

Virtual Discharge Nursing in Pediatric Care: A Concept Analysis Using Walker and Avant's Method

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Abstract

Virtual discharge nursing is an emerging innovation in pediatric healthcare that addresses the risks of complications, caregiver uncertainty, and preventable hospital readmissions following discharge. Despite its increasing adoption, the concept remains insufficiently defined and is often confused with general telehealth follow-up. This study aims to clarify the concept of virtual discharge nursing in pediatric care by identifying its defining attributes, antecedents, consequences, and empirical referents. Walker and Avant's eight-step concept analysis method was applied. Guided by Donabedian's structure–process–outcome model, a systematic review of twenty-four empirical studies published between 2020 and 2025 was conducted, focusing on nurse-led digital interventions, structured follow-up, and caregiver support. The analysis identified five defining attributes: nurse-led protocol-driven care, technology-enabled communication, structured discharge education, early symptom monitoring, and caregiver-centered engagement. Antecedents included the presence of skilled pediatric nurses, reliable digital infrastructure, and integration into discharge protocols. Consequences included reduced thirty-day readmissions, improved caregiver satisfaction, and earlier detection of complications. By distinguishing virtual discharge nursing from broader telehealth practices, this study establishes conceptual clarity and offers a structured framework for researchers, clinicians, and policymakers to strengthen pediatric transitional care.

Keywords: Virtual Discharge Nursing, Pediatric Care, Telehealth

1. Introduction

Hospital discharge is a critical transitional point in pediatric care, often associated with heightened risks for complications, caregiver uncertainty, and unplanned healthcare utilization (Tubbs-Cooley et al., 2020; Wozney et al., 2022). The increasing complexity of pediatric conditions, combined with shortened hospital stays, has amplified the importance of safe and structured post-discharge support. Evidence suggests that poorly coordinated discharges contribute to adverse outcomes, including readmissions and caregiver dissatisfaction, underscoring the need for innovative, standardized interventions (Chen et al., 2022; Martinsen et al., 2023). In this context, Virtual Discharge Nursing (VDN) has emerged as a

promising model, leveraging digital platforms to extend nurse-led follow-up into the home environment. VDN encompasses structured symptom monitoring, caregiver education, and early complication detection through secure telehealth systems, aiming to reduce fragmentation and improve continuity of care (Perpetua et al., 2023; Zain et al., 2024). While pilot programs and trials have demonstrated the feasibility and effectiveness of virtual discharge initiatives in both adult and pediatric populations (McGillion et al., 2021; Goldbloom et al., 2022; Oluyinka Olutoye et al., 2023), the lack of a unified conceptual framework has led to inconsistencies in terms of implementation, and evaluation.

The pediatric context underscores the urgency of conceptual clarity in VDN. Children discharged after surgery or acute illness often require intensive follow-up and caregiver guidance to prevent deterioration and avoid emergency visits. Structured telehealth programs, such as the virtualKIDS Acute Review, have shown that nurse-led audiovisual consultations can reduce emergency department revisits by 44% within 48 hours (Toriola et al., 2024). Similarly, remote automated monitoring trials demonstrate the potential of combining technology with standardized nursing oversight to extend recovery time at home and improve safety outcomes (McGillion et al., 2021). Programs employing electronic discharge communication tools have further highlighted the benefits of digital support in enhancing caregiver knowledge, adherence, and satisfaction (Wozney et al., 2022; Waite & Ahmed, 2023). Yet, despite growing evidence, there remains a tendency in literature and practice to conflate structured, nurse-led interventions with informal or ad hoc follow-up, thereby diluting the distinct value of VDN (Cyrus et al., 2022; Romano, 2025). Without precise definitions and boundaries, the scalability, replicability, and policy integration of VDN are significantly constrained.

To address this conceptual ambiguity, the present study applies Walker and Avant's (2005) concept analysis method, a rigorous eight-step framework widely employed to clarify complex nursing concepts (Babaei et al., 2024; Zeydani et al., 2023). Concept analysis provides a systematic process for identifying defining attributes, antecedents, consequences, and empirical referents, ensuring that the construct of VDN is articulated with both theoretical rigor and practical applicability. The analysis is further informed by Donabedian's model of quality of care, which situates healthcare delivery across structure, process, and outcome dimensions, providing a robust framework for mapping VDN's operational indicators (Björk et al., 2017). This dual theoretical lens enables VDN to be conceptualized not merely as a technological tool but as a structured nursing practice embedded within discharge protocols, institutional workflows, and caregiver-centered models of care. In doing so, the study establishes a clear, multidimensional definition of VDN that distinguishes it from broader telehealth services and provides a foundation for empirical evaluation, policy development, and clinical integration. Ultimately, clarifying this concept advances the science of pediatric nursing, supports digital transformation in health systems, and promotes safer, more equitable transitions of care for children and their families (Savitz et al., 2023; Leybov et al., 2024; Nguyen et al., 2024).

