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Visiting Nurses' Knowledge, Attitudes and Beliefs Regarding Telehealth to Promote Medication Compliance in the Elderly Population

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Promote Medication Compliance in the Elderly Population

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ABSTRACT

VISITING NURSES' KNOWLEDGE, ATTITUDES AND BELIEFS REGARDING

TELEHEALTH TO PROMOTE MEDICATION COMPLIANCE IN THE ELDERLY

POPULATION

Diane Renee Logan

Seton Hall University, 2023

Dissertation Chair: Genevieve Pinto Zipp, PT, EdD, FNAP

Introduction: Medication noncompliance in the elderly home dwelling adult is a persistent

problem resulting in decreased quality of life, hospital readmission within a 30-day period and

increased morbidity. Visiting nurses are in a key position to assist the elderly population to

employ medication compliance strategies that are tailor-made to fit their individual needs and

abilities. The introduction of telehealth technology, while meant to aid elderly home dwelling

individuals, may negatively impact the infusion of medication compliance strategies and thus

increase medication noncompliance if visiting nurses are not effective in employing this

technology.

Aim: The aim of this study is to evaluate visiting nurses' knowledge, attitudes, and beliefs of

incorporating telehealth technology while using medication compliance strategies. Once factors

are identified future work can seek to design programs to improve the use of telehealth

technology in the home care environment by visiting nurses.

Materials and Methods: The study employed a qualitative research approach using semi-

structured interviews to hear the voices of the visiting nurses. The Diffusion of Innovation theory

(DOI) and the Knowledge, Attitudes and Behavior (KAB) model were used as lenses through which to design interview guide questions that could assess visiting nurse's knowledge, attitudes and beliefs regarding employing telehealth technology in the home care environment to assist the elderly dwelling patient with medication management strategies. One on one interviews were conducted via Teams platform for a max of 60 minutes. Participants were visiting nurses who were employed at home health agencies working with elderly dwelling adults, and who use telehealth technology to advance medication compliance strategies.

Results: 10 interviews were conducted at which time data saturation occurred. The PI coded all data manually and intercoder agreement was obtained. Several themes emerged from the data. This study provided evidence that visiting nurses accept telehealth technology, are supportive of its continued use, and are willing to be educated on future advances in this technology to assist the elderly home care patient with medication compliance strategies. Visiting nurses enjoy utilizing telehealth technology, state that they find it convenient and easy to use. Telehealth technology enables nurses to fill the visit void related to limited staff and financial restraints.

Conclusion: Given the aging population of patients in the US requiring home health services the health care system must provide opportunities for nurses to continue to explore and adopt new technologies to advance medication compliance in the elderly population. Specifically, Universities and home health agencies must ensure that nurses are prepared to utilize telehealth technologies in order to promote the use of telehealth in the home care environment with the elderly patient to reduce medication non-compliance issues.

Keywords: telehealth, home health care, elderly, medication adherence

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CHAPTER I

INTRODUCTION

Statement of the problem

Medication nonadherence is a persistent public health issue that can influence

management of chronic conditions, especially among older adults (aged ≥65), who are more

likely to bear a greater disease burden than their younger counterparts, (Lee et al., 2018).

Medication nonadherence is often cited as a factor that impacts hospital readmission rates for the

elderly. Given the desire for the elderly to continue to live safely at home with quality of life,

visiting nurse services have grown amongst the ever-growing elderly population. With the

expected increase in 65 years and older adults from about 524 million in 2010 to about 1.5

billion in 2050, (World Health Organization, 2011), ensuring quality home care is imperative in

the United States. About 3.4 million homebound patients receive skilled nursing, therapy, social

work, and home health aide services from nearly 12,000 home health agencies each year

(MEDPAC, 2019). One of the evolving roles of visiting nurses as they take on new

responsibilities of providing nursing service in home settings is the use of information

technology (IT), which includes the innovation referred to as telehealth.

Telehealth interventions are defined by the American Telemedicine Association as

interventions that utilize tele-communications and information technologies to deliver health care

services, (ATA, 2017). Often, telehealth nursing focuses on patients' long-term wellness, self-

management, and global health care issues, (Shortliffe & Cimino, 2014). The cost-effectiveness

and patient acceptance of this new method of service delivery have been analyzed and found to

be effective (Taunton et al., 2004; Yun, 2008). The perceptions of nurses and their readiness to employ an innovation such as telehealth to manage older adults needs to live safely at home with a good quality of life and specifically adhere to medication management plans has not been previously studied.

Significance of the Problem

Not surprisingly, post-hospitalization is a high-risk period of non-adherence to medication for many elderly adults (Fallis et al., 2013). After patient discharge, medication administration is no longer supervised by healthcare staff and new medications are commonly introduced at discharge (Fallis et al., 2013). Nearly half of patients experience a medication error during self-medication and approximately 12%–17% of patients experience an adverse drug event after discharge (Cohen et al., 2012). These factors may contribute to medication non-adherence after discharge (Cohen et al., 2012; Fallis et al., 2013). Visiting nurses can educate the elderly on the most effective tailored strategies to maintain medication compliance in the home care environment and to prevent rehospitalization. Tailored instruction offered by the visiting nurse allows the personalization of the medication strategy, to fit an individual patient's needs. While no single strategy will guarantee that patients will fill their prescriptions and take their medications as prescribed, elevating adherence as a priority issue and promoting best practices, behaviors, and technologies may significantly improve adherence in the home care environment and ultimately promote safe and healthy living practices at home (National Council on Patient Information and Education, 2007).

Visiting nurses can educate the elderly on the most effective tailored strategies to maintain medication compliance in the home care environment and potentially prevent

rehospitalization. Tailored instruction offered by a visiting nurse allows the personalization of a medication strategy that fits an individual patient's needs.

Medicare guidelines allow the visiting nurse to visit a homebound patient that requires skilled nursing care. Examples of skilled nursing care include giving IV drugs, certain injections, or tube feedings; changing dressings; and teaching about prescription drugs or diabetes care. Medicare covers skilled nursing care when the services needed require the skills of a nurse, are reasonable and necessary for the treatment of the illness or injury and are given on a part-time or intermittent basis (visits only to draw blood are not covered by Medicare). "Part-time or intermittent" means you may be able to get skilled nursing services (combined) any number of days per week, as long as the services provided are fewer than 8 hours each day, 28 or fewer hours each week (or up to 35 hours a week in some limited situations. Administration of daily medications by mouth is not covered (Centers for Medicare & Medicaid Services, 2019). Since nursing visits are limited, usually 3 per week, visiting nurses may utilize telehealth to fill the visit void and address medication noncompliance issues daily. Although telehealth is available to elderly patients in the home care environment and some research is emerging regarding patients' perceptions of it, visiting nurses' perspectives on the use of telehealth have not been addressed.

Synthesis and Critical Analysis

In the literature, several strategies have been described to promote and manage medication compliance of community-dwelling elderly patients and their caregivers including those using Telehealth (O'Quin et al., 2015). The use of "apps", which are software applications specifically designed for mobile devices like tablets or smartphones, is one such common approach explored (Schreier et al., 2013). Many apps have been designed to scan medication bar

codes using the smartphone camera, to ensure the right medication is taken at the right time (Schreier et al., 2013; Stegemann, 2016). Another approach is Near Field Communication (NFC) based technologies for monitoring adherence to medications instead of manually entering data or scanning bar codes. NFC tags can be used for monitoring adherence to medications (Kastner et al., 2010; Morak et al., 2012). By bringing such NFC tags in touch with a smartphone, patients can record the intake of their medications. Alternatively, special "blisters" can be used to monitor the intake of medications via NFC. Such smart blisters are covered with a foil that includes an electronic circuit (Morak et al., 2012; Brath et al., 2013). A microcontroller recognizes interruptions of the conductive paths when the tablets or capsules are taken out of the blister and will then record the time and date. Via an accompanying app and telehealth link, the data can be shared in real time with healthcare professionals and, where appropriate, other caregivers. However, to date, smart blisters do not record the actual intake of the tablet or capsule, thus the accuracy of the measurement is limited (Morak et al., 2012; Brath et al., 2013).

To address some of the limitations associated with the strategies that do not allow for visualization of pill consumption, several systems have been designed to monitor medication ingestion via swallowing the medication in front of a camera or tracking the patient oral motor movement by motion detection (Stegemann et al., 2012). With the emergence of these new innovations to address medication compliance, many home health agencies, and the staff that they employ, which include nurses, must be aware of these innovations. However, nurses in home healthcare may possess limited knowledge and or awareness of these innovative strategies.

While we know that nursing services can enhances a patient's quality of life in the home care environment, if nurses do not know of technological telehealth innovations or are not ready

to use them, how can they effectively employ them to manage patient needs? Thus, we argue that we must first address visiting nurses' readiness to use the innovation of telehealth.

Purpose Statement

Since home care nursing visits are limited, visiting nurses can utilize telehealth to fill the visit void and address medication noncompliance issues daily. However, nurses' knowledge, attitudes, and beliefs, regarding this innovation and their readiness to employ it may negatively impact their utilization of this strategy. Therefore, the purpose of this study is to understand what home health nurses' knowledge, attitudes, and beliefs are regarding employing Telehealth practices to promote medication compliance of community-dwelling elderly patients and their perceived readiness to do so.

RQ1 What strategies do home health nurses use currently to promote and manage medication compliance of community-dwelling elderly patients?

RQ2 Are home health nurses aware of Telehealth practices?

