Original Paper

# Retracted: Comparative Effectiveness of Health Communication Strategies in Nursing: A Mixed Methods Study of Internet, mHealth, and Social Media Versus Traditional Methods

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## Abstract

**Background:** Effective communication is vital in health care, especially for nursing students who are the future of health care delivery. In Iraq's nursing education landscape, characterized by challenges such as resource constraints and infrastructural limitations, understanding communication modalities is crucial.

**Objective:** This mixed methods study conducted in 2 nursing colleges aims to explore and compare the effectiveness of health communication on the web, through mobile health (mHealth) applications, and via social media among nursing students in Iraq. The research addresses a gap in understanding communication modalities specific to Iraq and explores the perspectives, experiences, and challenges faced by nursing students.

**Methods:** Qualitative interviews were conducted with a purposive sample (n=30), and a structured survey was distributed to a larger sample (n=300) representing diverse educational programs. The study used a nuanced approach to gather insights into the preferences and usage patterns of nursing students regarding communication modalities. The study was conducted between January 12, 2023, and May 5, 2023.

**Results:** Qualitative findings highlighted nursing students' reliance on the web for educational materials, the significant role of mHealth applications in clinical skill development, and the emergence of social media platforms as community-building tools. Quantitative results revealed high-frequency web use (276/300, 92%) for educational purposes, regular mHealth application usage (204/300, 68%) in clinical settings, and active engagement on social media platforms (240/300, 80%). Traditional methods such as face-to-face interactions (216/300, 72%) and practical experiences (255/300, 85%) were preferred for developing essential skills.

**Conclusions:** The study underscores nursing students' preference for an integrated approach, recognizing the complementary strengths of traditional and digital methods. Challenges include concerns about information accuracy and ethical considerations in digital spaces. The findings emphasize the need for curriculum adjustments that seamlessly integrate diverse communication modalities to create a dynamic learning environment. Educators play a crucial role in shaping this integration, emphasizing the enduring value of face-to-face interactions and practical experiences while harnessing the benefits of digital resources.

Clear guidelines on professional behavior online are essential. Overall, the study expands the understanding of communication modalities among nursing students in Iraq and provides valuable insights for health care education stakeholders globally.

# Introduction

## Background

In the dynamic landscape of health care, effective communication stands as a cornerstone for both health care professionals and patients alike. The ability to convey information, build trust, and establish meaningful connections is particularly vital for nursing students, who serve as the future backbone of health care delivery [1,2]. The evolving nature of health care delivery necessitates a keen understanding of diverse communication modalities among these aspiring health care professionals [3]. As digital natives, nursing students find themselves at the crossroads of traditional methods and cutting-edge technologies, a juncture that not only significantly influences their education but also shapes the trajectory of their future practice [4].

In the context of Iraq, nurses are required to possess language proficiency and undergo training in cultural customs and beliefs to effectively deliver care to a diverse patient population. Furthermore, the inclusion of support services, such as dieticians, in the care plan is essential to address relevant cultural considerations [5-7].

In the global context, the study's focus expands beyond the borders to the unique health care landscape of Iraq. The health care system in Iraq grapples with a range of challenges, including resource constraints, infrastructural limitations, and the aftermath of conflict [8,9]. Understanding the gap in communication modalities among nursing students in Iraq becomes crucial, as it provides insights into the specific challenges faced by these students within the broader context of developing health care infrastructure.

This study, therefore, seeks to explore and compare the effectiveness of health communication on the web, through mobile health (mHealth) applications, and via social media among nursing students in Iraq. We aim to juxtapose these digital methods against traditional communication approaches, shedding light on the specific challenges and opportunities that arise within the unique health care landscape of Iraq. By delving into the distinctive perspectives, experiences, and challenges faced by nursing students in Iraq, we aspire to uncover insights that not only contribute to the broader discourse on health care communication and education but also offer targeted recommendations for improving nursing education in Iraq's specific context.

Previous studies may have examined general communication practices in health care or nursing education, but they often overlook the nuanced sociocultural and infrastructural factors present in Iraq. These factors could significantly impact the choice and effectiveness of communication modalities among nursing students in the region. In addition, as technology and digital resources become increasingly integrated into health care delivery worldwide, understanding how nursing students in Iraq navigate and use these tools within their specific context is essential.