2.Method

2.1. Justification for Concept Analysis Methodology

To address the persistent definitional ambiguity and limited operational coherence surrounding the concept of Virtual Discharge Nursing (VDN) in pediatric care, the present study applies the eight-step concept analysis method proposed by Walker and Avant (2005). VDN is understood here as a structured,

nurse-led, technology-enabled follow-up process conducted after pediatric hospital discharge, designed to monitor recovery, provide caregiver education, and detect complications at an early stage. This methodological approach is particularly appropriate for clarifying abstract, multidimensional, and contextually variable healthcare innovations whose delivery depends on clinical setting, patient needs, and technological capacity. As demonstrated in prior applications across nursing and health sciences, this method enables the systematic identification of defining attributes, contextual antecedents, resulting consequences, and measurable empirical referents of complex care models (Foley & Davis, 2017; Zeydanlı et al., 2023). In the context of pediatric telehealth, this approach allows for clearer differentiation between informal, unstructured post-discharge contact and a standardized, protocol-driven nursing intervention. Its structured, theory-informed framework facilitates the development of a conceptually rigorous and practically applicable definition of VDN, one that may serve both scholarly inquiry and healthcare decision-making. The emphasis on nursing practice not merely technological tools or clinical outcomes strengthens the framework's relevance for integration into pediatric care pathways and broader health system transformation.

2.2. Selection of the Concept and Purpose of Analysis

The concept selected for analysis is Virtual Discharge Nursing (VDN) as it applies to pediatric care. VDN refers to a structured, nurse-led, technology-enabled follow-up process conducted after a child's hospital discharge, with the aim of monitoring recovery, educating caregivers, and enabling early detection of complications. The selection of this concept is justified by the increasing adoption of telehealth-based discharge interventions in pediatric healthcare systems and their critical role in improving post-discharge outcomes, enhancing continuity of care, and aligning with broader health system digital transformation agendas. Despite its growing prominence in pediatric nursing practice and policy discussions, VDN lacks a unified operational definition, particularly regarding its integration with standardized discharge protocols, digital platforms, and measurable quality indicators. This definitional gap complicates efforts to distinguish between informal, ad hoc follow-up and structured, evidence-based virtual nursing interventions. The purpose of this analysis is to develop a standardized, context-sensitive, and theoretically grounded understanding of VDN that can serve both as a conceptual foundation for empirical research and as a framework for clinical policy and protocol development. Framing VDN as a nursing practice rather than solely a technological solution ensures emphasis on the implementation processes that drive quality outcomes, not just the availability of digital tools.

2.3. Literature Synthesis and Theoretical Framing

To establish a comprehensive and multidimensional foundation for the concept analysis, a multidisciplinary literature review was undertaken, incorporating sources from pediatric nursing, telehealth, post-discharge care, patient engagement, and health systems innovation. The synthesis emphasized studies on nurse-led virtual discharge models, telehealth follow-up interventions, and pediatric-specific post-discharge support systems. Key theoretical guidance was derived from Donabedian's Model of Quality of Care, which conceptualizes healthcare delivery through three interrelated components structure, process, and outcome and offers a useful framework for mapping the attributes, antecedents, and consequences of Virtual Discharge Nursing (VDN) in pediatric contexts.

Within this framework, structure encompasses digital infrastructure, nurse training, and discharge protocols; process includes the delivery of virtual education, symptom monitoring, and care coordination; and outcome captures measures such as readmission rates, caregiver satisfaction, and complication detection.

Empirical evidence highlights the effectiveness and adaptability of VDN across different care settings. Perpetua et al. (2023) demonstrated that a virtual discharge protocol utilizing telehealth technology to deliver remote discharge education improved patient satisfaction and maintained low readmission rates. Similarly, the virtualKIDS Acute Review program described by Toriola et al. (2024) reduced emergency department visits by 44% within 48 hours post-discharge, illustrating the preventive potential of structured, short-term telehealth support. Broader trials, such as McGillion et al.'s (2021) PVC-RAM randomized controlled trial, provided robust evidence that virtual care with remote automated monitoring can extend days alive at home post-surgery, underscoring the capacity of virtual follow-up to improve recovery trajectories. Comparative analyses, such as that by Zain et al. (2024), further support telemedicine's equivalence to in-person transitional care in maintaining quality performance and avoiding increased readmissions.

Additional pediatric-focused studies have underscored the role of telehealth in improving caregiver engagement and clinical efficiency. Oluyinka Olutoye et al. (2023) found higher patient satisfaction scores among pediatric surgical patients using telehealth, despite some disparities in access by language and demographics. Wozney et al. (2022) reviewed electronic discharge communication tools in pediatric emergency departments and concluded that such tools consistently improve caregiver knowledge, attitudes, and at-home care compliance. These findings align with the structural and process attributes defined in Donabedian's model, where effective information transfer and timely follow-up serve as core determinants of quality care.

2.4. Construction of Model, Borderline, and Contrary Cases

In accordance with Walker and Avant's method, the analysis incorporates the construction of three illustrative case types model, borderline, and contrary that reflect varying degrees of alignment with the defining attributes of Virtual Discharge Nursing (VDN) in pediatric care. Each case illustrates how clinical practices either fulfill or fall short of the essential components of structured, nurse-led, technology-enabled post-discharge follow-up. The model case exemplifies the full integration of scheduled nurse-led virtual consultations, structured symptom monitoring, and comprehensive caregiver education delivered via secure and accessible digital platforms. This approach ensures timely detection of complications, reinforces discharge instructions, and optimizes continuity of care, representing the benchmark for VDN implementation. In contrast, borderline cases demonstrate partial or inconsistent application of VDN principles, such as offering virtual follow-up without standardized protocols, omitting structured education, or failing to employ consistent monitoring tools thereby limiting the intervention's effectiveness. Contrary cases, meanwhile, represent the absence of any post-discharge virtual nursing follow-up, with families relying solely on in-person visits or unstructured telephone contact, resulting in missed opportunities for early intervention and support. Such differentiation not only clarifies the practical attributes of VDN but also highlights the necessity of a standardized, evidence-informed framework to ensure equitable and effective care transitions for pediatric patients.

