



## NURSING SERVICE INNOVATION TROUGH TOTAL QUALITY MANAGEMENT IN THE DIGITAL AGE: A SCOPING REVIEW

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### ABSTRACT

Hospitals are expected to deliver high-quality services at reasonable and competitive prices. TQM (Total Quality Management) is believed to be able to provide innovation to improve the effectiveness and efficiency of nursing services in the digital age. TQM is a management philosophy that focuses on the quality provided. In today's global market, TQM is an initiative aimed at addressing quality challenges and meeting patient demand, ultimately enabling hospitals to improve, particularly in the field of nursing services. This literature review is a scoping review. Data sources for the literature searches included PubMed and the ScienceDirect database. Articles reviewed were those published in the last 5 years. This literature review employed the PICO model (P: Nurse innovation, I: Total quality management, C: -, O: Digital age innovation). The inclusion criteria used were: articles focused on TQM, English-language articles, articles publications from 2020 to 2025, original research, full-text articles, and open-access articles. Exclusion criteria used include: narrative review, integrative review, scoping review, systematic review, and meta-analysis. Keywords used to search for articles were: "Nurse" AND "Total quality management" AND "Innovation" AND "Digital". The results of the initial search for articles until they were included were described in the PRISMA diagram. The results of searching articles from PubMed obtained 12 articles, and from Science Direct 343 articles. TQM creates a culture where nurses are encouraged to identify problems, find solutions, and generate innovative ideas for nursing services in the digital age.

Keywords: digital; innovation; nurse; total quality management

### How to cite (in APA style)

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## INTRODUCTION

Nurses are a very important resource in hospitals, and they must be skilled and behave in accordance with nursing care standards. Nurses must be able to provide professional services, because nurses interact more and provide nursing services with patients for 24 hours. If the service provided disappoints the patient, the patient tends to feel disadvantaged, and the patient easily says the quality of service provided by the hospital is bad. Regarding the poor quality of service, of course, this is a question of whether nurses do not have the skills to care for patients, even though nurses are professional health workers (Sintari et al., 2022). Nurses are health workers who have a large and important role in hospital services. Nurses who work must have basic knowledge about hospital services. The lack of service knowledge available from the hospital results in a decrease in the resulting performance. Nursing service innovation and service quality are the main factors in creating patient satisfaction in increasingly fierce competition. This confirms that nursing service innovation is important, the success of which depends on the integration of good service quality. These results are an important reference for hospital management to innovate and improve to meet patient expectations and face competition in the digital age (Fitriardi & Prasetyo, 2025).

The rapid development of information technology and science has led to very high demands on service quality. The age of the industrial revolution 4.0 allows easy access to information in all fields, including the field of nursing services in hospitals. Nursing services must be able to improve service quality and be accepted by the community to realize professional nursing services. The

quality of nursing services determines competition in meeting health needs and is an important factor in maintaining existence. The quality of nursing services will be obtained by making continuous improvement efforts on the ability of nurses, processes, and the environment as a whole (Henny Hendrani & Supriyadinata Gorda, 2021).

The emergence of new health care facilities requires nursing services in a hospital to be able to compete positively with other health services in the digital age. In this regard, hospitals are required to be able to produce high-quality services at reasonable and competitive prices. Referring to this paradigm, TQM is believed to be able to provide innovation to increase the effectiveness and efficiency of nursing services in the digital age. TQM is a type of management that focuses on the quality of care provided. In today's global market, TQM is an initiative to solve quality challenges and meet patient demands, making it a potential for hospitals to be better, especially in the field of nursing services. The fundamental goal of TQM is to achieve continuous improvement of organizational and technical procedures in nursing care to meet the nursing services provided to patients (Alawag et al., 2023). In response to previous research, the purpose of this literature review is to analyze in depth how nursing service innovation through TQM occurs in the digital age. The benefits and novelty of this literature review are the development of factors that determine innovation in nursing services through TQM in the digital age, with the hope of improving the quality of hospital services.

## **METHOD**

The search process in the literature review was conducted on August 13, 2025, in two electronic databases: Science Direct and PubMed, and the articles were searched using the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) checklist and flow chart protocol. The article search strategy used several inclusion and exclusion criteria consisting of PICO (P: Nurse, I: TQM, C:-, O: Digital age innovation). MeSH keywords and terms were developed in the article search using MeSH keywords including: "Nurse" AND "Total quality management" AND "Innovation" AND "Digital".