RQ3 Are home health nurses aware of Telehealth practices which can be used to promote and manage medication compliance of community-dwelling elderly patients?

RQ4 What are home health nurses' knowledge, attitudes, and beliefs regarding the use of telehealth technology as a strategy to manage and promote medication compliance?

RQ5 Do home health nurses feel ready to use Telehealth to promote and manage medication compliance of community-dwelling elderly patients and their caregivers?

Conceptual Framework

How nurses perceive telehealth practices employed by their organization to help patients with medication compliance, and their personal readiness to employ these practices, is important

to understand, since nurses will be instrumental in introducing telehealth technology in home healthcare. In the literature it has been noted that readiness for change is generally the first step in any change project. Until participants are ready for change, little can be done to bring about the change (Amarneh, 2017). Rogers's five-step Diffusion of Innovation theory can be used as a lens to explain how nurses proceed from having knowledge of an innovation to confirming the decisions to adopt or reject the idea (Kritsonis, 2005; Wonglimpiyarat & Yuberk, 2005). Rogers's diffusion of innovation theory, which serves as a conceptual framework for the identification of conditions that advance innovation adoption and related methods of adoption, is appropriate to utilize to explore visiting nurses' perception related to telehealth use for medication compliance, (Schmidt et al., 2009; Emani et al., 2012).

     Carl Rogers was an influential American psychologist best known for pioneering client-centered therapy and humanistic psychology, which are perspectives developed in response to early theories such as psychoanalysis. The Diffusion of Innovation theory is often regarded as a valuable change model for guiding technological innovation where the innovation itself is modified and presented in ways that meet the needs across all levels of adopters. It also stresses the importance of communication and peer networking within the adoption process (Rogers et al., 1992).

     Rogers's Diffusion of Innovation theory was first described in 1962, and characterizes people based on their likelihood to adopt technology and categorizes organizations based on their stage of adoption of a new technology. Rogers's five-step theory explains how individuals proceed from having knowledge of an innovation to confirming the decision to adopt or reject the idea (Kritsonis, 2005; Wonglimpiyarat & Yuberk, 2005). A distinguishing feature of

Rogers's theory is that even if a change agent is unsuccessful in achieving the desired change, that change could be resurrected at a later, more opportune time or in a more appropriate form (Kritsonis, 2005). The Five Stages of Rogers's Theory of Innovation are:

1.   **Knowledge.** The individual is first exposed to an innovation but lacks information about the innovation.

2.   **Persuasion.** The individual is interested in the innovation and actively seeks related information and details.

3.   **Decision.** The individual considers change and weighs the advantages and disadvantages of implementing the innovation.

4.   **Implementation.** The individual implements the innovation and adjusts the innovation to the situation. During this stage, the individual also determines the usefulness of the innovation and may search for further information about it.

5.   **Confirmation.** The individual finalizes the decision to continue using the innovation. (Rogers, 1995).

Rogers also emphasizes the importance of including key people (i.e., policymakers) interested in making the innovation happen, capitalizing on group strengths, and managing factors that impede the process.

Rogers defined the adopter categories as "the classifications of members of a social system on the basis of innovativeness" (Rogers, 2003, p. 22). This classification includes innovators, early adopters, early majority, late majority, and laggards. In each adopter category, individuals are similar in terms of their innovativeness: "Innovativeness is the degree to which an

individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a system" (Rogers, 2003, p. 22). Rogers's Five Categories of Innovators are:

1. **Innovators**

Innovators are adventuresome types that enjoy being on the cutting edge. The innovation's possible benefits make it exciting; the innovators imagine the possibilities and are eager to give it a try. The implementation and confirmation stages of the innovators' innovation decisions are of particular value to the subsequent decisions of potential adopters (Rogers, 1995, p. 263).

2. **Early Adopters**

Rogers stated adopters are those that are more likely to hold leadership roles in the social systems, and other members come to them to get advice or information about the innovation. Nurses that are looked at as role models in the agency and who are leaders will have an advantage encouraging their colleagues at every stage of the innovation process. Nurses with positive attitudes towards the induction of telehealth technology in the home care system through interpersonal networks will increase other colleagues' acceptance of this technology. Early adopters' leadership in adopting the innovation decreases uncertainty about the innovation in the diffusion process. Finally, "early adopters put their stamp of approval on a new idea by adopting it" (Rogers, 2003, p. 283). Early adopters are the nurses that are opinion leaders; they do not search widely like innovators, but they do speak with innovators and select the ideas they would like to try out (NursingAnswers.net, 2018).

3. **Early Majority**

Rogers claimed that although the early majority have a good interaction with other members of the social system, they do not have the leadership role that early adopters have (Rogers, 2003). However, their interpersonal networks are still important in the innovation-diffusion process. The nurse in the early majority category is not the first to accept telehealth technology use but is not the last to accept it. They usually take more time than it takes innovators and early adopters.

4. Late Majority

Rogers explains that people in the category of the late majority includes one-third of all members of the social system who wait until most of their peers adopt the innovation. Although they are skeptical about innovation and its outcomes, economic necessity and peer pressure may lead them to the adoption of the innovation. To reduce the uncertainty of the innovation, interpersonal networks of close peers should persuade the late majority to adopt it. Then, "the late majority feel that it is safe to adopt" (Rogers, 2003, p. 284).

5. Laggards

Rogers stated that laggards have the traditional view, and they are more skeptical about innovations and change agents than the late majority. This is the nurse who may lack the knowledge of telehealth use and may wait for her peers to accept it. This nurse will allow her colleagues to identify the advantages and disadvantages before they will utilize the technology themselves. Due to this hesitancy to use telehealth, laggards' innovation-decision period is relatively long (Rogers, 2003).

According to Rogers, diffusion of innovation at the individual level adoption occurs in five stages: 1) knowledge, 2) persuasion, 3) decision, 4) implementation, and 5) confirmation,

with five characteristics of innovation that influence an individual's decision to adopt or reject the innovation: i) relative advantage, ii) compatibility, iii) complexity, iv) trialability, and v) observability. Rogers suggests that these stages and characteristics be recognized when persuading users to adopt an innovation (Doyle et al., 2017). With home health agencies introducing telehealth as an instrument to assist the elderly population in the home care environment with medication compliance, understanding visiting nurses' knowledge of telehealth as an innovation, their perceptions surrounding its use, and their readiness to adopt or reject the idea will aid in preparing VNA nursing to advance perceptions regarding inception of telehealth practices.

A primary goal of healthcare professionals, regardless of the mode in which they deliver care of the populations they are working with, is to improve quality of life. Health care agencies delivering services to the elderly population at home must see to use all modes of delivery available to them including employing telehealth practices to reach this vulnerable population and help reduce their health care disparities. The visiting nurse, who is often the primary liaison from the healthcare agency to the patient in their home, must ensure that they utilize telehealth strategies that are designed and acceptable for the elderly homebound patient. For example, the elderly, who may have cognitive challenges and other disabilities, will require the skills of a nurse to incorporate tailored medication compliance strategies that deliver benefits, rather than add burdens while engaging with telehealth technologies. For the application of telehealth in homecare to become a valuable staple, visiting nurses must learn to accept, appreciate, and adapt to its use. The visiting nurses' knowledge, attitudes, and beliefs specifically regarding their

acceptance, appreciation and adaptive knowledge of telehealth practices must be explored to ensure success of telehealth introduction into the home health care setting.

Rogers's diffusion of innovation theory serves as a conceptual framework for the identification of conditions that advance innovation adoption and related methods of adoption and is appropriate to use when evaluating visiting nurses' knowledge, attitudes and beliefs related to telehealth use for medication compliance in the elderly population (Schmidt et al., 2009; Emani et al., 2012). Rogers's theory incorporates the processes of knowledge, persuasion, decision, implementation, and confirmation of an innovation. The use of this theory as a lens to evaluate visiting nurses' perspectives will add to advance evidence-based practice by identifying aspects to successfully incorporate telehealth technology into homecare agencies and contribute to enhancing the visiting nurses' acceptance of its use.

When assessing patients, the nurse employs expert qualities they have developed through education and experience. These qualities aid in the development of critical thinking skills to create effective medication compliance strategies that are tailored for individual patients' needs. The introduction of telehealth in the home care field to assist the elderly with medication compliance is a process in which the application of the above stages of Rogers's innovation theory as well as the nurse's education and experience can be utilized.

The nurse must assess the telehealth equipment and explore the rationale for its use. The visiting nurse uses a systemic approach to evaluate and analyze the needs of the patient, create tailored medication compliance strategies that meet the individual patient's needs, and incorporate these strategies into telehealth applications. Rogers's stage of knowledge entails a holistic approach that applies the nurse's expertise as well as investigation of the factors and

circumstances, such as history of medication noncompliance, that may have led to the physician's/agency's request to use telehealth as a resource. The visiting nurse than utilizes the stage of persuasion as he/she becomes interested in the use of telehealth technology to assist the patient and may actively research information via evidence-based practice to explore successful findings of its use. In the decision stage the nurse may consider the use of telehealth but will also explore the advantages and disadvantages of its use as related to his/her skills and that of the patient's. If the nurse is accepting and willing to utilize telehealth, implementation to the telehealth protocols will be introduced to assist the patient using tailored strategies to prevent medication noncompliance. The nurse may search for and adjust specific strategies to further assist the patient as needed. For example, the nurse may pre-fill a medication box for a patient who is forgetful and then utilize a phone app in which she will be able to see the patient take their daily medications from the pre-filled box. In the implementation stage the nurse implements telehealth use and will adjust and incorporate the specific tailored stages and add new ones if needed and remove strategies that may not be successful.