2.5. Identification of Antecedents and Consequences

The concept analysis identifies three key antecedents for effective Virtual Discharge Nursing (VDN) in pediatric care. First, trained pediatric nursing staff proficient in telehealth delivery ensure safe, patient-centered virtual follow-up, as shown in the virtualKIDS Acute Review program, which reduced emergency department visits by 44% within 48 hours (Toriola et al., 2024). Second, reliable digital platforms with caregiver access to devices and internet enable secure communication and monitoring, contributing to improved satisfaction and low readmission rates in the Virtual Discharge protocol (Perpetua et al., 2023). Third, integration of standardized virtual follow-up into discharge protocols supports continuity of care, with evidence showing telemedicine follow-up maintains readmission rates comparable to in-person care (Zain et al., 2024). Anticipated consequences include reduced 30-day pediatric readmissions (Zain et al., 2024), higher caregiver engagement and satisfaction (Perpetua et al., 2023), and earlier detection of complications for timely intervention (Toriola et al., 2024).

2.6. Operationalization Through Empirical Referents

To ensure that Virtual Discharge Nursing (VDN) in pediatric care is empirically measurable, clearly defined referents are necessary to evaluate its impact on quality, safety, and caregiver experience. Thirty-day pediatric readmission rates serve as a key clinical performance metric, with virtual care programs demonstrating the capacity to maintain high-quality outcomes while sustaining service volume, as seen in the Children's Hospital of Eastern Ontario's innovative virtual care model (Goldbloom et al., 2022). Caregiver satisfaction scores, obtained through structured post-discharge surveys, capture perceptions of accessibility, communication, and support, reflecting the patient-centered benefits reported in multi-hospital virtual nursing initiatives (Nguyen et al., 2024). Additionally, the frequency of complications detected and resolved through virtual follow-up offers a direct measure of patient safety and early intervention effectiveness, aligning with outcomes from pediatric tele-critical care programs that have mitigated adverse events through continuous remote surveillance (Swink et al., 2023). Together, these indicators enable a robust and evidence-based evaluation framework for VDN.

2.7. Addressing Methodological Challenges

A key challenge in conducting this concept analysis of Virtual Discharge Nursing (VDN) in pediatric care lies in balancing equitable access, cultural sensitivity, and workforce sustainability. Ensuring equity in digital access is essential, as disparities in device availability, internet connectivity, and caregiver digital literacy can limit participation; pilot initiatives using virtual visits for pediatric transitions of care have shown the importance of structured support to address such barriers (Madhavan et al., 2020). Cultural adaptation of telehealth communication is equally critical, particularly in diverse pediatric populations, to ensure that virtual interactions foster trust and comprehension across language and cultural differences, similar to findings from pediatric virtual fracture clinics where tailored communication enhanced safety and parent satisfaction (Waite & Ahmed, 2023). Finally, balancing nurse workload with virtual clinic demands requires careful role structuring; evidence from the attending nurse

model demonstrates how task reallocation can improve discharge timeliness and patient satisfaction while mitigating competing priorities (Cyrus et al., 2022). Addressing these challenges is essential to sustaining VDN as a safe, equitable, and effective care model.

2.8. Data Collection:

A systematic literature search for empirical studies on Virtual Discharge Nursing (VDN) in pediatric care was conducted using three primary open-access databases: Google Scholar, OpenAlex, and PubMed Central, following the PRISMA 2020 reporting guidelines (Page et al., 2021). Boolean operators and truncation were applied to combine the terms “virtual discharge nursing”, “telehealth”, “pediatric care”, and “post-discharge follow-up”. This search retrieved 280 records (Google Scholar: 104; OpenAlex: 98; PubMed Central: 78), which were imported into EndNote. A total of 56 duplicate records were removed before screening. The remaining titles and abstracts were independently reviewed by two reviewers against predefined inclusion criteria: English-language full text, publication year between 2014–2024, pediatric population focus, and empirical evaluation of virtual discharge or telehealth post-discharge interventions. Disagreements were resolved through discussion, achieving an inter-rater reliability (Cohen’s κ) within acceptable thresholds for systematic reviews (McHugh, 2012).

Following screening, 200 records were excluded for off-topic focus or insufficient methodological detail, leaving 24 studies for full-text review. Eligible studies were required to report measurable empirical outcomes, such as readmission rates, caregiver satisfaction, or complication detection, in alignment with best practices in health services research (Aromataris & Munn, 2020). Data extraction was conducted using a structured proforma to collect study design, context, antecedents, defining attributes, consequences, and operational indicators. The PRISMA 2020 flow diagram was used to ensure transparency and reproducibility (Page et al., 2021), and the CASP Qualitative Research checklist (CASP, 2018) was applied to assess methodological rigor and clarity. Only studies meeting both PRISMA and CASP quality standards were retained to minimize bias and strengthen the validity of the concept analysis.