The inclusion criteria in this literature review are (1) articles that are original articles with quantitative and qualitative methods; (2) articles published in 2020-2025 in English. Articles that did not discuss barriers to nursing service innovation through TQM in the digital age were excluded from this literature review. Researchers read 11 complete articles selected from 355 articles by critical appraisal using The Joanna Briggs Institute (JBI) checklist for randomized controlled trial studies, descriptive qualitative studies, qualitative with an interpretive approach, descriptive qualitative with an exploratory approach, qualitative with a design-based research (DBR) approach, and qualitative with a phenomenological approach. This method uses several criteria to assess the quality of the article to decide whether the article can be processed at the synthesis stage or not. The criteria include design, sample, instrument, and analysis. No studies were excluded based on this quality assessment. In this stage, data extraction was performed on 11 articles that had been obtained in the previous stage. Data grouping can be done based on several factors, such as (1) Researcher & Year of study, (2) Purpose of study, (3) Methods (design, sample, variables, instruments, and analysis), (4) Results.

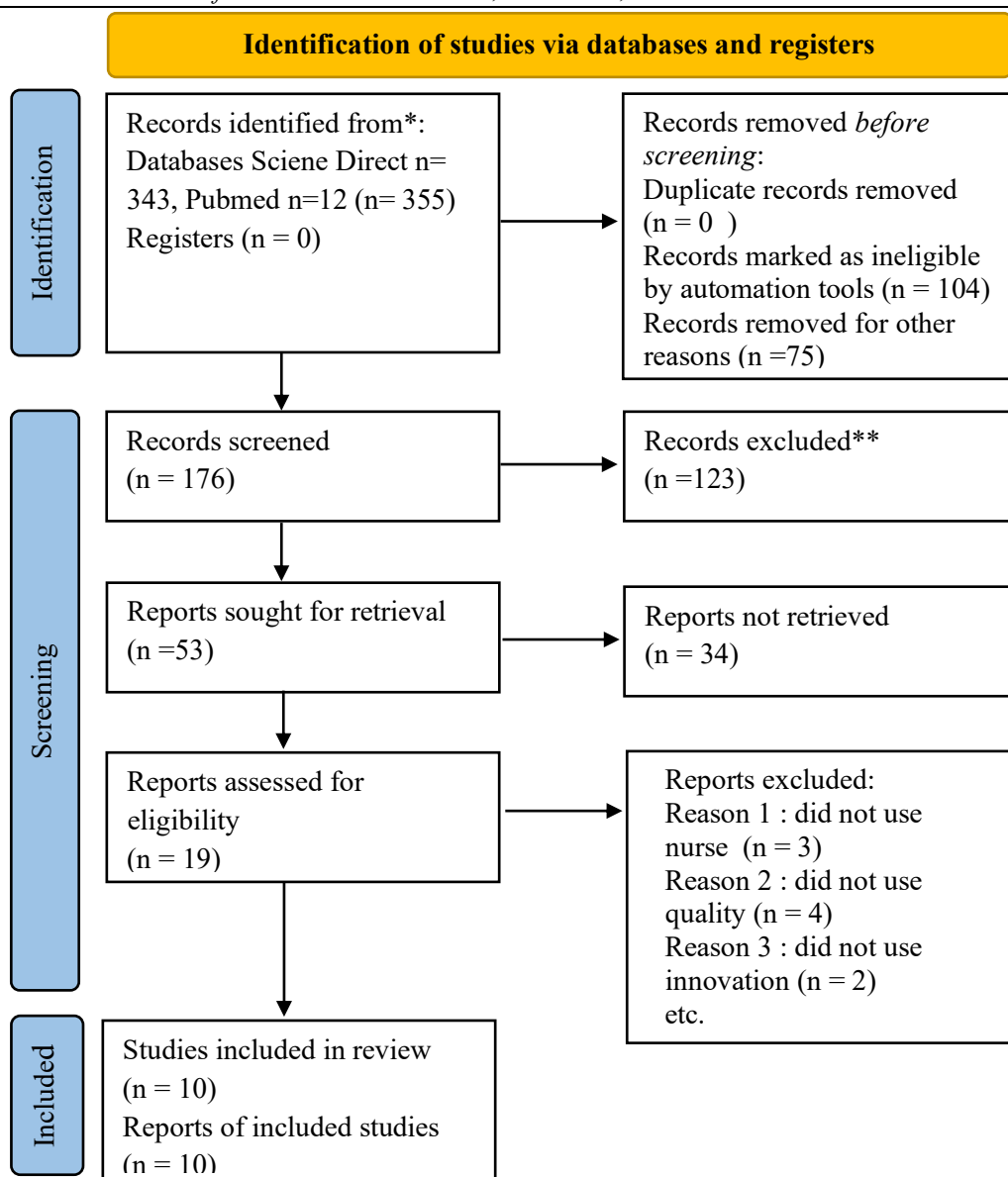


Figure 1. PRISMA diagram of study selection

## RESULT

Table 1.  
Summary of literature search results

| Article Title, Author, Year                                                                                                                                                         | Research objectives                                                                                                                                                                                                                                                                                             | Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Results                                                                                                                                                                                                                                                                                                                                                                                                            |
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| Effects of the "Internet +" nursing model based on User Profiling on postoperative recovery in breast cancer: A prospective randomized controlled clinical trial (Xie et al., 2025) | This study aims to evaluate the effectiveness of an "Internet+" based nursing care model using user profiling in postoperative recovery of breast cancer patients. The main focus was to reduce the fear of disease progression, and cancer recurrence, and improve post-traumatic growth, and quality of life. | <p>Design :</p> <p>This study used a prospective randomized controlled clinical trial (RCT) design with two groups:</p> <ol style="list-style-type: none"> <li>1. Intervention Group: Received routine care plus the "Internet+" model based on user profiling.</li> <li>2. Control Group: Received routine care only.</li> </ol> <p>The study followed CONSORT guidelines and was registered with the Chinese Clinical Trial Registry (ChiCTR2500100562).</p> <p>Sample:</p> <ol style="list-style-type: none"> <li>1. Inclusion Criteria:               <ol style="list-style-type: none"> <li>a. Female patients after breast cancer</li> </ol> </li> </ol> | <ol style="list-style-type: none"> <li>1. FOP-Q-SF: The intervention group's score was significantly lower (*t* = 3.98, P &lt; 0.001; Cohen's *d* = 0.781).</li> <li>2. FCRI-SF: Intervention group score was lower (*t* = -7.59, P &lt; 0.001; Cohen's *d* = 1.49).</li> <li>3. C-PTGI: Intervention group score was higher (*t* = -6,534, P &lt; 0.001; Cohen's *d* = 0.585).</li> <li>4. FACT-B: The</li> </ol> |