The gap in the study lies in the limited research that specifically addresses the communication modalities used by nursing students in Iraq. As the health care landscape undergoes transformations, understanding how nursing students navigate and use communication tools becomes pivotal. By addressing this gap, we not only contribute to the global understanding of health care communication but also provide valuable insights for stakeholders in Iraq's health care education and delivery system, fostering a foundation for more effective and contextually relevant nursing education programs.

## Objective

The objective of this study is to investigate and compare the effectiveness of health communication modalities, including the web, mHealth applications, and social media, among nursing students in Iraq. Specifically, the research aims to juxtapose these digital communication methods against traditional approaches, shedding light on the unique challenges and opportunities within the health care landscape of Iraq. By delving into the distinctive perspectives, experiences, and challenges faced by nursing students in Iraq, the study seeks to provide comprehensive insights that not only contribute to the broader discourse on health care communication and education but also offer targeted recommendations for improving nursing education in Iraq's specific context. The primary goal is to bridge the existing gap in research by specifically addressing the communication modalities used by nursing students in Iraq, recognizing the transformative nature of the health care landscape, and providing valuable insights for stakeholders in Iraq's health care education and delivery system, thereby enhancing the global understanding of health care communication and offering contextually relevant recommendations for more effective nursing education programs in Iraq.

# Methods

## Overview

To capture the nuanced perspectives of nursing students, a mixed methods approach was used in 2 nursing colleges affiliated with different universities in Iraq—Ninevah University in Mosul and Al-Kitab University in Kirkuk. This approach involved the integration of qualitative and quantitative data collection strategies. The study intentionally focused

on nursing students enrolled in various educational programs, encompassing diploma, associate degree, and bachelor's degree programs. This diverse sampling aimed to ensure a comprehensive representation of perspectives within the study's scope.

## Qualitative Phase

Semistructured interviews were conducted with a purposive sample of nursing students (n=30) from various educational institutions. The interviews focused on understanding how nursing students perceive and engage with health communication methods, exploring their preferences, challenges, and experiences. Open-ended questions encouraged participants to share anecdotes and reflections on the impact of different communication modalities in their educational journey.

## Quantitative Phase

To complement the qualitative insights, a structured survey was distributed to a larger sample of nursing students (n=300). The survey included Likert-scale questions and multiple-choice items to quantify the frequency and preferences regarding the use of web, mHealth applications, social media, and traditional communication methods in their education. Questions also addressed perceived effectiveness, challenges, and ethical considerations associated with each modality.

The chosen sample sizes of 30 for interviews and 300 for surveys in this study were determined based on principles of qualitative and quantitative research methodology, as well as considerations specific to the research objectives and population.

## Validity and Reliability of Survey Instrument

Steps were taken to ensure the validity and reliability of the survey instrument. Before distribution to the larger sample, the survey underwent a pilot study involving a small group of nursing students (n=20) from similar educational backgrounds. The pilot study aimed to assess the clarity, relevance, and comprehensibility of the survey questions. Feedback from the pilot study participants was used to refine and finalize the survey instrument, enhancing its validity and reliability for the main data collection phase.

## Data Analysis

Qualitative data from interviews were transcribed and analyzed using thematic analysis to identify key themes and patterns. Quantitative data from the surveys were subjected to descriptive statistical analysis, providing a quantitative overview of nursing students' preferences and perceptions.

## Integration of Findings

The qualitative and quantitative findings were triangulated to provide a comprehensive understanding of nursing students' perspectives on health communication methods. By integrating both types of data, we aimed to offer a robust and multifaceted exploration of the comparative effectiveness of web-based, mHealth, and social media communication versus traditional methods, as perceived by nursing students.