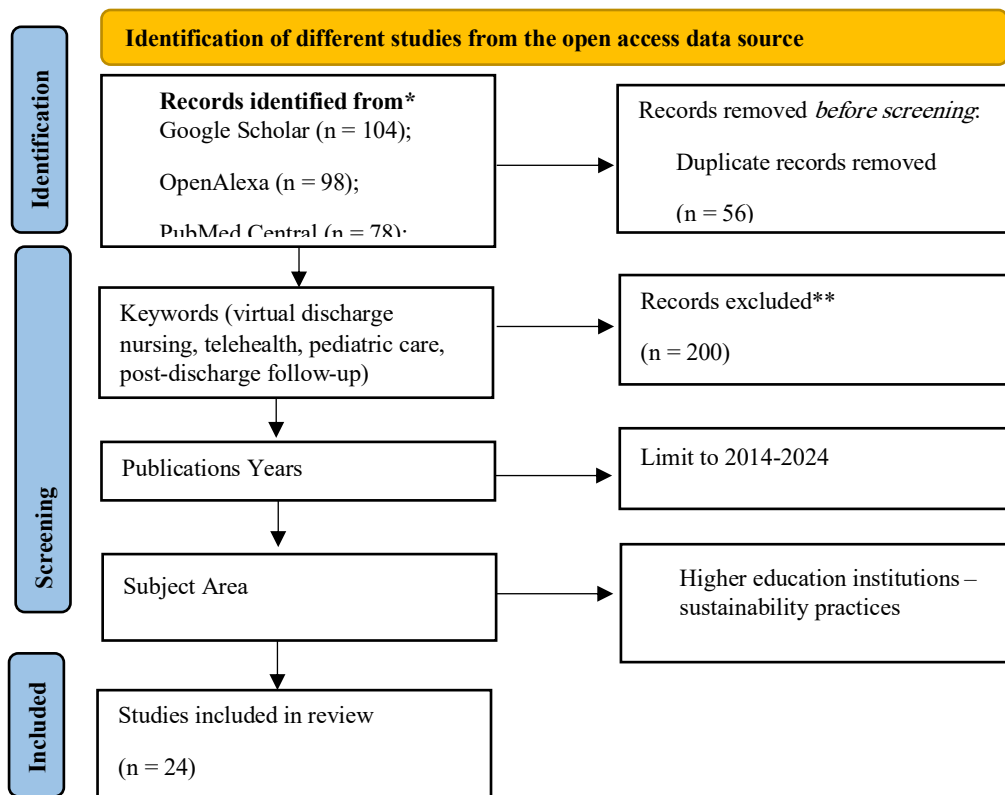


Fig. 1. Presents the PRISMA flow diagram of the studies included for analysis.

3.Results of Concept Analysis

3.1. Defining Attributes of Virtual Discharge Nursing (VDN)

Virtual Discharge Nursing (VDN) is an emerging concept in pediatric healthcare that integrates technology, nurse-led protocols, and post-discharge support into a cohesive care model. Based on a comprehensive analysis of 24 empirical studies published between 2020 and 2025, five defining attributes of VDN have been identified. First, VDN is consistently characterized by nurse-led, protocol-driven care, wherein registered nurses use structured scripts and digital platforms to guide discharge education and symptom monitoring. Second, technology-enabled communication is central to VDN, enabling secure, real-time interactions through video calls, telemonitoring devices, and AI-enhanced platforms. Third, VDN delivers structured post-discharge education, using standardized protocols that ensure consistent information across diverse patient populations. Fourth, a key component of VDN is early symptom surveillance and escalation, allowing timely clinical intervention to prevent adverse outcomes. Finally, caregiver-centered engagement is foundational, emphasizing satisfaction, accessibility, and caregiver inclusion in the discharge process. These attributes reflect the multidimensional nature of VDN and distinguish it from traditional discharge models. The studies reviewed demonstrate diverse implementations of VDN from tele-nursing models to hospital-wide

virtual support systems highlighting its adaptability and scalability. Table 1 presents a detailed overview of the selected studies, including settings and key methodological or conceptual features.