| Article Title,<br>Author, Year                                                                        | Research objectives                                                                                                                                                                                                                    | Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Results                                                                                                                                                        |
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|                                                                                                       |                                                                                                                                                                                                                                        | <p>surgery.</p> <p>b. Age &gt;18 years.</p> <p>c. Have internet access, and communication skills.</p> <p>2. Exclusion Criteria:</p> <p>a. Distant metastasis.</p> <p>b. Severe disease (heart, liver, kidney).</p> <p>c. Mental disorders such as schizophrenia.</p> <p>3. Sample size: 104 patients (52 per group), calculated by power analysis (Cohen's <math>d^* = 0.6</math>, 15% dropout rate).</p> <p>Variable :</p> <p>Independent Variable: "Internet+" model based on user profiling.</p> <p>Variable Depend:</p> <p>1. Fear of disease development (FOP-Q-SF).</p> <p>2. Fear of cancer recurrence (FCRI-SF).</p> <p>3. Posttraumatic growth (C-PTGI).</p> <p>4. Quality of life (FACT-B).</p> <p>Control Variables: Age, education level, marital status, income, type of surgery.</p> <p>Instrument :</p> <p>1. FOP-Q-SF (fear of progression questionnaire-short form): Measures fear of disease progression (12 items, Likert scale 1-5).</p> <p>2. FCRI-SF (Fear of Cancer Recurrence Inventory-Short Form): Measures fear of recurrence (9 items, scale 0-4).</p> <p>3. C-PTGI (Chinese Posttraumatic Growth Inventory): Assesses posttraumatic growth (20 items, scale 0-5).</p> <p>4. FACT-B (Functional Assessment of Cancer Therapy-Breast): Evaluating quality of life (37 items, scale 0-4).</p> <p>Analysis:</p> <p>1. Descriptive Statistics: Mean <math>\pm</math> SD for normal data, median (IQR) for abnormal data.</p> <p>2. Test Statistics:</p> <p>a. Independent sample t-test for comparison between groups.</p> <p>b. Paired t-test for intra-group comparison.</p> <p>c. Chi-square test or Fisher's exact test for categorical data.</p> <p>3. Effect Size: Cohen's <math>d^*</math> to measure the magnitude of the effect of the intervention.</p> <p>4. Significance: <math>P &lt; 0.05</math> is considered significant.</p> | <p>intervention group's score was higher (<math>t^* = -4,579</math>, <math>P &lt; 0.001</math>; Cohen's <math>d^* = 0.656</math>).</p>                         |
| Self-care management and experiences of using telemonitoring as support when living with hypertension | <p>The aim of this study was to describe the experience of self-care management at home in patients living with hypertension or heart failure, with support from primary care through telemonitoring.</p> <p>This study focuses on</p> | <p>Design:</p> <p>Descriptive qualitative study.</p> <p>Sample :</p> <p>1. Patients: 20 people with a primary diagnosis of hypertension or heart failure, who had used the telemonitoring app for 6 months.</p> <p>2. Informal Caregivers: 4 people who live with the patient, and are involved in the use of telemonitoring applications.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p>1. Acquire necessary self-care skills.</p> <p>2. Reciprocal relationship with health workers.</p> <p>3. Develop expertise in managing chronic diseases.</p> |