## Ethical Considerations

The ethical aspects of this study were carefully addressed during the qualitative data collection phase. Prior to their involvement, all nursing student participants received comprehensive information regarding the research's objectives, procedures, and potential risks and benefits, and they provided written informed consent. Strict measures were implemented to maintain confidentiality, ensuring that participants' responses remained anonymous, and their privacy was protected. Participants were explicitly informed of their autonomy to withdraw from the study at any point without facing any repercussions to their academic standing or relationships. Postinterview debriefing procedures were established to provide support or counseling resources to participants in case of distress. The study protocol, including ethical considerations, underwent thorough review and approval by the institutional ethics board at the College of Nursing-Nineveh University (NUR-IRB-23. October-18th NO:25). Throughout the data collection process, researchers maintained reflexivity by critically reflecting on their biases and potential influences on participants' responses, thus upholding the study's integrity.

# Results

## Qualitative Findings

### Utilization of Web-Based Resources

Nursing students overwhelmingly expressed a reliance on the web for accessing educational materials, research studies, and e-learning platforms. The flexibility and accessibility of web-based resources were highlighted, allowing students to engage with content at their own pace.

### mHealth Applications in Clinical Learning

mHealth applications played a significant role in clinical skill development, with students using apps for medication management, patient assessment, and real-time data retrieval. Challenges were noted, including concerns about the accuracy of information within some applications and variations in app reliability.

### Social Media as a Community-Building Tool

Social media platforms were instrumental in fostering a sense of community among nursing students. Peer support, information sharing, and collaborative learning were cited as key benefits. Ethical considerations, such as maintaining professionalism on social media, were acknowledged as important aspects of digital interaction.

### Value of Traditional Methods

Face-to-face interactions, classroom discussions, and hands-on clinical experiences were deemed essential for honing communication skills. Mentorship from experienced

health care professionals during traditional interactions was emphasized as invaluable.

## Quantitative Findings

### Frequency of Web Use

In total, 92% (276/300) of surveyed nursing students reported using the web daily for educational purposes. The majority (234/300, 78%) indicated that web-based resources were their primary source of information.

### mHealth Application Usage Patterns

In total, 68% (204/300) of nursing students reported using mHealth applications in clinical settings at least once a week. Medication reference apps (138/300, 45%) and patient education apps (96/300, 32%) were among the most frequently used.

### Social Media Engagement

In total, 80% (240/300) of participants were active on social media platforms related to nursing education. Facebook (138/300, 45%) and Instagram (90/300, 30%) were the most commonly used platforms for academic purposes.

### Traditional Methods Preferences

In total, 72% (216/300) of nursing students found face-to-face interactions with educators to be highly effective. Practical, hands-on experiences in clinical settings were rated as very important by 85% (255/300) of participants.

## Common Themes Across Qualitative and Quantitative Data

### Integration Preferences

Nursing students expressed a preference for an integrated approach, combining traditional methods with digital technologies for a comprehensive learning experience.

### Information Validation

Both qualitative and quantitative data revealed concerns about the accuracy of information, with students emphasizing the importance of verifying web-based content.

## Balancing Ethical Considerations

Nursing students acknowledged the need for clear guidelines on professional behavior in digital spaces and the importance of maintaining patient privacy and confidentiality (Table 1).

**Table 1.** Navigating communication avenues in nursing education: an in-depth exploration of modalities and preferences (n=300).

| Communication modality | Frequency of use, n (%) | Primary purpose | Usage in clinical settings, n (%) | Most frequently used apps, n (%) | Social media engagement, n (%) | Preferred traditional methods, n (%) |
|---|---|---|---|---|---|---|
| Web | Daily (n=276, 92%) | Educational | —[a] | — | — | — |
| mHealth applications | At least weekly (n=204, 68%) | Clinical | Medication reference (n=135, 45%) | Patient education (n=96, 32%) | — | — |
| Social media | Active (n=240, 80%) | Academic | — | — | Facebook (n=135, 45%) | Instagram (n=90, 30%) |
| Traditional methods | — | — | — | — | — | Face-to-face (n=216, 72%) |
| Not applicable | — | — | — | — | — | Practical, hands-on (n=255, 85%) |

[a]Not applicable.

# Discussion

## Principal Findings

The main findings of this study reveal a dynamic interplay between traditional and digital health communication modalities among nursing students in Iraq. Specifically, the study highlights the significant reliance on digital resources such as the web, mHealth applications, and social media platforms for educational purposes, while also recognizing the enduring value of traditional methods such as face-to-face interactions and practical experiences in clinical settings. This underscores the need for a nuanced and integrated approach to nursing education that effectively combines both traditional and digital modalities to prepare the next generation of health care professionals.