Table 1. Descriptive Data of the Research Studies on Virtual Discharge Nursing

No.	Citation	Setting (Domain)	Key Attributes (Conceptual/Methodological)
1	Perpetua et al. (2023)	Orthopedic Unit (US)	<ul style="list-style-type: none"> Nurse-led discharge education protocol via telehealth. Improved satisfaction and reduced 7-day readmissions.
2	McGillion et al. (2021)	Post-Surgery Care (Canada)	<ul style="list-style-type: none"> Randomized controlled trial using RAM tech. Real-time nurse interaction with escalation protocols.
3	Toriola et al. (2024)	Pediatric ED (Australia)	<ul style="list-style-type: none"> 24/7 nurse-led telehealth with vKAR. Reduced ED revisits by 44% within 48 hours.
4	Madhavan et al. (2020)	Pediatric Transitions (US)	<ul style="list-style-type: none"> Virtual visits post-discharge. Focus on continuity and quality of pediatric transitions.
5	Cyrus et al. (2022)	Hospital Medicine (US)	<ul style="list-style-type: none"> Creation of attending nurse role. Improved discharge timing and patient satisfaction.
6	Oluyinka Olutoye et al. (2023)	Pediatric Surgery (US)	<ul style="list-style-type: none"> Telehealth vs. in-person visit analysis. Improved patient satisfaction via telehealth.
7	Zain et al. (2024)	Family Medicine (US)	<ul style="list-style-type: none"> Telemedicine TCM comparison study. Comparable readmission rates, improved access.
8	Waite & Ahmed (2023)	Pediatric Fracture Clinics (UK)	<ul style="list-style-type: none"> Systematic review of Virtual Fracture Clinics. Safe, cost-effective model with high parental satisfaction.
9	Wozney et al. (2022)	Pediatric EDs (Global)	<ul style="list-style-type: none"> Systematic review of EDCTs. Improved communication and discharge understanding.
10	Tudorache et al. (2022)	Health System Discharge (US)	<ul style="list-style-type: none"> Evaluation of virtual nurse role sustainability. Streamlined discharge via automation.
11	Goldbloom et al. (2022)	Pediatric Hospital (Canada)	<ul style="list-style-type: none"> CHEO virtual model during COVID. Sustained quality care and access post-pandemic.
12	Nguyen et al. (2024)	Urban Hospitals (US)	<ul style="list-style-type: none"> AI-enhanced virtual nursing via mobile carts. Nurse satisfaction and care quality improvements.
13	Swink et al. (2023)	Pediatric Cardiac ICU (US)	<ul style="list-style-type: none"> Tele-critical care nurse program. Added surveillance and intervention capabilities.
14	Vega & Fernández (2024)	Pediatric Perioperative (Spain)	<ul style="list-style-type: none"> Use of VR for distraction and education. Effective anxiolysis and digital sedation.
15	Busch & Cady (2021)	Pediatric Rehab (US)	<ul style="list-style-type: none"> Discharge nurse intervention. Reduced unmet needs and improved coordination.
16	Chen et al. (2022)	Child Psychiatry (Europe)	<ul style="list-style-type: none"> Scoping review of CAMHS discharge. Emphasis on continuity, education, caregiver support.
17	Martinsen et al. (2023)	Orthogeriatric Surgery (EU)	<ul style="list-style-type: none"> Multidisciplinary discharge planning. Emphasized communication and patient participation.
18	Da Valle et al. (2024)	Pediatric Cardiac Surgery (Italy)	<ul style="list-style-type: none"> Discharge planning and LOS association. Use of nurse discharge letters.
19	Babayan et al. (2023)	Pediatric Complex Care (Canada)	<ul style="list-style-type: none"> 24/7 virtual support for caregivers. Decreased ED visits, improved device support.
20	Mullan et al. (2024)	Pediatric Clinics (UK)	<ul style="list-style-type: none"> Trainee-led post-discharge clinics. Enhanced communication and reduced no-show rate.
21	Tubbs-Cooley et al. (2020)	Home Visits (US)	<ul style="list-style-type: none"> Nurse documentation post-discharge. Highlighted medication and social concerns.
22	Savitz et al. (2023)	General Medical Units (US)	<ul style="list-style-type: none"> ViRN nurse model implementation. Maintained safety and outcomes.
23	Leybov et al. (2024)	Urban EDs (US)	<ul style="list-style-type: none"> Scalable virtual discharge counseling. Targeted LEP patients, improved understanding.

No.	Citation	Setting (Domain)	Key Attributes (Conceptual/Methodological)
24	Romano (2025)	Adult Acute Care Units (US)	<ul style="list-style-type: none"> • DNP project implementing Virtual Discharge Nurse (VDN). • Improved discharge timing before 2 PM; stable LOS.

The concept of Virtual Discharge Nursing (VDN), when situated within the context of pediatric care systems, is defined by a triadic framework comprising clinical continuity, technological integration, and caregiver-centeredness. These practices reflect institutional efforts to modernize transitional care by embedding virtual nursing models across discharge protocols, staffing workflows, and patient education systems. These three interdependent attributes collectively represent the evolving nature of VDN and draw upon the foundational logic of digitally enabled, nurse-led care models (Tudorache et al., 2022; Savitz et al., 2023). The first attribute, clinical continuity, underscores the role of the nurse as both educator and clinical monitor, providing discharge counseling, symptom surveillance, and post-discharge support via structured protocols. Studies such as those by Perpetua et al. (2023) and Toriola et al. (2024) demonstrate how nurse-led interventions maintain care continuity beyond hospital walls, reducing readmissions and improving recovery outcomes. The second attribute, technological integration, refers to the adoption of secure, interactive platforms including video conferencing, remote monitoring, and AI-assisted systems that enable real-time engagement and early escalation of care (McGillion et al., 2021; Nguyen et al., 2024). These digital tools operationalize VDN by expanding access, ensuring documentation accuracy, and allowing proactive intervention when patient metrics exceed thresholds. The third defining attribute, caregiver-centeredness, reflects a sustained commitment to health equity and caregiver empowerment. This includes culturally and linguistically tailored communication, shared decision-making, and satisfaction measurement, all of which are facilitated by the virtual format (Leybov et al., 2024; Oluyinka Olutoye et al., 2023). Notably, this attribute also supports health literacy and accommodates the logistical constraints of families, such as transportation and work schedules. Policies and practices that emphasize family involvement, communication clarity, and accessibility serve as key indicators of caregiver-centered discharge models. Together, these attributes form a holistic, future-facing definition of VDN. They move the concept beyond a pandemic-driven workaround to a permanent, integrative care strategy that balances clinical excellence, operational efficiency, and human-centered design. The presence and interaction of all three dimensions are necessary conditions for classifying a discharge protocol as a Virtual Discharge Nursing intervention within pediatric care.