The nurse is constantly evaluating the usefulness of telehealth and examining their own knowledge, attitudes and beliefs concerning acceptance and satisfaction of its use. In the confirmation stage, the nurse determines whether he/she is satisfied with the use of telehealth and the aspects that it offers to decrease medication noncompliance issues. According to Rogers, if the innovation-decision has already been made, in the confirmation stage the nurse will than look for support of colleagues and/or the patient to support the acceptance of telehealth technology (Rogers, 2003).

As the nurse begins to utilize this accepted telehealth technology and encourage other colleagues to utilize it at the intra-level within the agency, the visiting nurse according to Rogers would be the change agent who will be encouraging and promoting its use in the home care environment.

A change agent is defined as an individual who influences the patients' innovation-decision in a direction deemed desirable by a change agency (Rogers, 1995). In order to be a change agent, the nurse must evaluate their knowledge, attitudes and beliefs on telehealth to examine whether they can be the change agent in the decision to utilize telehealth. As with all innovation of new technology, incorporation will depend upon individual characteristics and attributes of the nurse. Rogers described the innovation-diffusion process by identifying attributes of innovations that help to decrease uncertainty about the innovation (Rogers, 2003). Attributes of innovations include five characteristics of innovations: (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability. He stated that "individuals' perceptions of these characteristics predict the rate of adoption of innovations" (Rogers, 2003, p. 219). Also, Rogers noted that although there is a lot of diffusion research on the characteristics of the adopter categories, there is a lack of research on the effects of the perceived characteristics of innovations on the rate of adoption. Rogers defined the rate of adoption as "the relative speed with which an innovation is adopted by members of a social system" (Rogers, 2003, p. 221). For instance, the number of individuals who adopted the innovation for a period of time can be measured as the rate of adoption of the innovation. The perceived attributes of an innovation are significant predictors of the rate of adoption. Rogers

reported that 49-87% of the variance in the rate of adoption of innovations is explained by these five attributes.

6. Relative Advantage

Rogers defined relative advantage as "the degree to which an innovation is perceived as being better than the idea it supersedes" (Rogers, 2003, p. 229). If the visiting nurse employed by an agency believes that using telehealth will improve medication compliance strategies that are currently being used, he/she will be agreeable to utilizing this technology. For example, the nurse pre-fills a medication box for her/his patient daily but is unable to monitor if the patient is taking their medication. By incorporating telehealth technology, utilizing a telephone app, the nurse will be able to visualize the patient taking the medication. This would be of great advantage to both the nurse and the patient to meet the goals of medication compliance.

7. Compatibility

Rogers stated that "compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters" (Rogers, 2003, p. 15). Hoerup describes that each innovation influences one's opinions, beliefs, values, and views about acceptance of technology (Hoerup, 2001). If an innovation is compatible with an individual's needs, then uncertainty will decrease and the rate of adoption of the innovation will increase. The nurse may have knowledge and experience working in the home care environment but may lack the instruction and skills needed to use telehealth technology which can influence her/his decision to accept its induction.

8. Complexity

Rogers defined complexity as "the degree to which an innovation is perceived as relatively difficult to understand and use" (Roger, 2003, p. 15). As Rogers stated, opposite to the other attributes, complexity is negatively correlated with the rate of adoption. Thus, excessive complexity of an innovation is an important obstacle in its adoption. As stated above, if the nurse is not familiar with telehealth technology, he/she will be reluctant to accept its use. If hardware and software are user-friendly, then the nurse might consider using it in the home care environment.

9. Trialability

According to Rogers, "trialability is the degree to which an innovation may be experimented with on a limited basis" (Rogers, 2003, p. 16). Also, trialability is positively correlated with the rate of adoption. As stated by Rogers, the more an innovation is tried, the faster its adoption. The visiting nurse, once introduced to this new technology, will find ways to make its application more useful and adapt it to meet the needs of the patient. For example, the tailored medication strategies created by the nurse for the patient will be adapted to the telehealth program. Over time these strategies may be modified or discontinued, and new strategies may be incorporated. Rogers suggests that increased reinvention may create faster adoption of the innovation.

10. Observability

Rogers defined observability as "the degree to which the results of an innovation are visible to others" (Rogers, 2003, p. 16). Role modeling (or peer observation) is the key motivational factor in the adoption and diffusion of technology (Parisot, 1997). As nurses in the home health agency begin to utilize telehealth technology, become familiar with its use, and see

its advantages of increasing medication compliance, they will encourage other colleagues to incorporate telehealth use into their own patients' plans of care. Since home care nursing will be utilizing telehealth technology to fill visit voids and address medication noncompliance issues in the elderly homecare population, nurses' knowledge, attitudes and beliefs regarding telehealth induction and their readiness to utilize its use must be explored. Rogers's diffusion of innovation theory will assist in identifying their knowledge, attitudes and beliefs which are important for acceptance of telehealth technology.

Application of Rogers's Diffusion of Innovation will be effective in exploring adaptation to new technology but, unless one assesses the cognitive constructs associated with the intervention, one is unable to offer a justifiable reason for this phenomenon. Further, attitudes are typically heightened immediately following an intervention but often dissipate over time, negatively influencing the future likelihood of performing a particular behavior. As a result, research suggests that interventions and their evaluation should involve all three domains. The growing body of KAB research suggests that this design has profound potential as well as profound utility in this area.

Although the KAB method is more complex than most, this complexity affords a more comprehensive understanding of the cognitive constructs associated with development and change. This is particularly true of complex learning environments, where traditional, simple evaluation strategies are often inadequate. While each specific KAB evaluation is distinct, research has shown the KAB method to be a reliable and valid method to evaluate change as a result of interventions (Schrader & Lawless, 2004). The Knowledge-Attitude-Behavior (KAB) model has been proposed as a way of explaining the role of knowledge. The KAB model

proposes that behavior changes gradually. As knowledge accumulates in a health behavior

domain, changes in attitude are initiated. Over some period, changes in attitude accumulate,

resulting in behavioral change (Baranowski et al., 2003).

Figure 1

KAB Model
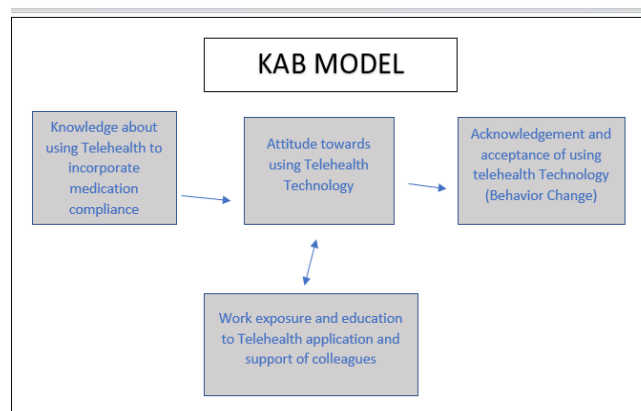
CHAPTER II

REVIEW OF LITERATURE

The Role of the Visiting Nurse in Medication Compliance

Visiting nurses have always been pioneers of new innovations since their role expanded in the 21st century, beginning with Lillian Wald's work in the Henry Street Settlement in 1893, and the founding by Mary Breckenridge of the Frontier Nursing Service in 1925. Visiting nurses, even at this early time, were functioning as autonoumous providers, providing care in the home to thousands of individuals in urban and rural cities throughout the United States (Keeling, 2015).

Medication compliance has always been an essential component of nursing care to prevent the further exacerbation of disease. Compliance with medical recommendations, especially with drug therapy, has been recognized to represent a complex challenge regardless of the care setting (Haynes, 1979). In the home care setting the use of long-term therapies and multiple comorbidities requiring multiple medications require visiting nurses to create and monitor tailored strategies to meet individual patients' needs.

Ensuring patient medication compliance presents a major challenge for home health nurses. However, with the emergence of telehealth technologies, opportunities exist for visiting nurses to improve medication compliance by enabling greater communication and supervision with their patients. Visiting nurses are aware that adherence to medication regimens in the elderly population, due to multiple comorbidities and polypharmacy, is an issue that must be addressed, especially from the perspective of the visiting nurse. Adherence to prescribed

medications is associated with improved clinical outcomes for chronic disease management and reduced mortality from chronic conditions, (Vrijens et al., 2012). Many elderly patients in the home care environment that are not compliant with their medication regimens return to the hospital within a 30-day period. Medication nonadherence among patients, particularly those with chronic diseases such as diabetes, has become an expensive problem for the American medical community, with a direct cost of approximately $100 billion annually that may range as high as $300 billion in potentially avoidable spending. Nonadherence in the United States is associated with 125,000 deaths annually and at least 10 percent of hospitalizations (Pittman, 2014).

The initial review of the medication regimen by the visiting nurse when admitting the elderly patient to the home health agency often finds discrepancies in medical orders/medical directions. Patients do not always recall all medications they were taking prior to hospital admission and thus do not report them accurately when hospitalized. When discharged from the hospital, individuals often resume taking their previous medications along with their new prescriptions. Furthermore, individuals are often found taking expired medications or old prescriptions that have been discontinued. Individuals take prescription medications that are duplicates, one in the generic name and one in the trade name, on the assumption that they are two different medications.