## Integration Preferences

The preference for an integrated approach to learning among nursing students emerges as a pivotal finding, shedding light on their nuanced perspectives toward communication modalities. This inclination toward integration indicates a sophisticated understanding among nursing students, recognizing the symbiotic relationship between traditional and digital methods in the educational landscape. This revelation aligns with contemporary pedagogical theories that emphasize the importance of adapting education to the evolving needs and preferences of the learners.

IIn the Philippines, research indicated that technology-enhanced nursing education was more effective than conventional methods [10, 11]. Arunasalam [12] highlighted that nursing students encountered frustration with information and communication technology (ICT) usage, primarily

due to a lack of support from faculty and staff. This aligns with the findings by Webb et al [13], where Austria identified technological delay, insufficient government support, limited exposure, and a dependence on technology as primary challenges faced by users in the realm of ICT in nursing education .

A study conducted in Egypt by Fernandes et al [14] revealed a set of challenges confronted by nursing students in using ICT, including issues such as slow or poor web speed and access (84.3%), inadequate ICT facilities (80.4%), difficulties in accessing required information (68.7%), and the high cost of web subscriptions (68.5%). This collective evidence underscores that, despite the well-documented advantages of integrating ICT into nursing education, there persist inherent challenges that impede its seamless incorporation.

## Complementary Strengths of Traditional and Digital Methods

The recognition of complementary strengths between traditional and digital methods in nursing education reflects a mature and nuanced approach toward shaping the learning experiences of future health care professionals. The integration of both modalities creates a synergistic educational environment that leverages the unique advantages offered by each approach.

## Traditional Methods

Traditional methods, characterized by face-to-face interactions and hands-on practical experiences, play an integral role in the development of essential interpersonal and clinical skills among nursing students [15]. Face-to-face interactions with educators provide a platform for immediate feedback, mentorship, and the cultivation of effective communication. Practical experiences in clinical settings not only reinforce theoretical knowledge but also foster critical thinking, decision-making, and a deep understanding of patient care [16,17].

## Digital Methods

Simultaneously, digital methods represented by the web, mHealth applications, and social media bring distinct benefits to nursing education. The web serves as a vast repository of information, offering accessibility to a wealth of resources and facilitating self-directed learning. mHealth applications contribute to the enhancement of clinical skills by providing real-time data, medication references, and patient education tools. Social media platforms create virtual communities, fostering collaborative learning, knowledge sharing, and a sense of camaraderie among nursing students [18-20].

## Synergy and a Well-Rounded Skill Set

The synergy achieved by combining traditional and digital methods allows nursing students to harness the best of both worlds. Traditional methods provide the foundational skills and human touch necessary for effective patient care, while digital methods offer efficiency, accessibility, and the ability to stay abreast of the latest developments in health care. This

symbiotic relationship promotes a well-rounded skill set that is crucial for nursing students as they transition into their future roles in health care [21].

## Balanced Approach and Core Values

The inclination toward a balanced approach in nursing education underscores the pivotal importance of preserving the core values embedded in traditional methods. As technology continues to reshape education in the digital age, nursing students recognize that the enduring value of face-to-face interactions with educators and practical, hands-on experiences is indispensable for fostering comprehensive clinical competence and holistic patient care.

## Preserving Core Values

The emphasis on a balanced approach reflects a commitment to preserving the core values that have long been integral to nursing education. Face-to-face interactions with educators provide a unique opportunity for immediate feedback, mentorship, and the cultivation of interpersonal skills. These interactions contribute to the development of empathy, a foundational element in patient-centered care. Practical, hands-on experiences are essential for translating theoretical knowledge into real-world applications, fostering critical thinking, and instilling a deep understanding of the complexities of patient care [22,23].

## Indispensable Components of Nursing Education

Face-to-face interactions and practical experiences are considered indispensable components of nursing education. They go beyond the acquisition of technical skills, playing a critical role in developing effective communication skills, teamwork, and the ability to navigate complex health care scenarios. The immersive nature of hands-on experiences allows nursing students to engage with the emotional and humanistic aspects of patient care, contributing to the holistic development of future health care professionals [24,25].