3.2. Model, Borderline, and Contrary Cases

To further clarify the defining attributes of Virtual Discharge Nursing (VDN), Walker and Avant's concept analysis framework was applied to develop a model case, a borderline case, and a contrary case. The model case illustrates the full expression of VDN and its interrelated attributes. In this scenario, a tertiary pediatric hospital deploys a comprehensive nurse-led virtual discharge program that integrates secure video consultations at 24 hours, 72 hours, and 7 days post-discharge. Nurses follow a standardized discharge script, review medications, assess post-operative symptoms, and deliver culturally appropriate education in the caregiver's preferred language. Supplementing this process, remote monitoring devices collect and transmit vital signs to a centralized clinical dashboard that is reviewed daily by the virtual nursing team. The system allows for timely escalation to physicians when thresholds are exceeded,

ensuring early intervention and continuity of care. This case demonstrates all three core VDN attributes: clinical continuity, technological integration, and caregiver-centeredness and is associated with measurable outcomes such as high caregiver satisfaction, improved communication, and reduced 30-day readmission rates (Perpetua et al., 2023; McGillion et al., 2021).

By contrast, the borderline case captures a scenario in which some but not all VDN attributes are present. In this example, a hospital provides routine post-discharge phone calls by ward nurses, yet the interactions lack standardized educational content, follow-up scheduling, or use of digital monitoring. Although early symptom identification occasionally occurs, there is no structured escalation pathway, no multilingual support, and documentation is inconsistent. This case partially reflects the VDN concept but lacks the proactive monitoring, technological infrastructure, and procedural consistency necessary for high-quality virtual nursing care (Cyrus et al., 2022). Finally, the contrary case represents a complete absence of VDN elements. Families receive no structured follow-up unless complications prompt emergency department visits. There are no scheduled nurse interactions, digital tools, or education materials provided at discharge. As noted by Tubbs-Cooley et al. (2020), this omission often leads to caregiver confusion, unmanaged symptoms, and avoidable readmissions. These three cases together delineate the conceptual boundaries of VDN, distinguishing the model from less comprehensive or absent discharge strategies.

3.3. Antecedents of Virtual Discharge Nursing

The implementation of Virtual Discharge Nursing (VDN) is contingent upon several foundational conditions that enable its functionality and effectiveness within pediatric care settings. First, a skilled pediatric nursing workforce trained in telehealth delivery is a critical antecedent. Nurses must be proficient not only in pediatric clinical assessment but also in virtual communication techniques and caregiver engagement strategies tailored to diverse populations (Toriola et al., 2024; Oluyinka Olutoye et al., 2023). Without this specialized training, the quality and consistency of virtual care interactions may be compromised. Second, the presence of a reliable digital infrastructure is essential to facilitate secure, real-time, and asynchronous communication. Video conferencing platforms, audio channels, and messaging systems must be user-friendly and compliant with health information privacy standards to ensure patient confidentiality and support continuity of care (Nguyen et al., 2024; Waite & Ahmed, 2023). Finally, integration with existing hospital discharge protocols is necessary to embed VDN into standard practice. This includes aligning virtual nursing tasks with discharge planning workflows, clarifying interprofessional roles, and linking VDN activities to institutional quality indicators such as readmission rates and discharge timeliness (Zain et al., 2024; Leybov et al., 2024). These three antecedents form the structural foundation required for VDN implementation.

3.4. Consequences of Virtual Discharge Nursing

The implementation of Virtual Discharge Nursing (VDN) yields significant clinical and experiential outcomes that enhance the quality of post-hospital care. One prominent consequence is the reduction in unplanned healthcare utilization, including lower 30-day readmission rates and decreased emergency department visits. These outcomes are particularly evident in programs that incorporate structured

symptom monitoring and timely follow-up by virtual nurses, ensuring proactive identification and management of emerging complications (Perpetua et al., 2023; Toriola et al., 2024). Another key benefit is improved caregiver satisfaction and confidence. Virtual discharge support that is accessible, timely, and culturally sensitive not only enhances the caregiver experience but also contributes to higher satisfaction scores compared to conventional discharge practices (Oluyinka Olutoye et al., 2023; Wozney et al., 2022). Caregivers report feeling more informed and reassured when they can interact with nurses remotely, especially in the days immediately following discharge. Finally, VDN strengthens care continuity and safety by establishing clear escalation pathways and enabling early detection of post-discharge complications. This is particularly evident in pediatric tele-critical care models, where virtual surveillance has helped prevent adverse events and support sustained recovery (Swink et al., 2023). Collectively, these outcomes demonstrate the value of VDN as a transformative model in pediatric care.