Many individuals do not view over-the-counter drugs as medications, and neglect to tell their health-care provider about them. Therefore, visiting nurses must be insightful detectives, asking probing questions that help the patient recall or identify over-the-counter medications (Logan, 2019). Visiting nurses must assess the patients cognitive and physical abilities to create

a tailored plan of care to meet their specific needs and ensure medication compliance even when the visiting nurse is not physically with the individual patient in their home. Traditionally, nurse-led interventions to improve medication compliance among elderly adults in the home care environment have been a staple in the success of elderly medication compliance (Henk et al., 2017).

Successful practical compliance aids include organizers and reminders such as blister packs, calendars, dosage counters, special containers, dosage forms, controlled delivery, and microprocessors. Pharmacists and nurses are both in a strategic position to identify eligible patients for adherence interventions, to assess and promote adherence. Pharmacists specifically ensure treatment efficacy, security, and access and provide information on the medication and related lifestyle advice. Nurses clinically co-manage patients with physicians; they also provide patients with information on their disease (Celio et al., 2018). Therefore, it is important for healthcare professionals, especially visiting nurses, to follow up with older adults early and frequently to keep them adherent to therapy. Nurses are well placed to provide and coordinate adherence care because they are present in most healthcare settings, are in close physical proximity to patients, and act as interfaces between patients and physicians (Van Camp et al., 2013).

A systemic study (Henk et al., 2017) examined the effects of nurse-led and nurse-collaborative interventions to improve medication adherence among discharged home-dwelling older adults. The complex nurse-led and nurse-collaborative interventions retained for the study tended to improve the medication adherence to long-term medication prescriptions among home-dwelling older adults. The systemic study stated out of 1,546 records identified, 82 full-text papers were evaluated, and 14 studies were included, 11 RCTs and 2 CCTs. Overall, 2,028

patients were included (995 in intervention groups; 1,033 in usual-care groups). Interventions were nurse-led in seven studies and nurse-collaborative in seven more. In nine studies, adherence was higher in the intervention group than in the usual-care group, with the difference reaching statistical significance in eight studies.

Given the inconsistencies noted in the literature surrounding nurse-led interventions in home care, new strategies must be employed to increase elderly medication compliance rated in homecare. Telehealth practices may prove to be a strategy that can increase compliance rates, given it lacks the need for in-person implementation.

Surprisingly, as far back as 1925, telemedicine was emerging with the pioneering science fiction publisher Hugo Gernsback's vision of the "teledactyl," a device that, fifty years in the future, would allow a doctor to perform "diagnosis by radio." "Gernsback's then-futuristic invention represents the kind of innovative thinking needed in health care today to adapt to the growing population of elderly people and the looming shortage of providers" (Schwamm, 2014). As Gernsback envisioned this technology working, nurses must also envision a future with technology. Nurses must be the innovators and users of telehealth technology to assist the elderly population. Given that visiting nurses are not available to provide patient oversight daily in the person's home, visiting nurses have the opputunity to ultilize telehealth practices to incorporate tailor-made medication compliance strategies to assist the elderly as needed, which can offer more consistent oversight of the patients' management of their care.

Reasons for Medication Non-compliance

Many reasons for medication non-compliance have been stated in the literature. Sociological and psychological frameworks have afforded a greater understanding of non-

compliance associated with medicines, by suggesting that intentional non-compliance is not a deviant behavior that stems from ignorance or particular "character traits" or sociodemographic characteristics. Compliance is better conceptualized as a variable behavior, rather than a trait characteristic; most people are non-compliant some of the time (Donovan & Blake, 2002). Patients need to communicate with the visiting nurse to improve medication compliance.

Effective ways to reduce noncompliance include emphasizing personal choice and control; reassessing patients' readiness, beliefs about importance, or confidence; and sometimes backing off and joining with patients in their decisions. In effective behavioral consultation, providers encourage patients to express their concerns and use active listening techniques, such as open-ended questions, clarifications, reflective statements, and summary statements. Health care providers help their patients to be more active, brainstorm options, and consider the advantages and disadvantages of various therapeutic approaches. Collaborating and negotiating are integral to these encounters, though patients assume control over decision-making (Delamater, 2006).

The visiting nurse can further explore aspects of aging; individuals may have vision, hearing, and memory problems affecting how they take their medications (such as swallowing problems, precise identifying of the medications); and they may not be able to comply with therapy. In addition, with aging and reduced physical and mental abilities, they may need others to remind and prepare their medications for them. An individual's inability to receive, interpret, and perceive the primary information, health instructions, and services that are necessary to make a proper decision can affect non-compliance (Naghavi et al., 2019).

A low income and inability to pay health costs are another important factor. During the disease period, in addition to the main costs of treatment, other indirect costs of treatment such as transportation, residence and diet are imposed on the individual; due to these extra costs that the individual may not be able to pay, he/she, unfortunately, is forced to no longer follow the doctor's instructions (Naghavi et al., 2019). The visiting nurse must assess psychological factors, since psychosocial explanatory frameworks suggest that people often need to understand or evaluate their medicines before deciding whether to take them and may make cost- or risk-benefit choices about treatment options within their own belief and preference framework (Donovan & Blake, 2002).

Behavioral factors and motivation are other factors related to medication compliance since patients carry out a "cost-benefit" analysis of each treatment, weighing the costs and risks of each treatment against the benefits as they perceive them. The visiting nurse must be accepting of patient perceptions and the personal and social circumstances within which they live, which are crucial to their decision-making. Thus, an apparently irrational act of noncompliance (from the nurse's point of view) may be a very rational action when seen from the patient's point of view (Donovan & Blake, 2002).

Medication non-compliance in the elderly population is still more likely to occur due to the inability of the visiting nurse to visit the patients as often as she/he would like. Succesful use of telehealth technology can help the nurse to increase communication with the patient by using a telehealth device to communicate with the patient on a daily basis. Not only do these connections have a therapeutic benefit, but they are also essential to ensuring that visiting nurses

address patient needs and concerns in a way that prepares patients to successfully manage their own health (Oldenburg, 2020).

Elderly Perspectives on Taking Medications

Since elderly patients may appear to balance the benefits and disadvantages of their medications, it is important that the visiting nurse educates the elderly patient about their medications and how they are related to the disease process. The degree of information held by patients, regarding their disease and self-evaluation of the benefits of the medication, impact whether patients accept or reject their medications.

Decision-making on an ill-informed basis may be a factor leading to a reduction in adherence. Visiting nurses must be aware that adherence levels to medication regimens may be affected by potential difficulties in terms of experiencing and understanding the links between the medication and health outcomes. The elderly patient may perform their own "cost-benefit analysis" for medication use, weighing expense, perceived side effects and potential benefits (Rubin, 2007). In response to a questionnaire, researchers stated typical reasons for not taking their medications which included forgetfulness (30%), other priorities (16%), decision to omit doses (11%), lack of information (9%), and emotional factors (7%); 27% of the respondents did not provide a reason for poor adherence to a regimen. Four weeks after starting a new medication for a chronic illness, patients identified a substantial need for further information (Barber et al., 2004).

Literature has shown that the elderly population has had difficulties in the past with medication compliance. One study found that 28% of community based older adults did not keep their medication bottles closed so that they could open them, and 47% admitted that labels

on their medications were unclear and they could not read them due to poor eyesight, inability to

read English, or small writing on the label (Bevil, 1981). Studies have demonstrated that from

31% to 64% of older adults living at home have difficulty opening medication containers, with

childproof containers presenting the most difficulty (Nikolaus et al., 1996). This study is

seminal. and demonstrates that the same problems are still occurring 40 years later, stressing the

importance of the assistance of the visiting nurse to prevent medication errors.

Other studies have demonstrated that patient education and counseling by visiting nurses

over several home visits or with follow-up phone calls produces increased medication adherence

in recipients (Robbins et al., 2004). To improve medication compliance in the elderly population

in the home care setting, visiting nurses through telehealth technology can counsel, educate, and

visualize patients taking their medication and provide reassurance, enabling patients to be

successful with maintaining medication compliance. In the study, nurses stated that using

telehealth technology was like having a second set of eyes to monitor patients after hospital

discharge to ensure that medications were taken correctly. Nurses also stated that they were able

to fill visit voids due to financial restraints and the pandemic (COVID).

Controversies in the Field of Research:

The statistics are startling, but as many as half of 187 million patients in the U.S. do not

take their medications as prescribed – meaning they do not follow the intensity of the drug

regimen or continue to take their drugs through the duration of the prescription. There are a

variety of potential reasons for this, including poor communications between healthcare

providers and patients, fear of side effects, high medication costs, interaction with other

prescriptions, and simple forgetfulness (National Council on Patient Information and Education,

2013). Research has shown that medication adherence improves clinical outcomes and reduces illness, disability, and death.

Despite such findings, many people do not realize the full potential benefits of their medications. In patients who fail to adhere to prescribed medication regimens, disease management is predominantly suboptimal or ineffective, particularly in long-term conditions such as hypertension (Krousel-Wood et al., 2005).