| Article Title,<br>Author, Year                                                                                                 | Research objectives                                                                                                                                                                                                                                                                                                                              | Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| or heart failure: A descriptive qualitative study<br>(Strandberg et al., 2023)                                                 | how patients and informal caregivers (such as family) experience the use of telemonitoring applications in supporting self-care activities.                                                                                                                                                                                                      | 3. Recruitment: Conducted in three primary care centers, and one hospital medical department in southern Sweden.<br>Variable : -<br>Instrument :<br>1. Semi-Structured Interviews: Conducted over the phone (due to the COVID-19 pandemic) with an open-ended question guide. Questions covered experiences with telemonitoring, impact on self-care, and interactions with health professionals.<br>2. Duration: 30-75 minutes per interview.<br>Analysis :<br>1. Method: Qualitative content analysis with an inductive approach.<br>2. Process:<br>a. Transcript of the interview.<br>b. Identify the unit of meaning.<br>c. Coding, and grouping of codes into subcategories, and categories.<br>d. Interpretation of the main theme.<br>3. Tools: NVivo software to help organize data.                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Factors influencing digital health competence among healthcare professionals: A cross-sectional study<br>(Erfani et al., 2025) | This study aims to explore the factors that affect the preferences of family caregivers in using telehealth services to care for the elderly with disabilities. The focus is on identifying:<br>1. Barriers that prevent family caregivers from using telehealth.<br>2. Motivational factors (facilitators) that encourage the use of telehealth | Design :<br>Qualitative with an interpretive approach<br>Sample :<br>1. Kriteria Inclusive:<br>a. Primary caregiver of the elderly with disabilities (age $\geq 60$ years, Katz Index score $< 6$ ).<br>b. Treat for at least 3 months, with no diagnosed physical/mental problems.<br>c. Be willing to participate voluntarily.<br>2. Number of Participants: 20 people (11 males, 9 females) from communities in Dongguan, China.<br>Variable : -<br>Instrument :<br>1. Interview Guide: 6 open-ended questions (example: "How did you feel about the previous treatment method?").<br>2. Process:<br>a. Interviews are recorded, and transcribed verbatim.<br>b. Conducted in 4 groups ( $\approx 40$ minutes/group).<br>c. Member checking for result validation.<br>Analysis :<br>1. Familiarization: Reading transcripts repeatedly.<br>2. Coding: Two researchers created the initial code, then developed it into a theme.<br>3. Review Theme: Team discussion to reach consensus.<br>4. Reporting: In-depth descriptions with participant quotes. | 1. Barriers (12 Sub-themes):<br>a. Learning Capacity: Difficulty understanding technology (example: "I can't operate an app").<br>b. Cost: Telehealth rates are considered expensive compared to in-person consultations.<br>c. Medical Habits: More comfortable with face-to-face visits.<br>d. Promotion: Lack of socialization about the benefits of telehealth.<br>2. Drivers (2 Sub-themes):<br>a. Convenience: Fast access with no geographical limits.<br>b. Professionalism: Trust in telehealth platforms managed by reputable hospitals. |
| Expectations for gynaecological cancer                                                                                         | 1. Explore the expectations of nurses and individuals with                                                                                                                                                                                                                                                                                       | Design :<br>Qualitative descriptive with explorative approach.<br>Sample :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1. Support care and educate nurses with content across the continuum of care.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| Article Title,<br>Author, Year                                                                                                                         | Research objectives                                                                                                                                                                                                                                                                                                                                                   | Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| nursing guidance development: A qualitative exploration: Part 1 – Creating foundational support<br>(Williams et al., 2024)                             | lived experience of gynecologic cancer towards the development of specialized gynecologic cancer nursing care guidelines in Australia.<br>2. Focus on preferences regarding the content and design of the guide to ensure functionality and practicality in daily practice.                                                                                           | 1. 27 participants consisted of:<br>a. 20 nurses working in the field of gynecological cancer.<br>b. 7 people with lived experience of gynecological cancer (consumer).<br>2. Criteria included:<br>a. Nurse: Worked in Australia.<br>b. Consumer: Diagnosed and treated within the last 3 years in Australia.<br>Variable : -<br>Instrument :<br>1. Demographic survey (using REDCap).<br>2. Focus groups (6 sessions) and individual interviews (7 sessions) with semi-structured guides.<br>Analysis :<br>1. Inductive content analysis with the help of NVivo software.<br>2. The codification process involved 4 researchers to ensure validity.<br>3. Results were validated with 2 participants to confirm accuracy.                                                                                                                               | 2. Design the guide with functionality and practicality for nurses in daily practice.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Support for an innovative approach to delivering gynaecological cancer nursing guidance: A qualitative exploration – Part 2<br>(Williams et al., 2025) | 1. Exploring the perceptions and expectations of gynaecological cancer nurses and survivors related to the development of gynaecological cancer nursing guidelines in Australia.<br>2. Investigate the design preferences and desired content in the guide.<br>3. Provide a foundation for developing relevant, evidence-based resources to support nursing practice. | Design :<br>Descriptive qualitative with an exploratory approach.<br>Sample :<br>1. 20 nurses working in the field of gynecological cancer (specialist or non-specialist).<br>2. 7 gynecological cancer survivors (6 ovarian cancers, 1 uterine cancer).<br>Variable : -<br>Instrument :<br>Focus Group Discussions (FGD) and online individual interviews.<br>Semi-structured interview guide with 11 open-ended questions (example: "What do you expect from this guide?").<br>Demographic survey for participant background data.<br>Analysis :<br>1. Analysis of inductive content (Hsieh & Shannon, 2005) with the help of NVivo software.<br>a. Verbatim transcription.<br>b. Data coding and categorization.<br>c. Grouping of themes and sub-themes.<br>2. Validation through discussion of the research team and member check with participants. | 1. Main Theme: Foundational support resource for nurses.<br>2. Sub-theme:<br>a. Reducing variation in care: Standardizing care to reduce access inequalities.<br>b. Acknowledging diversity in nursing roles: Acknowledging the diversity of nursing roles (specialists, coordinators, etc.).<br>c. Addressing barriers: Overcoming challenges such as lack of centralized information and communication between teams.<br>d. Supporting development: Improving the knowledge and skills of nurses, especially those who are new to this field. |
| The benefits of artificial intelligence for nursing operational managers in South African public                                                       | 1. Key Objective: To explore and describe the real benefits of AI for nursing operations managers in South African public hospitals.                                                                                                                                                                                                                                  | Design :<br>Qualitative with an exploratory, descriptive, and contextual approach.<br>Sample :<br>60 operational managers were purposively selected from one academic hospital.<br>1. Criteria included:<br>a. Exposed to AI in their units.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1. Improving the health system<br>2. Reduce healthcare costs<br>3. Decreased professional workload<br>4. Improving professional                                                                                                                                                                                                                                                                                                                                                                                                                 |