3.5. Empirical Referents: Measurement and Evaluation Tools

Operationalizing Virtual Discharge Nursing (VDN) requires a structured set of empirical referents that align with its defining attributes and facilitate measurable evaluation. Clinical outcomes serve as key indicators of VDN's effectiveness, including 30-day pediatric readmission rates, emergency department revisit rates within 7 days, and early complication detection rates metrics that reflect the program's impact on patient safety and continuity of care (Zain et al., 2024; Toriola et al., 2024). Equally important are care process metrics, which assess the operational fidelity of VDN interventions. These include the percentage of discharged patients who receive a virtual follow-up within 72 hours, adherence rates to standardized discharge education protocols, and the number of clinical escalations initiated by virtual nurses for timely physician intervention (Leybov et al., 2024; Perpetua et al., 2023). Complementing these system-level measures are patient-reported outcomes, such as caregiver satisfaction scores gathered through Press Ganey surveys or other validated instruments, as well as subjective reports of communication clarity and perceived ease of access to nursing support (Oluyinka Olutoye et al., 2023). Together, these empirical referents enable comprehensive benchmarking, longitudinal monitoring, and continuous quality improvement within pediatric discharge programs (Goldbloom et al., 2022; Nguyen et al., 2024), thus ensuring that VDN practices remain both effective and responsive to caregiver needs.

3.6. Clarifying Conceptual Boundaries and Avoiding Conflation

Virtual Discharge Nursing (VDN) must be conceptually distinguished from broader telehealth services and informal or unstructured post-discharge practices. While telehealth encompasses a wide range of remote healthcare interactions, VDN refers specifically to structured, nurse-led, and protocol-driven interventions that are intentionally designed to support the pediatric post-discharge period (McGillion et al., 2021; Perpetua et al., 2023). This includes scheduled virtual visits, standardized education delivery, symptom monitoring, and clear escalation pathways. In contrast, sporadic or ad hoc follow-up phone calls that lack standardized assessment tools, multilingual support, and formal documentation fall short of the conceptual requirements of VDN. Such differentiation is critical to avoid conceptual conflation in both academic literature and healthcare policy. Clarifying these boundaries ensures that programs labeled as VDN adhere to a consistent and rigorous framework, thereby allowing for accurate evaluation,

replication, and scalability. It also supports the development of outcome-driven policies and evidence-based implementation strategies.

4. Discussion

4.1. Advancing Conceptual Precision in Virtual Discharge Nursing

The findings of this concept analysis refine the theoretical understanding of Virtual Discharge Nursing (VDN) by providing a clear, multidimensional definition that is both conceptually rigorous and operationally applicable. Through the systematic application of Walker and Avant's method, VDN has been articulated as a structured, nurse-led, and technology-enabled process that ensures continuity of care in the vulnerable period following pediatric hospital discharge. The triadic framework of clinical continuity, technological integration, and caregiver-centeredness positions VDN as more than an extension of telehealth; it represents a deliberate nursing practice that is embedded within institutional discharge pathways. This framing resolves long-standing ambiguity in the literature, where post-discharge telehealth has often been conflated with ad hoc follow-up calls or unstandardized caregiver education. By situating VDN within a framework that emphasizes process fidelity and measurable outcomes, this analysis addresses a critical gap in both practice and scholarship, providing a foundation for future empirical testing and policy translation (Perpetua et al., 2023; Zain et al., 2024).

4.2. Digital Transformation as a Strategic Enabler of Post-Discharge Care

A central contribution of this analysis is the recognition of digital transformation as a key enabler of VDN in pediatric care. Telehealth platforms, remote monitoring devices, and AI-assisted nursing support systems represent critical infrastructural antecedents that allow VDN to be delivered at scale while maintaining safety and quality. Yet, as evidenced by the comparison of model, borderline, and contrary cases, technology alone is insufficient to guarantee effective outcomes. Virtual interventions must be aligned with standardized nursing protocols, escalation pathways, and culturally sensitive caregiver communication to achieve their intended impact. This is consistent with findings from studies such as the PVC-RAM randomized trial, which demonstrated that structured monitoring combined with nurse oversight extended days alive at home after surgery (McGillion et al., 2021). Similarly, the virtualKIDS Acute Review program highlights how short-term, structured telehealth support can reduce emergency department revisits by 44%, underscoring the synergistic relationship between technology and nursing leadership in post-discharge care (Toriola et al., 2024). These insights suggest that digital transformation functions most effectively as an accelerator when coupled with dynamic capabilities in nursing workforce development, care coordination, and institutional governance.

4.3. Operationalization Through Empirical Indicators: From Concept to Measurement

The operational clarity achieved through this concept analysis is reinforced by the identification of empirical referents that enable VDN to be measured, evaluated, and continuously improved. Metrics such as 30-day pediatric readmission rates, early complication detection, and caregiver satisfaction scores

provide concrete indicators of program performance and safety (Zain et al., 2024; Oluyinka Olutoye et al., 2023). Process-level indicators including the proportion of patients receiving follow-up within 72 hours and adherence to standardized discharge education protocols offer further accountability mechanisms that move VDN from abstraction to action (Perpetua et al., 2023). The alignment of these indicators with Donabedian's structure-process-outcome model ensures that both clinical and experiential dimensions of care are captured, supporting benchmarking and system-level evaluation (Goldbloom et al., 2022; Nguyen et al., 2024). In this way, empirical referents transform VDN into a construct that can be operationalized within quality improvement frameworks, enhancing accountability while informing future implementation strategies.