According to the National Council on Patient Information and Education, poor medication adherence has been discussed and debated for at least three decades, but these problems have generally been overlooked as a serious public health issue and, as a result, have received little direct, systemic, or sustained intervention (National Council on Patient Information and Education, 2013). Consequently, Americans have inadequate knowledge about the significance of medication adherence as a critical element of their improved health (NCPIE, 2007). The term compliance has come into disfavor because it suggests that a person is passively following a doctor's orders, rather than actively collaborating in the treatment process. The visiting nurse is at the forefront with the ability to address medication noncompliance immediately, since she has face-to-face contact with the patient and the ability to develop a reciprocal relationship. This relationship is active in nature since the patient is educated and the nurse uses tailor-made compliance strategies to engage the patient in promotion of their health. The nurse actively collaborates with the patient where the physician may only prescribe the medication with no education on its purpose or relationship to the disease process.

Behavior changes to enhance medication adherence require different strategies for different people. Trust, hope, fear, motivation, knowledge, literacy, skills, tools, rehearsal,

reinforcement, feedback, confidence, and competence are key concepts in the literature of medication compliance (Center for Health Transformation, 2010). The problem of non-adherence often defies isolated efforts and tactics, but studies have shown that multi-disciplinary approaches work well, multiple channels work better than single channels, and a longer time horizon is more realistic than a short one. Indeed, everyone is different, and everyone changes over time (Center for Health Transformation, 2010).

Improving adherence with medication regimens can make a difference. Adherence is a complex behavioral process strongly influenced by the environment in which people live, health care provider practice, and how health care systems deliver care. Adherence is also related to people's knowledge and beliefs about their illness, motivation to manage it, confidence in their ability to engage in illness-management behaviors, and expectations regarding the outcome of treatment and the consequence of poor adherence (World Health Organization, 2003). The reviewed findings from this research will enable the visiting nurse in the home care setting to establish evidence-based research strategies that will assist patients with compliance to medication regimens. With the advantages of telehealth technology, a tailored approach with specific medication compliance strategies can assist the elderly patient to reach their full potential of health.

Barello et al. performed a review of 11 studies "to detect, categorize and synthesize findings from the literature about the application of eHealth in engaging people in their own care process (Barello et al., 2016). Development of these interventions must go beyond simply communicating remotely with patients, but this review demonstrates that patient education and the development of self-care skills can be performed using telemedicine technologies and strategies.

The Need for Visiting Nurses and Telehealth for Medication Management in the Elderly Home Care Patient

The transition from hospital to home is a particularly vulnerable time for elderly patients, and nonadherence to prescribed medication regimen after discharge from the hospital increases the risk of post discharge complications. With nearly one-fifth of hospitalized Medicare fee-for-service patients readmitted within 30 days, a heightened focus has been placed on improving the quality of the transition process to reduce costs and improve patient care (Unruh et al., 2017).

Previous studies have demonstrated significant medication-related problems at the time of discharge, including mediation discrepancies that doubled readmission rates (Coleman et al., 2005), as well as a lack of patient understanding, where 50% of patients were unable to state the name and purpose of their medications at the time of discharge (Makaryus & Friedman, 2005). One study found that over 50% of medication-related admissions were preventable, while another determined that these preventable admissions resulted in significantly longer hospital stays (Dormann et al., 2004). Forster et al. (2003) reported that one in five hospitalizations is complicated by post discharge adverse events, and 66% of these events are related to medications. Research has shown that nearly one third of home health patients may be receiving medications that can cause them to become more confused, increase their risk of falls, and result in more frequent hospitalization (Frey & Rahman, 2003). Home health care patients do not receive regular visits from nurses and therapists, and thus the opportunity exists for increased vigilance over medication use, improved screening for potential problems, and better communication with prescribers to coordinate the medical regimen and avoid harmful drug interactions (Frey & Rahman, 2003).

Additionally, 33–69% of medication-related hospital admissions in the United States are due to medication nonadherence with a resultant cost of approximately $100 billion per year (Osterberg & Blaschke, 2003). Hospitalization among older adults receiving skilled home health services continues to be prevalent. Nationally, 27% of Medicare-reimbursed home health recipients are hospitalized at some point while receiving home health services (Centers for Medicare and Medicaid Services Home Health Compare, 2012).

Visiting nurses are essential in preventing hospital readmission due to medication noncompliance. Education is a large part of medication adherence. Taking the time to explain and ensure patients understand why they are using their medication is important and improves the likelihood that they will be compliant. Visiting nurses and/or providers who utilize telemedicine and technology can guide their patients by having them engage in behaviors that increase the usage of their medications. Providers and patients can leverage technology to ensure patients are taking their medication using tracking programs and providing reports back to their healthcare provider on their usage as well as their lab results (ex: blood pressure/blood sugar), and symptoms that they experienced (Alvarez, 2020).

Visiting nurses provide a valuable service to their patients by helping them stay healthier, reducing costs, and helping them avoid hospitals and long-term care facilities (Barrett et al., 2010; Mamolen et al., 2000). Approaches that do not consider the input of these critical, yet underappreciated healthcare providers run the risk of missing valuable opportunities to reduce adverse events and improve care received at home. The experience and expertise of home care nurses have the potential to guide substantial improvements in patient safety and care at a relatively low cost. Ignoring them is not just foolish, but dangerous (Romagnoli et al., 2013).

The introduction of telehealth in the home care environment, and the expertise of the visiting nurse in constructing tailored medication compliance strategies, can prevent unnecessary rehospitalization.

Strategies That Assist the Elderly with Medication Compliance

As a visiting nurse in the home health field, many problems upon initial assessment can be found due to medications prescribed from several different physicians and prescriptions filled at multiple pharmacies, a problem called polypharmacy (Logan, 2019). Since prescriptions may be filled at several pharmacies, medication reviews conducted by the pharmacist are not possible. The Agency for Healthcare Research and Quality (AHRQ) recommends medication reconciliation, defined as the "comparison of the patient's current medication regimen against the physician's admission, transfer, and/or discharge orders to identify discrepancies," as a beginning to improving medication safety (Agency for Healthcare Research and Quality, 2019).

However, this is where visiting nurses take over to prevent rehospitalization of patients, by reconciling these medications and using telehealth technology to make this transition process safer. As a visiting nurse for a home health agency, the opportunity to do a review on prescriptions in the home is a key starting point to patient safety. Since service is often covered by Medicare benefits following a return home from the hospital setting, this systemic medication review is beneficial.

The OASIS (The Outcome and Assessment Information Set) is a statutory requirement for in home medication review required by home health agencies. The OASIS tool enables a basis for prevention from adverse medication effects as well as adherence to the appropriate medication regimen. The OASIS tool can identify potential weakness, both physical and

cognitive, that may interfere with the ability to comply with a medication regimen. OASIS is a comprehensive assessment designed to collect information on nearly 100 items related to a home care recipient's demographic information, clinical status, functional status, and service needs (Centers for Medicare and Medicaid Services-CMS, 2009).

Though healthcare practitioners cannot supervise or accompany patients through each day of the medication adherence process, healthcare practitioners can play a unique and important role providing patients a good start at implementing behavior changes. Solutions should not only help design scientifically based, proven intervention strategies, but also reduce the time and cost involved with implementing these strategies in various healthcare settings (Atreja et al., 2005).

Nursing Interventions that are Successful to Aid with Medication Non-compliance:

Frontloading of skilled nursing visits is one way home health agencies have attempted to reduce the need for readmission among this chronically ill population. Frontloading has been defined as providing 60% of the planned skilled nursing visits within the first 2 weeks of the home health episode (CMS, 2009). Frontloading of skilled nursing visits is thought to allow clinicians to identify issues early on and to intervene before a readmission is needed. Results on the benefits of frontloading are particularly beneficial for those with heart failure, decreasing readmission rates from 39.4% to 16% (Rogers et al., 2007). These findings suggest that it may be critically important to provide intense and targeted home health services to Medicare-reimbursed beneficiaries within the first 14 days of skilled home health. (O'Connor et al., 2014). The visiting nurse can prefill a medication box to help patients adhere to their medication

regimens. The nurse can observe on each visit if the medication box is emptied in the scheduled dose compartment to see if the patient has been compliant.

The complex nature of the medication compliance issue suggests that there are not likely to be any quick or simple remedies for this non-compliance problem. Making clear the link between the treatment and the illness could enhance the likelihood of a better compliance. Describing the effects of treatment could, on the other hand, significantly affect patients negatively. Better patient education, aimed at improving patients' understanding of their treatment and their doctor's instructions is suggested as compliance enhancing (Donovan, 2002).

Education is provided on medication adherence and the patient is instructed on their current medications and the potential side effects that these medications may cause. When health professionals view patient education as a process rather than a single intervention, health professionals may fear that the process will become too time-consuming. However, the process of patient education, if incorporated into daily interactions of each patient encounter, can save time by increasing patient compliance. Fewer calls or visits to the physician or pharmacist, as well as other benefits of compliance such as avoiding hospitalizations, may result if proper educational techniques are employed early in therapy (Meichenbaum & Turk, 2002).

Visiting nurses in the home care environment have the time and the opportunity to incorporate strategies that can apply to the individual patients' care needs, whether these strategies are written materials, visual aids, electronic aids, or simple verbal reminders. Green et al. conducted a quantitative review of 10 experimental studies specifically addressing educational and behavioral interventions designed to improve medication compliance (Green et al., 1984). All methods, written materials, visual aids, electronic aids, or simple verbal

reminders, with the exception of written materials used alone, were effective in significantly and substantially improving knowledge of medication use and decreasing the incidence of error.

Often the nurse in the home care setting uses pictures to indicate what each medication is used for. Research in psychology and marketing indicates that humans have a cognitive preference for picture-based, rather than text-based, information (Kripalani et al., 2004). Studies have shown that pictorial aids improve recall, comprehension, and adherence and are particularly useful for conveying timing of doses, instructions on when to take a medicine, and the importance of completing a course of therapy (Katz et al., 2006).