| Article Title,<br>Author, Year                                                                                                                         | Research objectives                                                                                                                                                                                             | Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| hospitals<br>(Nene, 2025)                                                                                                                              | 2. Specific Objective:<br>Understand the benefits of AI to drive wider adoption of AI in nursing units.                                                                                                         | <p>b. Have staff report to them.<br/>c. Be willing to participate.</p> <p>2. Exclusion criteria: not exposed to AI or on leave during data collection.</p> <p>Variable : -<br/>Instrument :</p> <p>1. In-Depth Interviews: 12 individual interviews.<br/>2. Focus Group: 2 sessions (13 and 14 participants).<br/>3. Field Notes: Notes nonverbal expressions during interviews.</p> <p>Analysis :<br/>Method: Thematic analysis of Giorgi and Colaizzi. Step:</p> <p>1. Extraction of significant statements from transcripts.<br/>2. Interpretation of the Meaning of the Statement.<br/>3. Grouping of themes and categories.<br/>4. Validation of findings by participants and independent coder.</p>                                                                                                                | competence                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Lived experience of nurses caring for critically ill patients sustained by healthcare technologies in Benin-City, Nigeria<br>(Olorunfemi et al., 2024) | <p>1. Explores the life experiences of nurses caring for critical patients who rely on health technology.</p> <p>2. Understand the emotional, technical, and interpersonal challenges that ICU nurses face.</p> | <p>Design :<br/>Qualitative with a hermeneutic phenomenological approach.</p> <p>Sample :</p> <p>1. Participants: 10 ICU nurses from the University of Benin Teaching Hospital (UBTH).<br/>2. Criterion:<br/>a. Minimum of 3 years of experience as a registered nurse.<br/>b. Minimum of 1 year of experience in the ICU.<br/>c. Willing to be interviewed and recorded.</p> <p>Variable : -<br/>Instrument :</p> <p>1. In-Depth Interviews: An open-ended interview guide to delve into experiences.<br/>2. Observations and Field Notes: Documentation of activities in the ICU.<br/>3. Triangulation: A combination of interviews, observations, and literature reviews.</p> <p>Analysis :</p> <p>1. Transcription: Convert interview recordings to text.<br/>2. Coding: Using NVivo software to identify themes</p> | <p>1. Technical Challenges:<br/>a. Nurses often feel worried and untrained in operating medical devices.<br/>b. The need for continuous training to improve competence.</p> <p>2. Emotional Load:<br/>a. High stress due to high mortality rates and large responsibilities.<br/>b. Difficulty in conveying the news of death to the family.</p> <p>3. Role of Technology:<br/>4. Makes it easier to monitor patients but has the potential to reduce human touch.<br/>5. Interaction with Family:<br/>6. Open communication reduces conflict but requires special skills.</p> |
| Defining nursing entrepreneurship from the point of view of future professionals: A qualitative study                                                  | <p>1. Explain the definition of entrepreneurship in nursing based on the perceptions of nursing students from different countries.</p> <p>2. Propose a definition of</p>                                        | <p>Design :<br/>Descriptive qualitative method using the COREQ (Consolidated Criteria for Reporting Qualitative Research) guide.</p> <p>Sample :</p> <p>1. 160 first- and second-year nursing students from four universities in Spain, Colombia, and Peru.<br/>2. Sample Details:<br/>a. Spain: 23 participants (all women).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p>1. Health and Patient Support: Innovations to improve patient care.<br/>2. Innovation in Nursing: Application of new technologies and methods.<br/>3. Continuous Professional Improvement: Research and competency</p>                                                                                                                                                                                                                                                                                                                                                      |

