using multistage sampling across different hospital levels to minimize variation and improve representativeness. Although the TPB-based causal

model included only major determinants, other potentially relevant psychological or contextual factors influencing technology adoption, such as socioeconomic issues, were included in the regression model and thematic analysis. The study, using the TPB model, provides a theoretical and practical framework for improving nurses' current practices regarding the use of DT.

CONCLUSION

Digital health is not limited by infrastructure alone; organizational readiness and DT adoption are equally important. The major determinants of behavior based on TPB were highly significant in ensuring the use of digital technology in nursing. The findings affirm that technology acceptance is necessary but not sufficient; digital health systems must be embedded within a strong capacity-building framework that addresses skill deficits, workflow redesign, leadership support, and cultural change among nurses. Need-based strategies should be implemented urgently to build nurses' capacity and develop technological systems for hospitals at different levels. Not only ensuring rational use of technology, but also the adoption of the digital healthcare system is important to make it sustainable.

AUTHOR'S CONTRIBUTIONS

Conceptualization: MAA, Data curation: SAZ, SS, MSH. Formal analysis: SS, SAZ, AZMS.

Methodology: MAA, SS, SAZ.

Project administration: MAA, SAZ, AZMS, SCD, MSH. Writing- original draft: MAA, SAZ, AZMS. Writing- review & editing: SS, SCD, MSH.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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REFERENCES

1. Stoumpos AI, Kitsios F, Talias MA. Digital Transformation in Healthcare: Technology Acceptance and Its Applications. *Int J Environ Res Public Health*. 2023; 20 (4): 3407. <https://doi.org/10.3390/ijerph20043407> PMID: 36834105
2. Gopal G, Suter-Crazzolara C, Toldo L, Eberhardt W. Digital Transformation in Healthcare - Architectures of Present and Future Information Technologies. *Clin Chem Lab Med*. 2019; 57 (3): 328-335. <https://doi.org/10.1515/cclm-2018-0658> PMID: 30530878
3. Eden R, Burton-Jones A, Scott I, Staib A, Sullivan C. Effects of eHealth on Hospital Practice: Synthesis of the Current Literature. *Aust Health Rev*. 2018; 42 (5): 568-578. <https://doi.org/10.1071/AH17255> PMID: 29986809
4. Navarro Martínez O, Leyva-Moral JM. Digital Transformation Led by Nurses and Nursing Managers' Priorities: A Qualitative Study. *J NursManag*. 2024; 2024: 8873127. <https://doi.org/10.1155/2024/8873127> PMID: 40224899
5. Zhang L, Bullen C, Chen J. Digital Health Innovations to Catalyze the Transition to Value-Based Health Care. *JMIR Med Inform*. 2025; 13: e57385. <https://doi.org/10.2196/57385>
6. Abbott PA, Coenen A. Globalization and Advances in Information and Communication Technologies: The Impact on Nursing and Health. *Nurs Outlook*. 2008; 56 (5): 238-246. <https://doi.org/10.1016/j.outlook.2008.06.009> PMID: 18922277
7. Global Strategy on Digital Health 2020-2027. Geneva: World Health Organization; 2025. Available online: <https://iris.who.int/handle/10665/338326> (accessed 05/2/2026).
8. Khan MM, Al Amin MM. A Study on Digital Transformation in the Healthcare Sector of Bangladesh: Current Scenario and the Future Roadmap. *J Gov Account Stud*. 2021; 1 (2): 163-176. <https://doi.org/10.35912/jgas.v1i2.463>
9. World Health Organization. Advancing Digital Health Strategy in Bangladesh. Available online: <https://www.who.int/bangladesh/news/detail/03-01-2021-advancing-digital-health-strategy-in-bangladesh> (accessed 12/08/2025).
10. Wang J. Digital Transformation of Nursing Services in Health 4.0 Hospitals. *Open J Nurs*. 2025; 15 (4): 291-298. <https://doi.org/10.4236/ojn.2025.154021>
11. Alshammary HH, Alrshidy FM, Alrashidy MM, Alsaeed RS, Alshmmari AS, Alenzi MS, Alzubaidi HA, Zubaid HH. Nursing as the Cornerstone of Medical Care: Advancing Patient Safety, Quality, and Health Outcomes. *Rev Diabet Stud*. 2025 Mar 20:148-60. <https://doi.org/10.70082/7fdnrw20>
12. Erfani G, McCready J, Gibson B, Nichol B, Unsworth J, Jarva E, Mikkonen K, Tomietto M. Factors Influencing Digital Health Competence Among Healthcare Professionals: A Cross-Sectional Study. *Appl Nurs Res*. 2025; 82: 151922. <https://doi.org/10.1016/j.apnr.2025.151922> PMID: 40086941
13. Walzer S, Armbruster C, Mahler S, Farin-Glattacker E, Kunze C. Factors Influencing the Implementation and Adoption of Digital Nursing Technologies: Systematic Umbrella Review. *J Med Internet Res*. 2025; 27: e64616. <https://doi.org/10.2196/64616>
14. Kelley TF, Brandon DH, Docherty SL. Electronic Nursing Documentation as a Strategy to Improve Quality of Patient Care. *J Nurs Scholarsh*. 2011; 43 (2): 154-162. <https://doi.org/10.1111/j.1547-5069.2011.01397.x> PMID: 21605319