It is essential for health care workers including prescribers, dispensers, and nurses, to take part effectively in counseling the patients in their area. Patient education has been deemed effective in promoting the success of the healthcare system. Health professionals and nurses administer patient education in different ways. For instance, patient education is delivered through a cognitive learning process, affective process, and psychomotor learning approach. Patient education is documented to provide evidence of the process of patient compliance (Cerio, 2017).

Education can have a significant impact on adherence with medication and can help to optimize adherence when used concurrently with the provision of written instruction and telehealth use. In this regard nurses have been found to be influential in providing patient-centered medication education especially post discharge from hospital (Wolfe & Schirm, 1992). As a healthcare educator, I have created a mnemonic to assist visiting nurses when creating tailor-made strategies for medication compliance in the elderly population. By following this

mnemonic and creating strategies that address the important topics, it enables the nurse to

enhance medication compliance in the elderly population.

Figure 2

Mnemonics Help Nurses Promote Medication Adherence.

MENTOR the patient, providing guidance and reassurance about medication concerns and questions.
EDUCATE on medication trade/generic names, route, scheduled dose, and side effects.
DIRECT questions should be asked concerning medication understanding and adherence.
IDENTIFY each medication and educate patient on its purpose related to the disease process.
CONSULT physicians and pharmacists as needed.
ACCEPT patient's beliefs and leave biases behind.
TAILOR a customized medication compliance plan.
INSTRUCT patient to not share medications with others and to maintain daily compliance.
OBTAINABLE goals should be created.
NOTIFY nurse case manager if any medications are added or discontinued.
STRATEGIES should be customized to fit patient's individual needs.

Telehealth Use by Nurses

With telehealth, visiting nurses can enhance how the mnemonic MEDICATIONS is used

in the home. In one study (Hayakawa et al., 2013), a smartphone-based medication self-

management system with a real-time alert feature, showed improved medication adherence

among the participants. The system studied had two major features. First, patients' medication

history in an accurate, accessible format was stored and maintained. Second, the system provided

an electronic reminder when medications were missed. Data input included prescription data that

are read using barcodes with a smartphone camera, together with photographic images of the

medication. The system also provided real-time medication monitoring with wireless pillboxes.

Using a smartphone system was found to be acceptable to patients and supported medication

self-management (Hayakawa et al., 2013). Marek et al. evaluated health status outcomes of frail

older adults receiving a home-based support program that emphasized self-management of

medications using both care coordination and technology. Results identified home-based nurse care coordination along with the med planner device as effective in supporting participants to better clinical health status outcomes (Marek et al., 2013).

Adherence-aiding strategies have been shown to be better when combined. Utilizing the mnemonic above and incorporating (MEDICATIONS) strategies could include involvement of the patient in the negotiation of treatment goals, reduction of the complexity of the treatment regimen, tailoring the treatment to the patient's lifestyle, use of reminders, encouragement of family support, informing patients about side-effects, monitoring of adherence, and provision of feedback to the patient (Logan, 2019).

Visiting nurses play a pivotal role in the medication management process for these older adults. Considering the expense of prescription drugs in the current health-care system, a small investment in comprehensive assessment and interventions to promote accurate and safe management of medications will provide cost-effective care and improve the quality of life for older adults struggling to manage their often-complex medication regimens (Marek & Antle, 2008). The assistance of telehealth technology will only help to increase medication compliance when incorporating the above successful mnemonic strategies.

Perceptions of the Elderly Using Telehealth

Before visiting nurses apply telehealth technology to incorporate medication compliance strategies, examination of elderly patients' satisfaction with technology-enhanced interventions must be evaluated. A multitude of issues need to be examined including issues concerning the actual operation of devices (ease of use, adjustability to changing needs); perceived impact on lifestyle; impact on medication burden; sense of control and confidence in the system; perceived

impact on cost; and quality of care (Kaufman et al., 2013; Reeder et al., 2011). Reeder et al. examined ninety-six frail older adult participants who used medication dispensing devices for 12 months (Reeder et al., 2011). The ninety-six participants completed a satisfaction survey related to perceived usefulness and reliability. These results were analyzed and grouped by themes in the following areas: Ease of use, Reliability, Medication Management Assistance, Routine Task Performance, and Acceptability.

Nearly all participants perceived the medication dispensing device as very easy to use, very reliable, and helpful in the management of their medications. Eighty-four percent of participants expressed a desire to use the machine in the future. Elderly patients attributed their medication adherence and feeling of being in control over their medication regimen to their nurses' interest, friendliness, willingness to provide quality information, and ability to act as counselors (Henriques et al., 2012). The technology-enhanced medication management device in this study was an acceptable tool for older adults to manage medication in collaboration with home care nurses.

Nurses' Experience with Telehealth Use

A systemic review (Koivunen et al., 2018) synthesized the best available research evidence on nursing professionals' experiences of the facilitators and barriers to the use of online telehealth services in nursing practice. All studies were qualitative, and the methodologies used were well suited to the aims of the reviewed studies settings, home care and outpatient clinics representing, for instance, diabetes or oncology care or rehabilitation. The telehealth applications used in the studies applied videoconferencing/videophone for online connections (n = 9). In twelve studies, a special ICT application or package was used to connect to patients or clients.

Email (n = 1) and mobile phone (n = 3) use remained slight. In 15 studies, the key conclusions described mostly positive experiences of online telehealth use. The variety of applications in use causes new learning needs and it seems that the allocation of resources for the implementation is a constant problem. Despite the everyday use of ICT in personal life, nurses' attitudes towards telehealth use in nursing remains somewhat negative. Further discussion is needed among professionals on how this change will be accepted and implemented in practice.

Evaluation of visiting nurses' knowledge, values, and beliefs will add to the current evidence-based practice. Patients rely on visiting nurses to provide interaction and support when confronting medication compliance issues. Henry et al. conducted a systematic literature review to identify interpersonal health care provider (HCP) behaviors and attributes related to provider–patient interaction during care in telehealth delivery (Henry et al., 2017). Of 5,261 unique article abstracts initially identified, 338 full-text articles remained after exclusion criteria were applied and these were reviewed for eligibility.

Finally, data were extracted from 45 articles. Through qualitative synthesis of the 45 articles, it was noted that papers encompassed many disciplines and targeted care to people in many settings including home care, primary and specialist care, mental health/counseling, and multi-site teams. Interpersonal behaviors were observed identifying six themes, health care provider-based support for telehealth delivery; provider–patient interactions during the telehealth event; environmental attributes; and guidelines for education interventions or evaluation of HCP behaviors. Although unable to identify current best practices, important considerations for practice and education did emerge. These include perceptions of the utility of telehealth, differences in communication patterns such as pace and type of discourse, reliance on visual cues

by both provider and patient especially in communicating empathy and building rapport; and confidentiality and privacy in telehealth care delivery (Henry et al., 2017). This study further identifies the need to examine visiting nurses' perspectives regarding the introduction of telehealth to incorporate medication compliance strategies in the elderly population.

Gaps in the Literature

Presently, in the literature, there is no evidence to support that any strategy used to address medication compliance is better than another. When collaboration with health professionals is good and patients' treatment and care are planned together to match their normal life, patients have good adherence (Kääriäinen et al., 2013). Healthcare professionals should feel accountable for optimizing medication management among home-dwelling older adults, particularly during their transitions home from acute care settings. Implementing effective primary care management should be a priority among home dwelling older adults with multiple chronic conditions to prevent adverse health outcomes and to promote autonomy in their daily lives (Pereira et al., 2019). Additionally, findings support that when patients see overall improvement in their health, they are more likely to remain committed to taking their medication as prescribed by the provider (Vermeire et al., 2001).

The visiting nurse can incorporate a menu of compliance-enhancing strategies that are tailored to meet the elderly patient's individual needs. Therefore, we argue that if the visiting nurse creates individualized medication compliance strategies which incorporate telehealth technology to aid in consistent monitoring, compliance would be positively impacted and likely lead to cost savings for the home health agency (Alvarez, 2020).

To date, few studies have explored the knowledge, attitudes, and beliefs of visiting nurses using telehealth technology to improve medication compliance in the elderly home care population. Therefore, it is important to evaluate their knowledge, attitudes and beliefs, since they are the ones who are creating tailored medication compliance strategies for this patient population. To advance the use of telehealth technology for medication compliance, the voice of visiting nurses must be heard. Rogers's Diffusion of Innovation theory and the Knowledge-Attitude-Behavior (KAB) model will be appropriate tools to hear the voices of visiting nurses.