| Article Title,<br>Author, Year                                                                                                                                                                              | Research objectives                                                                                                                                                                                                                                                                                                                                      | Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| (Monteagudo et al., 2025)                                                                                                                                                                                   | entrepreneurship in nursing that is in accordance with the needs of today's society.                                                                                                                                                                                                                                                                     | <p>b. Colombia: 83 participants (70 females, 13 males).</p> <p>c. Peru: 54 participants (42 females, 12 males).</p> <p>3. Average age: 22 years.</p> <p>Variable :-</p> <p>Instrument :</p> <ol style="list-style-type: none"> <li>1. Open-ended question: "What do you think entrepreneurship in nursing means?"</li> <li>2. Data collection uses Mentimeter's digital platform to ensure anonymity and freedom of expression.</li> </ol> <p>Analysis :</p> <p>Analysis tematik berdasarkan metode Braun dan Clarke. Proses:</p> <ol style="list-style-type: none"> <li>1. Read the response repeatedly for familiarization.</li> <li>2. Manual coding in Spanish to maintain linguistic nuance.</li> <li>3. The grouping of the code into main categories and themes.</li> <li>4. Triangulation by researchers to validate the findings.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>development.</p> <ol style="list-style-type: none"> <li>4. Nurses' Contribution to Society: Solutions to social and environmental challenges.</li> <li>5. Independent Project Development: Entrepreneurship as a business and economic opportunity.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Acceptability and usability of a nurse-assisted remote patient monitoring intervention for the post-hospital follow-up of patients with long-term illness: A qualitative study<br><br>(Wathne et al., 2024) | <ol style="list-style-type: none"> <li>1. Evaluate the acceptability and usability of nurse-assisted remote patient monitoring (RPM) interventions for patients with post-hospitalized long-term illnesses.</li> <li>2. Determine the feasibility and potential implementation of RPM interventions using Normalisation Process Theory (NPT).</li> </ol> | <p>Design :</p> <p>Descriptive and explanatory qualitative approaches.</p> <p>Sample :</p> <ol style="list-style-type: none"> <li>1. Patients: 10 patients were observed during the training, and 27 patients were interviewed (17 heart failure patients, 10 colorectal cancer patients).</li> <li>2. Nurses: 8 navigator nurses were interviewed.</li> <li>3. Patient inclusion criteria: age <math>\geq 18</math> years, able to speak Norwegian, and being treated for heart failure or colorectal cancer.</li> </ol> <p>Variable : -</p> <p>Instrument :</p> <ol style="list-style-type: none"> <li>1. Observation: A structured observational guide to record patient responses during training.</li> <li>2. Interview: Semi-structured interview guide with open-ended questions about the experience of using RPM.</li> </ol> <p>Analysis :</p> <ol style="list-style-type: none"> <li>1. Data diAnalysis using the stepwise-deductive induction method: <ol style="list-style-type: none"> <li>a. Encoding of observation data and interview transcripts.</li> <li>b. Grouping the code into categories and sub-themes.</li> <li>c. Mapping findings into the NPT (coherence, cognitive participation, collective action, reflexive monitoring) construct.</li> </ol> </li> <li>2. Triangulation is carried out to ensure the validity of the findings.</li> </ol> | <ol style="list-style-type: none"> <li>1. Main Theme: "Achieving acceptance and usability through digital social interaction". The interaction between patients and nurses is a key factor in the acceptance and usefulness of RPM.</li> <li>2. Sub-Theme: <ol style="list-style-type: none"> <li>a. Coherence: Patients and nurses understand the purpose and how RPM works.</li> <li>b. Cognitive Participation: Adaptation to RPM, including digital communication and handling of technical errors.</li> <li>c. Collective Action: Integration of RPM into daily life and work practices.</li> <li>d. Reflexive Monitoring: Evaluate the benefits of RPM and recommendations for improvement.</li> </ol> </li> <li>3. Key Findings: <ol style="list-style-type: none"> <li>a. Patients feel safe and supported by nurse feedback.</li> <li>b. Nurses assess RPM</li> </ol> </li> </ol> |