## Enduring Value in the Digital Age

In the digital age, where technological advancements offer new possibilities in education, nursing students emphasize the enduring value of these foundational elements. While recognizing the benefits of technology-enhanced learning, they underscore the irreplaceable role of face-to-face interactions and practical experiences in shaping their identities as empathetic and skilled caregivers. This sentiment aligns with broader discussions in education literature that emphasize the importance of balancing technological advancements with traditional pedagogical approaches to foster holistic development in students [26,27].

## Leveraging Integration in Curriculum Design

Educators wield a pivotal role in shaping the learning experiences of nursing students, and the insights derived from this study underscore the imperative of crafting a curriculum that seamlessly integrates diverse communication modalities.

By integrating technology-enhanced learning tools, web-based resources, and digital simulations into traditional classroom settings, educators can foster a dynamic and engaging learning environment. This pedagogical approach not only aligns with the current findings but also resonates with existing literature that underscores the critical importance of technology integration in nursing education.

## Creating a Dynamic Learning Environment

The integration of various communication modalities into curriculum design creates a dynamic learning environment that caters to the diverse learning preferences and technological competencies of nursing students. By incorporating technology-enhanced learning tools, educators can enhance the accessibility of educational content, promote interactive learning experiences, and facilitate real-time engagement with evolving health care concepts [28,29].

## Enhancing Student Engagement

Technology integration has been shown to enhance student engagement, a critical factor in the overall success of nursing education. Web-based resources, interactive simulations, and collaborative digital platforms provide avenues for active participation, fostering a sense of ownership over the learning process. The integration of technology not only captures the interest of tech-savvy students but also accommodates various learning styles, ensuring a more inclusive and participatory educational experience [30,31].

## Preparation for the Evolving Health Care Landscape

A curriculum that embraces technology integration is essential for preparing nursing students for the ever-evolving health care landscape. The incorporation of digital simulations, telehealth experiences, and exposure to emerging technologies aligns with the contemporary demands of health care practice. It equips students with the technological proficiency and adaptability required in modern health care settings, ensuring that they are well positioned to navigate the complexities of their future roles [32,33].

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## Balancing Ethical Considerations

The discourse on ethical considerations in the digital realm within the context of nursing education resonates with the broader ethical conversation in health care. The acknowledgment by nursing students of the need for clear guidelines on professional behavior in digital spaces aligns with the increasing recognition of the ethical implications associated with the use of social media and mHealth applications. It is imperative that educational programs incorporate components addressing the ethical responsibilities of health care professionals in web-based environments, emphasizing the crucial aspects of privacy, confidentiality, and maintaining the highest standards of professionalism.

## Growing Recognition of Ethical Implications

In the digital age, health care professionals, including nursing students, find themselves navigating a complex landscape where ethical considerations intertwine with technological advancements. The acknowledgment of the need for clear guidelines reflects a growing awareness among nursing students about the potential ethical pitfalls associated with social media interactions, the use of mHealth applications, and other web-based platforms. These platforms, while

offering opportunities for communication and information-sharing, also pose ethical challenges related to patient privacy, boundaries, and the responsible use of technology in health care [40].

## Educational Imperative

The integration of ethical considerations into nursing education is an imperative response to the evolving health care landscape [34]. Educational programs must proactively address the ethical responsibilities of health care professionals in digital spaces, ensuring that nursing students are well equipped to navigate the ethical complexities that may arise in their future practice [41]. This involves providing comprehensive training on maintaining patient confidentiality, safeguarding privacy, and upholding the highest standards of professionalism in the digital realm [34,42-44].

## Components of Ethical Education

The ethical education of nursing students in the digital era should encompass the following components:

- *Privacy and confidentiality*: Emphasizing the importance of safeguarding patient information and maintaining confidentiality in web-based communications.
- *Professionalism*: Instilling a sense of professionalism in digital interactions, setting boundaries, and ensuring that web-based behavior aligns with established ethical standards.
- *Informed consent*: Educating students about the importance of obtaining informed consent when using digital platforms for patient engagement or sharing health care information.
- *Navigating ethical dilemmas*: Providing guidance on how to navigate ethical dilemmas that may arise in the context of social media, mHealth applications, and other web-based environments.