Figure 3
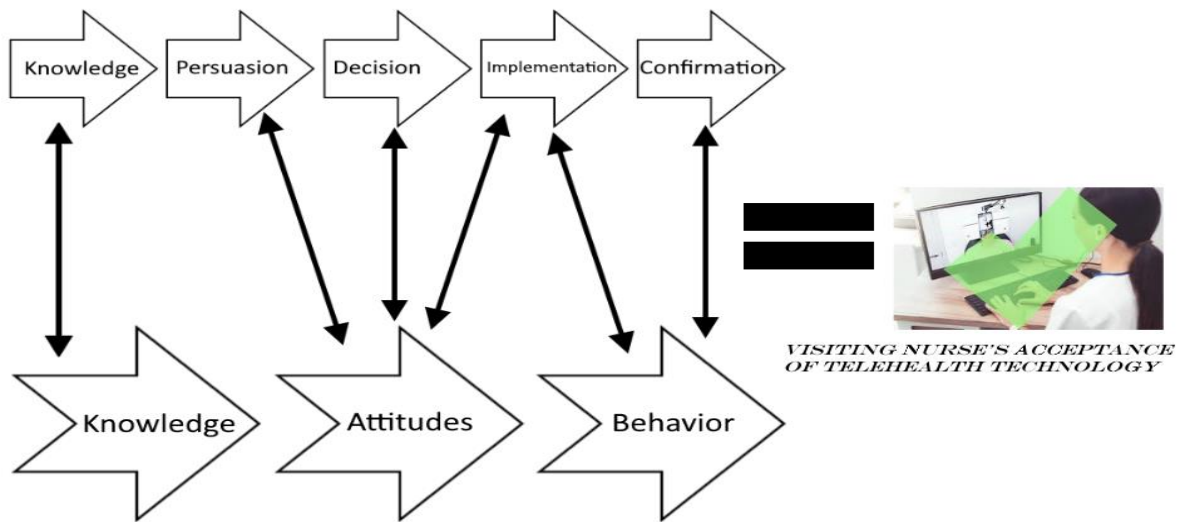
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Koivunen et al. (2018) conducted a study with the aim to synthesize the best available research evidence on nursing professionals' experiences of the facilitators and barriers to the use

of online telehealth services in nursing practice. Telehealth is used to deliver healthcare services and health-related information by means of information and communication technology (ICT). The systematic review of qualitative studies was conducted using thematic synthesis of previous studies. International electronic databases PubMed, CINAHL, Eric, Web of Science/Web of Knowledge and Scopus, and Finnish databases Medic and Ohtanen, were searched in spring 2013. In addition, the search was completed in fall 2015.

Following critical appraisal, 25 studies from 1998 to fall 2015 were reviewed and the findings were synthesized. Both facilitators and barriers were grouped into five main categories which were related to nurses' skills and attitudes, nurses' work and operations, organizational factors, and patients and technology. The highest number of facilitators and barriers was found in the category focusing on nurses' work and operations. Based on the findings, nurses' skills and attitudes are preventing factors in the implementation of telehealth. There is also a need to focus on patients' role in telehealth usage, although the findings support positive adoption of ICT tools among patients.

The findings called for further development of technological tools used in nursing practice and healthcare services. They used a critical skills appraisal program. The change from traditional face-to-face nursing to the use of telehealth calls for local agreements and further discussions among professionals on how this change will be accepted and implemented into practice. In addition, organizations need to make sure that nurses have enough resources and support for telehealth use.

<center>**Chapter III**</center>

<center>**METHODOLOGY**</center>

Research Design: A Qualitative Approach

A qualitative approach was used to collect data through individual semi-structured interviews, allowing for the voices of the visiting nurses who are employed at home health agencies that work with the elderly dwelling adult, and who use telehealth technology to advance medication compliance strategies, to be heard. The semi-structured interview gives participants ample time and scope to express their diverse views and allows the researcher to react to and follow up on emerging ideas and unfolding events (Nohl, 2009).

Sample

Criterion sampling, one of the purposeful sampling methods, was utilized to choose the group of nurses in the study. The criteria for obtaining the nurses included in the study required them to be licensed registered nurses employed by a home health agency that worked with the elderly population and utilized telehealth technology to incorporate medication compliance strategies to assist the elderly with medication noncompliance. A sample size of 15-30 visiting nurses was obtained, meeting saturation threshold (Nohl, 2009). Semi-structured interviews via teams were conducted, audiotaped, and transcribed verbatim by the primary researcher. Questions were concerning effective medication compliance strategies that theses nurses had created for their patients while using telehealth applications, and their perspectives on the use of this technology to increase medication compliance in the elderly home care patient.

Inclusion Criteria

- Licensed Professional Nurse (RN)

<center>41</center>

- RN must be employed at Home Health Agency

- RN must work with the elderly population

- Experience creating tailored medication compliance strategies for the elderly patient

- Agency must utilize telehealth technology

- 1yr or more experience in the home health field

- May be either a male or female

- Must be 18yrs or older

Exclusion Criteria:

- Not a professional nurse (RN)

- Not employed at a home health agency

- Does not work with the elderly population

- Does not have experience creating tailored medication compliance strategies for the elderly.

- Does not have 1yr or more experience working in the home health field

- Under the age of 18yrs

Interview Questions

Interview questions were created by the PI, who is a registered nurse that has worked for 24 years in the home health field assisting the elderly population with medication compliance. To establish content and face validity of the demographic and open-ended questions, an expert panel of three health-care educators, two with PHDs and one with a DNP with experience using research methods, reviewed the interview guide questions for clarity, organization and content correctness reaching 80% consensus, after two rounds of review.
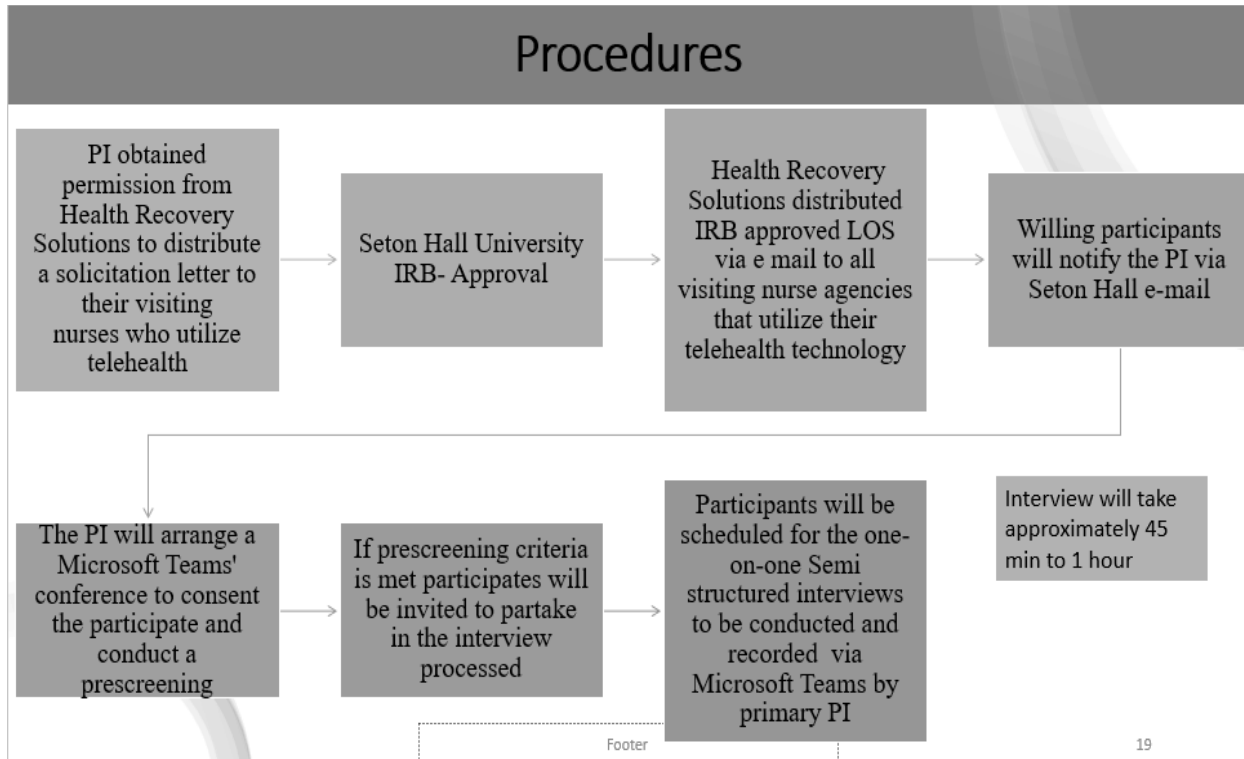
Procedures

The PI contacted Health Recovery Solutions and organized a telehealth meeting with the executive of the company and the director of nursing to explain the study and ask permission to interview nurses who met the criteria. The PI received a formal letter of support from the agency that was then included in the IRB application and submitted to the IRB at Seton Hall University. Once the study was approved by Seton Hall University IRB, Health Recovery Solutions distributed the letter of solicitation to all visiting nurses working at home health agencies in the United States that utilize Health Recovery Solutions telehealth technology. Willing potential participants contacted the PI via Seton Hall e-mail. Potential participants who completed the email pre-screening tool and were identified as meeting the inclusion criteria, were invited to partake in the interview process by the PI via email. Participants meeting inclusion criteria were scheduled for one-on-one semi-structured interviews that were conducted via Microsoft Teams by the primary PI. The interviews were audiotaped, and automatic transcription function was used. Overall, the interview was approximately 45min – 60 minutes in length. During the interview, the researcher also took notes (journal notes) which were later used to ensure transcription accuracy. Participants were reminded that breaks were allowed if they felt the need to do so. They also were informed that to protect their identity, they needed to provide a pseudonym and that they could withdraw from the study at any point.

Interview questions were clear, concise, and applicable to the field of home health care. Interview questions were open-ended. Open-ended questions allowed the participants to freely voice their experiences and minimize the influence of the researcher's attitudes and previous findings (Creswell, 2009). The first part of the interview contained demographic questions and

the second part contained questions related to the nurse's knowledge, attitudes and beliefs pertaining to telehealth use while incorporating medication compliance strategies.