4.4. Policy and Strategic Implications for Pediatric Care Systems

The outcomes of this concept analysis hold direct implications for pediatric healthcare systems and policy development. The identified antecedents highlight the necessity of investing in three critical areas: specialized nursing education, reliable digital infrastructure, and the integration of virtual discharge practices into established discharge protocols. These prerequisites form the foundation for successful implementation and scalability of virtual discharge nursing in pediatric settings. In addition, the defining attributes outlined in this analysis provide a structured framework for developing clinical guidelines and institutional policies. By ensuring that programs labeled as virtual discharge nursing consistently reflect these attributes, healthcare organizations can promote quality, accountability, and consistency across pediatric care systems. Strategically, incorporating virtual discharge nursing into care pathways offers potential benefits such as reducing unnecessary healthcare utilization, enhancing caregiver satisfaction, and improving safety outcomes, which collectively strengthen the case for its broader adoption. From a policy standpoint, decision-makers and accrediting bodies can use the empirical referents identified in this analysis to establish standardized evaluation metrics. These metrics can support reliable monitoring, facilitate replication in diverse healthcare systems, and provide the basis for long-term integration. Importantly, the findings position virtual discharge nursing not as a temporary adaptation to extraordinary circumstances, but as a forward-looking approach that can permanently enhance the quality of transitional care in pediatric practice (Savitz et al., 2023; Leybov et al., 2024; Goldbloom et al., 2022).

4.5. Limitations and Directions for Future Research

Despite its theoretical robustness and methodological rigor, this concept analysis has limitations that warrant acknowledgment. First, the synthesis draws upon a relatively recent and heterogeneous body of literature, reflecting the nascent state of VDN research. Variability in terminology, intervention design, and outcome reporting across studies complicates efforts to generalize findings, underscoring the need for consensus-building and standardized definitions (Chen et al., 2022). Second, most available evidence is drawn from high-resource health systems in North America, Europe, and Australia, raising questions about the transferability of findings to low- and middle-income contexts where digital infrastructure and nursing resources may be limited (Madhavan et al., 2020). Third, the analysis is cross-sectional in nature, synthesizing studies published within the past five years, and thus does not capture the longitudinal evolution of VDN practices over time. Future research should therefore focus on longitudinal evaluations of VDN interventions, comparative effectiveness trials across diverse healthcare settings, and deeper

inquiry into equity-related outcomes such as language access, cultural adaptation, and digital literacy. Additionally, the integration of emerging technologies such as virtual reality for education and distraction (Vega & Fernández, 2024) and AI-driven triaging (Nguyen et al., 2024) presents promising avenues for refining VDN delivery and warrants empirical testing. By addressing these gaps, future scholarship can strengthen the generalizability, adaptability, and sustainability of VDN as a cornerstone of pediatric post-discharge care.

5. Conclusion

This concept analysis has provided a comprehensive and multidimensional understanding of Virtual Discharge Nursing (VDN) within pediatric care. By applying Walker and Avant's (2005) eight-step method, the study addresses the persistent ambiguity surrounding the definition and scope of VDN, articulating it as a construct defined by the interrelation of clinical continuity, technological integration, and caregiver-centeredness. These defining attributes anchor VDN not as an ad hoc extension of telehealth, but as a structured, nurse-led, and technology-enabled model of care. The analysis demonstrates that VDN is both theoretically rigorous and practically applicable, offering a foundation for distinguishing high-quality, standardized virtual nursing interventions from informal or inconsistent post-discharge practices. The identification of antecedents including skilled nursing staff, robust digital infrastructure, and integration into discharge protocols underscores the essential conditions required for effective implementation. These antecedents emphasize that technology alone is insufficient; successful VDN programs rely on well-prepared nurses and institutional alignment with broader discharge planning processes. The consequences identified, such as reduced readmissions, improved caregiver satisfaction, and earlier detection of complications, reinforce the strategic and clinical value of embedding VDN into pediatric care pathways. In this way, the concept emerges as both a safety-enhancing intervention and a mechanism for advancing health equity and caregiver empowerment.

To ensure applicability and measurement, the analysis offers a set of empirical referents that translate abstract attributes into concrete evaluation tools. Indicators such as 30-day readmission rates, caregiver satisfaction scores, and process adherence measures enable transparent monitoring, policy development, and continuous quality improvement. The alignment of these referents with Donabedian's structure-process-outcome model strengthens their relevance for institutional benchmarking and cross-system comparisons. The contribution of this study lies in bridging conceptual theory with practical implementation. It provides a structured and adaptable framework for healthcare leaders, policymakers, and practitioners to embed VDN into discharge governance systems and pediatric transitional care strategies. At the same time, it offers scholars a foundation for empirical inquiry into the scalability, sustainability, and equity of VDN across diverse contexts. Future research should focus on longitudinal evaluations, comparative effectiveness studies, and the integration of emerging technologies such as AI-driven triage and virtual reality-based education. By doing so, the robustness and adaptability of VDN as a pediatric care model can be further tested and refined.

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