| Article Title,<br>Author, Year                                                                                                                                                            | Research objectives                                                                                                                                                                                                                                                                                                 | Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| Feasibility of a new transmural care pathway for advance care planning for older persons: A qualitative study into community care registered nurses' perspectives<br>(Jepma et al., 2024) | The purpose of this study was to explore community nurses' perspectives on the feasibility of a new transmural care pathway for advance care planning (ACP) in older adults. The focus was on understanding the challenges and enablers in implementing this care pathway from the perspective of community nurses. | <p>Design :<br/>Using a qualitative design with a phenomenological study approach.</p> <p>Sample :</p> <ol style="list-style-type: none"> <li>Participants: 19 community nurses from three home care organizations in the Netherlands.</li> <li>Criteria: Nurses with varied work experience (1–20 years) and different backgrounds (somatic, dementia, palliative care).</li> </ol> <p>Variable :-</p> <p>Instrument :</p> <ol style="list-style-type: none"> <li>Interview Guide: Developed based on the Normalization Process Theory (NPT) and ACP challenges identified from the literature.</li> <li>Pilot Interview: Conducted to test the interview guide before the main study.</li> <li>Help Tools: Standard ACP documents and workflow diagrams are provided to participants prior to the interview.</li> </ol> <p>Analysis :</p> <ol style="list-style-type: none"> <li>Transcript: Interviews are recorded and transcribed verbatim.</li> <li>Thematic Analysis: Using a deductive-inductive approach with the help of MAXQDA 2020 software. <ol style="list-style-type: none"> <li>Deductive: Based on the NPT framework (coherence, cognitive participation, collective action, reflective monitoring).</li> <li>Inductive: Findings emerge from data organically.</li> </ol> </li> <li>Triangulation: Discussion of the research team to validate the findings.</li> </ol> | <ol style="list-style-type: none"> <li>Views on the Transmural Care Pathway: <ol style="list-style-type: none"> <li>Nurses positively welcome a more organized work structure.</li> <li>Standard documentation is considered to facilitate collaboration and reduce the burden on patients.</li> <li>Suggestions to simplify the ACP form and involve patients more actively.</li> </ol> </li> <li>Nurses' Needs to Fulfill Their Roles: <ol style="list-style-type: none"> <li>Clarity of roles and responsibilities between nurses, doctors, and other professionals.</li> <li>ACP training to improve communication skills and emotion management.</li> <li>Appropriate patient criteria for receiving ACP.</li> </ol> </li> <li>Key Implementation Points: <ol style="list-style-type: none"> <li>Nurse involvement from the beginning to increase ownership.</li> <li>A centralized digital health platform to facilitate access to information.</li> <li>Phased implementation (small-scale first).</li> </ol> </li> <li>Evaluation of New Practices: <ol style="list-style-type: none"> <li>Periodic follow-ups to ensure ACP remains relevant.</li> <li>Measurement of patient and professional satisfaction.</li> <li>The level of use of the ACP form as an indicator of success.</li> </ol> </li> </ol> |