15. Jacob C, Sanchez-Vazquez A, Ivory C. Social, Organizational, and Technological Factors Impacting Clinicians' Adoption of Mobile Health Tools: Systematic Literature Review. *JMIR Mhealth Uhealth*. 2020; 8 (2): e15935. <https://doi.org/10.2196/15935> PMID: 32130167
16. Alam MZ. mHealth in Bangladesh: Current Status and Future Development. *Int Technol Manag Rev*. 2018; 7 (2): 112-124. <https://doi.org/10.2991/itm.7.2.1>
17. Ahmed T, Rizvi SJR, Rasheed S, Iqbal M, Bhuiya A, Standing H, Bloom G, Waldman L. Digital Health and Inequalities in Access to Health Services in Bangladesh: Mixed Methods Study. *JMIR Mhealth Uhealth*. 2020; 8 (7): e16473 <https://doi.org/10.2196/16473>
18. Bosnjak M, Ajzen I, Schmidt P. The Theory of Planned Behavior: Selected Recent Advances and Applications. *Eur J Psychol*. 2020; 16 (3): 352-356. <https://doi.org/10.5964/ejop.v16i3.3107> PMID: 33680187
19. La Barbera F, Ajzen I. Control Interactions in the Theory of Planned Behavior: Rethinking the Role of Subjective Norm. *Eur J Psychol*. 2020; 16 (3): 401-417. <https://doi.org/10.5964/ejop.v16i3.2056>
20. Lee CY, Jung NH. Knowledge, Attitudes and Practices (KAP) Toward Artificial Intelligence in Rehabilitation Among Occupational Therapists: A Cross-Sectional Online Survey in Korea. *Medicine (Baltimore)*. 2025; 104 (45): e45701. <https://doi.org/10.1097/MD.00000000000045701> PMID: 41204480
21. Chawla RL, Gadge NP, Ronad S, Waghmare A, Patil A, Deshmukh G. Knowledge, Attitude and
22. Hossain M, Tiwari A, Saha S, Ghimire A, Imran M, Khatoon R. Applying the Technology Acceptance Model (TAM) in Information Technology Systems to Evaluate the Adoption of Decision Support Systems. *J Comput Commun*. 2024; 12 (8): 242-256. <https://doi.org/10.4236/jcc.2024.128015>
23. Bloom BS, Thomas HJ, Madaus GF. *Handbook on Formative and Summative Evaluation of Student Learning*. USA, NY: McGraw-Hill; 1971.
24. Zhao L, Zhang S. Employment Effects of Technological Progress in U.S. Healthcare: Evidence from Listed Companies. *Sustainability*. 2025; 17 (11): 4856. <https://doi.org/10.3390/su17114856>
25. Vatandoost M, Litkouhi S. The Future of Healthcare Facilities: How Technology and Medical Advances May Shape Hospitals of the Future. *Hosp Pract Res*. 2019; 4 (1): 1-11. <https://doi.org/10.15171/hpr.2019.01>
26. De Leeuw JA, Woltjer H, Kool RB. Identification of Factors Influencing the Adoption of Health Information Technology by Nurses Who Are Digitally Lagging: In-Depth Interview Study. *J Med Internet Res*. 2020; 22 (8): e15630. <https://doi.org/10.2196/15630>
27. Mather C, Cummings E, Gale F. Nurses as Stakeholders in the Adoption of Mobile Technology in Australian Health Care Environments: Interview Study. *JMIR Nursing*. 2019; 2 (1): e14279. <https://doi.org/10.2196/14279>
<https://doi.org/10.1177/17449871241226899> PMID: 39070573
28. Longhini J, Rossetini G, Palese A. Digital Health Competencies and Affecting Factors Among Healthcare Professionals: Additional Findings From a Systematic Review. *J Res Nurs*. 2024; 29 (2): 156-176.
29. Kritsotakis G, Andreadaki E, Linardakis M, Manomenidis G, Bellali T, Kostagiolas P. Perception Regarding Artificial Intelligence in Periodontology: A Questionnaire Study. *Cureus*. 2023; 15 (11): e48309. <https://doi.org/10.7759/cureus.48309>