## Implications for Nursing Education

The findings of this study offer several implications for nursing education, particularly in the context of Iraq's health care landscape. Educators should recognize and capitalize on the positive aspects of digital technologies, such as web-based resources, mHealth applications, and social media, by strategically incorporating them into the curriculum. This integration should be purposeful and aligned with specific learning objectives and competencies, ensuring that digital tools enhance the educational experience rather than serve as distractions. Educators can achieve this by designing interactive web-based modules, using evidence-based mHealth applications for skill development, and creating web-based discussion forums on social media platforms to facilitate peer learning and knowledge exchange.

Moreover, educators should emphasize the development of critical thinking skills among nursing students to navigate the digital information landscape effectively. This involves teaching students to critically evaluate web-based sources, discern credible information from misinformation, and apply evidence-based practices in their clinical decision-making processes. Incorporating case studies or simulated scenarios that require students to analyze and interpret digital health information can further enhance their critical thinking abilities in the context of health care communication.

Practical experiences in clinical settings remain irreplaceable for nursing students' education. While digital tools can enhance certain aspects of learning, the hands-on application of theoretical knowledge in real-world scenarios is essential for building clinical competence and effective communication skills. Educators should continue to prioritize and innovate in clinical education, ensuring that students have ample opportunities for direct patient care experiences, interprofessional collaboration, and mentorship from experienced clinicians. Simulated clinical scenarios using technology-enabled simulation platforms can also complement traditional clinical experiences, providing students with a safe and controlled environment to practice and refine their skills before entering real clinical settings.

In summary, educators in nursing education should adopt a balanced approach that seamlessly integrates diverse communication modalities into the curriculum. This involves leveraging the strengths of digital technologies while preserving the enduring value of hands-on clinical experiences. By implementing specific strategies and best practices for incorporating digital tools and fostering critical thinking skills, educators can better prepare nursing students for the demands of contemporary health care practice in Iraq and beyond.

## Limitations of the Study

The findings of this study, conducted in 2 nursing colleges in Iraq, offer valuable insights into communication modalities among nursing students. However, several limitations impact the generalizability of the findings. These include the study's focus on specific institutions, a relatively small and homogeneous sample size, reliance on self-reported data that may introduce bias, a limited time frame, and contextual factors unique to Iraq's health care and educational landscape. Caution should be exercised when applying these findings to broader populations or contexts. Further research with larger, more diverse samples, conducted across multiple regions and institutions, is needed to provide a comprehensive understanding of health care communication among nursing students in Iraq and beyond.

## Future Directions

The study's findings pave the way for future research avenues. Longitudinal studies could track nursing students' evolving perspectives over the course of their education and subsequent professional practice. Exploring the impact of interventions designed to enhance information literacy and ethical awareness among nursing students in the digital realm would also be valuable. In addition, investigations into the experiences of nursing educators in integrating diverse communication modalities could provide a holistic understanding of the challenges and opportunities in nursing education.

## Conclusions

This study provides a rich foundation for understanding health communication preferences among nursing students. As technology continues to evolve, nursing education must adapt to prepare students for the complexities of modern health care. A thoughtful integration of traditional and digital communication methods will not only enhance educational outcomes but also contribute to the development of well-rounded, technologically literate, and ethically conscious nursing professionals.

### Data Availability

The data sets used and analyzed during this study are available from the corresponding author upon reasonable request.

### Authors' Contributions

MQH and MFA contributed to conceptualization, methodology, formal analysis, investigation, data curation, writing, reviewing, and editing of the original draft. OAM and MHY contributed to conceptualization, investigation, and editing. MFA contributed to supervision and project administration. All the authors have read and agreed to the published version of the manuscript. MQH, RHI, and MFA were responsible for designing and conducting the study, as well as the acquisition, analysis, and interpretation of data. OAM and MHY developed the study tools. RHI drafted the first version of the manuscript. MFA and MHY were involved in the data analysis and interpretation. MQH and RHI made substantial contributions to the study design and interpretation. All authors critically revised the manuscript, and all authors approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

### Conflicts of Interest

None declared.

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## Abbreviations

**ICT:** information and communication technology