## **DISCUSSION**

Nursing care, is a fundamental aspect in improving the quality of life of patients. Effective and efficient nursing services are the cornerstone of efforts to improve public welfare, reduce mortality, and extend life expectancy. In the digital age, technology has played a role in the transformation of various sectors, including the health sector. Innovation in nursing services is a must that cannot be delayed, given the increasing demands of the public for fast, transparent, and quality services. Nursing services refer to the integration of digital technology in the health system that aims to improve service quality, speed up administrative processes, and facilitate patient access to health services. With the use of AI-based applications, telenursing, and social media, patients can access various health services such as registration, medical consultation for treatment, and health monitoring online. These technologies also enable care providers to collect and analyze patients' health data in real-time, thus providing faster and more accurate responses to patients' health needs. Although the potential of digital technology in healthcare, especially nursing services, is enormous, its implementation still faces various challenges (Ashar et al., 2025).

It shows that the integration of the digital age in healthcare can yield significant benefits to society. Collaboration between healthcare professionals, such as doctors, nurses, and other healthcare professionals, and technologists can lead to innovative solutions that optimize the delivery of care. One example of an open opportunity is quality management in the development of health apps that allow patients to access health information, monitor their health conditions, and interact directly with health professionals through such platforms. Such collaboration allows for more efficient information exchange between patients and healthcare services, enabling more precise and personalized care adjustments according to individual needs. In addition, digital age innovations in quality management also enable the adoption of more proactive healthcare practices, such as telenursing. Through quality management and technology in the digital age, health data analysis and utilization of technologies such as artificial intelligence (AI), telenursing and social media can provide nursing services more effectively, more holistically, affordably, and meet the health needs of patients at large (Hasyim, 2024).

The utilization of technology during the digital age is needed by nurses to facilitate nursing services in hospitals. Technology plays a role in supporting and assisting nursing services to increase patient satisfaction, but innovation and change in the nursing service system technology are needed. Technology was created to provide convenience and comfort for nurses in completing their duties without feeling burdened in providing health services. Nursing technology was created to support nursing science and management, and the delivery of nursing care to patients. Health technology innovation during digital transformation has an impact on the efficiency, quality, and performance of nurses. Based on the results of the current literature review, although technology saves time, improves service quality, and facilitates the delivery of nursing care, nurses need management innovations to make it easier to manage quality in the delivery of nursing care (Fatika Puteri Rosyi Prabowo & Puput Mulyono, 2024).

The implementation of nursing service management innovations can apply the TQM method, which refers to the entire scope of the organization, emphasizing the importance of joint commitment to improve performance both in terms of products, availability of raw materials, and service delivery to patients in hospitals for now and in the future. The purpose of TQM is to provide products and services that have quality and can meet the needs of patients on an ongoing basis, so as to encourage sustainable levels of purchase of services and have an impact on increasing producer productivity in achieving economies of scale. The components that should be of concern in the implementation of TQM include customer focus, education and training, teamwork, continuous improvement process, and employee involvement. Through these five components, nursing services will be able to involve all aspects owned both internally and externally to all forms of activities carried out by continuing to pay attention to continuous improvement to improve the quality of both

products, services, processes, and quality management innovations of nursing services (Luh & Pancawati, 2022).

TQM, over the past few decades, has evolved into one of the most widespread strategic management approaches to improve products and services in order to increase patient satisfaction. TQM has been shown to have a positive influence on innovation performance in organizations in nursing services. One of the ways TQM can influence innovation performance is by creating a culture of continuous improvement, especially technological innovation of nursing services in the digital age. Nowadays, continuous improvement and innovation programs have been stimulated and spread widely due to the importance of hospital competitiveness. TQM emphasizes the importance of involving all employees, especially nurses, in the organization of the process towards digital nursing service technology. This creates a culture where nurses are encouraged to identify problems and suggest solutions, which can lead to innovative ideas in the digital age. If TQM and all nursing service functions can be carried out properly, it will create nurse innovation productivity. This is because nurses in hospitals carry out their functions and responsibilities and are expected to always focus on patient satisfaction. A management style that emphasizes patient happiness and prioritizes quality as a nursing service innovation in the digital age by involving all nurses (Frandelli & Silvianita, 2023).

## CONCLUSION

Based on the results of the literature review that has been carried out, it can be concluded that in the digital age, the application of nursing services to TQM has undergone a significant transformation. Thanks to technological innovations, such as improving service quality, efficiency, and productivity, patient satisfaction, developing human resources for nursing services, and addressing challenges and solutions to nursing service innovation. The involvement of all management components, from resources, labor, environment, and processes, becomes an integrated part in the continuous application of TQM to produce quality nursing service products. The quality produced is adjusted to customer expectations, so that the quality of the products produced can generate customer satisfaction.

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