- Nurses' eHealth Literacy and Associations with the Nursing Practice Environment. *Int Nurs Rev.* 2021; 68 (3): 365-371.
<https://doi.org/10.1111/inr.12650> PMID: 34004022
30. Mohammed AS, Wudu D, Minda Z, Diress GM. Attitudes Toward Implementation of Electronic Medical Record and Its Associated Factors Among Health Professional Workers in Selected Public Hospitals in Addis Ababa, Ethiopia, 2023: A Multi-Center Cross-Sectional Study. *Digit Health.* 2024; 10: 20552076241277034. <https://doi.org/10.1177/20552076241277034>
 31. Dai Q, Li M, Yang M, Shi S, Wang Z, Liao J, Li Z, E W, Tao L, Tang YD. Attitudes, Perceptions, and Factors Influencing the Adoption of AI in Health Care Among Medical Staff: Nationwide Cross-Sectional Survey Study. *J Med Internet Res.* 2025; 27: e75343. <https://doi.org/10.2196/75343>
 32. Van Houwelingen T, Meeuse ACM, Kort HSM. Enabling Nurses' Engagement in the Design of Healthcare Technology - Core Competencies and Requirements: A Qualitative Study. *Int J Nurs Stud Adv.* 2023; 6: 100170. <https://doi.org/10.1016/j.ijnsa.2023.100170> PMID: 38746818
 33. Choi H, Tak SH. Nurses' Behavioral Intention in Using Virtual Clinical Simulation Training: By Structural Equation Modeling. *Nurse Educ Pract.* 2022; 65: 103492. <https://doi.org/10.1016/j.nepr.2022.103492> PMID: 36332490
 34. Cho Y, Kim M, Choi M. Factors Associated with Nurses' User Resistance to Change of Electronic Health Record Systems. *BMC Med Inform Decis Mak.* 2021; 21 (1): 218. <https://doi.org/10.1186/s12911-021-01581-z>
 35. Burkoski V. Nursing Leadership in the Fully Digital Practice Realm. *Nurs Leadersh (Tor Ont).* 2019; 32 (SP): 8-15. <https://doi.org/10.12927/cjnl.2019.25818> PMID: 31099743
 36. Ashley C, Williams A, Dennis S, McInnes S, Zwar NA, Morgan M, Halcomb E. Telehealth's Future in Australian Primary Health Care: A Qualitative Study Exploring Lessons Learnt From the COVID-19 Pandemic. *BJGP Open.* 2023; 7 (2): BJGPO.2022.0117. <https://doi.org/10.3399/BJGPO.2022.0117> PMID: 36750374
 37. Addotey-Delove M, Scott RE, Mars M. Healthcare Workers' Perspectives of mHealth Adoption Factors in the Developing World: Scoping Review. *Int J Environ Res Public Health.* 2023; 20 (2): 1244. <https://doi.org/10.3390/ijerph20021244>
 38. Putteeraj M, Bhungee N, Somanah J, Moty N. Assessing E-Health Adoption Readiness Using Diffusion of Innovation Theory and the Role Mediated by Each Adopter's Category in a Mauritian Context. *Int Health.* 2022; 14 (3): 236-249. <https://doi.org/10.1093/inthealth/ihab035>