Figure 4

Procedures

Procedures

| PI obtained permission from Health Recovery Solutions to distribute a solicitation letter to their visiting nurses who utilize telehealth | → | Seton Hall University IRB- Approval | → | Health Recovery Solutions distributed IRB approved LOS via e mail to all visiting nurse agencies that utilize their telehealth technology | → | Willing participants will notify the PI via Seton Hall e-mail |

| The PI will arrange a Microsoft Teams' conference to consent the participate and conduct a prescreening | → | If prescreening criteria is met participates will be invited to partake in the interview processed | → | Participants will be scheduled for the one-on-one Semi structured interviews to be conducted and recorded via Microsoft Teams by primary PI | Interview will take approximately 45 min to 1 hour |

Footer   19

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The following measures were taken by the PI to decrease potential bias:

a) Researcher ensured that questions were worded differently and that the questions were engaging throughout the interview.

b) Neutrality was maintained to not influence the participants' responses. No details were given about the company's or researchers' role or the goal of the study.

c) Researcher considered all the data obtained and analyzed it with a clear and unbiased mind.

d) Researcher continuously re-evaluated the impressions and responses and ensured that pre-existing assumptions were kept at bay.

e) Researcher considered potential bias and ordered the questions suitably.

f) General questions were asked first, before moving to specific or sensitive questions.

g) Questions were kept simple to avoid words that could have introduced bias.

h) No leading questions were asked that could have prompted the participant to respond in favor of a particular assumption.

i) Open-ended questions were created to prevent participants from simply agreeing or disagreeing or guiding him or her to provide a truthful and honest answer.

j) When the answers did not sound true the questions were asked in a different manner

k) Direct questions were used that allowed the participants to select from a range of potential choices rather than a 'Yes' or 'No' choice.

l) Questions were asked in a manner that allowed the participant to feel accepted no matter what the answer was.

m) Questions were introduced such as asking what a third party would do in a particular situation. This helped the participant to project his or her own feelings onto others and provide accurate, truthful, and more representative answers.

Data Analysis

Before the data was analyzed, the researcher transcribed all interviews and journal notes. The process of transcribing allowed the researcher to become acquainted with the data (Reissman, 1993). The researcher created Microsoft Word files for the interviews and journal notes. The researcher created a password saved in the researcher's computer for which only she has access. The researcher transcribed verbatim by hand the interview and categorized and

identified themes by color coding. To ensure accuracy, all transcripts were reviewed by PI and the committee chair.   All information shared by participants was not linked to their identity or used to identify their identity. Participants' identities remained anonymous by assigning code names and ensuring that publication or presentations from this study did not and would not mention these code names. Participants' participation in this study resulted in no risks to them personally or to the agency in which they were employed. Participation was voluntary, and participants were able to leave the study and discontinue participation at any time. Participants were also able to decline to answer any question during the interview. The study entailed a Qualitative approach; therefore, no statistical analysis was conducted.

For ease of note taking, getting all the participants input, and not slowing down the interview process, the audio recording function via Microsoft Teams was used. The recording was made and kept confidential and placed in a safe place. The investigator transcribing the interview was the only individual who had access to the Teams recording. The recording and journal notes were kept in a secure location and were destroyed when the study was completed. Data transcriptions were read and re-read, and participants names were not located anywhere on the transcriptions, only their code which identified the transcription; they were listed as P1, P2, P3, etc.

During the qualitative analysis, the PI manually decoded and encoded the responses from the interview questions using paper & pencil on hard copies to place them into categories and ultimately thematic analysis.

Coding. The data was coded manually immediately following each interview. The PI assigned emergent codes using both in vivo for unique words/language of subjects and descriptive coding to summarize a topic of a passage. Both codes worked together to bring out

the meaning and essence of the data (Creswell, 2013; Saldana, 2016). Coding involved a 2-part process: decoding to determine the core meaning of the passage and encoding that determined which code to use and label the passage. Categories and themes helped to develop the "voice" of the visiting nurses who participated in the study. Significant statements, sentences or quotes that provided an understanding of the participants' caregiving experience were highlighted and grouped into meaning units (Charmaz, 2006; Creswell, 2013; Saldana, 2013; Saldana & Omasta, 2018; Miles et al., 2014). Saturation was achieved when no new codes or themes emerged in participants' voices.

The PI's process of coding employed first, and second cycle coding practices described by Saldana (Saldana, 2016). In the first cycle coding, the PI used first order coding which is the initial coding and includes analytical memos taken. The second order coding used in vivo coding, which was obtained from direct quotes from the participants and or descriptive codes, which were phrases based upon participant statements. Intercoder agreement served as an external check during the coding process to help come to a full consensus on the themes generated. The PI established a codebook along with the transcripts that were externally checked by the committee chair. The PI and the committee chair reached consensus on the codes, categories and thematic analysis generated. Codes, categories, and thematic analysis in which the PI and committee chair did not reach consensus were collected, reviewed, and discussed and after this collaborative process, those codes in which consensus was not achieved, did not move forward in the data analysis. The PI then compared and contrasted the study's synthesized data and discussed it considering the current available literature on the topic.

CHAPTER IV

RESULTS

The qualitative study results are organized by research questions. Prior to reporting the results corresponding to the research questions, an overview of participant characteristics or prescreening information and demographic information is provided in the form. The first table represents the inclusion and exclusion requirements and the participant prescreening tool.

Table 1

Demographics

Participants	Age	Gender	Race/Ethnicity	Years Experience	Degree
P1	37YRS	Female	African American	10YRS	BSN
P2	45YRS	Female	African American	22YRS	Associate
P3	69YRS	Female	Caucasian	38YRS	BSN
P4	43YRS	Female	Caucasian	22YRS	BSN
P5	41YRS	Female	Caucasian	19YRS	BSN
P6	37YRS	Female	Caucasian	16YRS	BSN
P7	58YRS	Female	Caucasian	38YRS	MSN
P8	37YRS	Female	Caucasian	15YRS	MSN/NP
P9	39YRS	Female	Caucasian	18YRS	BSN
P10	70YRS	Female	Caucasian	42YRS	BSN

The mean age of the participants was 47.6; 100% were female, 80% Caucasian, 20% African American. When asked about years of experience, the mean was 24. Level of education varied with 70% BSN's, 20% MSN, and 1% holding an associate degree.

The results of the Qualitative study research questions and interview guide questions are listed below. Each participant was interviewed based on interview questions that were created from research question. After completion of each interview all questions were reviewed, codes were identified, codes were merged into categories, that then formed the basis for the identified themes. The right side of each table identifies the codes/categories, and the left side of each table shows the thematic analysis.

To address Research Question 1: What are home health nurses' experiences with telehealth practices to promote and manage medication compliance of community-dwelling elderly patients? The following interview guide questions were explored: IGQ1. Describe your experiences using telehealth practices to promote medication compliance of community-dwelling elderly patients? IGQ2. Can you provide an example of how you have used telehealth to incorporate medication compliance strategies for your patients? IGQ3. Do you find using telehealth to incorporate medication compliance strategies useful (yes, no, maybe)? Can you please explain your response?

Table 2 provides each participant in vivo or descriptive codes identified from their response to each interview guide question that was associated to research question 1.

Table 2

Results Research Question #1

IGQ1 Describe your experiences using telehealth practices to promote medication compliance of community-dwelling elderly patients?	IGQ2 Can you provide an example of how you have used telehealth to incorporate medication compliance strategies for your patients?	IGQ3 Do you find using telehealth to incorporate medication compliance strategies useful (yes, no, maybe)? Can you please explain your response?
P1 Cardiac patients	"I call the patient, using Bluetooth, to review medications." - Check vitals - Review medication bottle	Yes, "It allows monitoring vital signs via telehealth, changes can be made if needed since findings are discussed with me."
P2 Transplant patients	"I use a collaborative zoom meeting with patient."	Yes, "I monitor correct times medication taken; it assists patients with scheduling appointments and making referrals."
P3 Cardiac patients	"Preparing medications in a box every two weeks." "I check via telehealth to see if patients took meds." "I create reminders like written signs, color coding pill bottles, timers, alarms, and telehealth, med pre-pour boxes where the alarm will go off on to the box and it helps them to remember that at three o'clock, they have to take their Lasix."	Yes, "It allows correspondence/joint venture with pharmacy, medication administration can be monitored."
P4 Elderly	"I like making visits via Zoom and Facetime to observe taking of medication, making it, you know, filling it out their plan or so that they just have to open the top and take them explaining to them the risks and the benefits of not taking. There was some duplicate stuff. I suspected that their Lasix dose was wrong. And so, I was able to get on telehealth quickly, actually, and get it all situated."	Yes, "It addresses issues sooner to avoid problems."

IGQ1 Describe your experiences using telehealth practices to promote medication compliance of community-dwelling elderly patients?	IGQ2 Can you provide an example of how you have used telehealth to incorporate medication compliance strategies for your patients	IGQ3 Do you find using telehealth to incorporate medication compliance strategies useful (yes, no, maybe)? Can you please explain your response?
P5 Elderly	"Speaking via telehealth about medication compliance, going over written medication sheets, medication sheets and reminder card, check off lists, plans customized to patient needs, making sure they know both trade name and generic names, and of course, making things easy for them to maintain compliance."	Yes, "provides medication reconciliation."
P6 COVID	"You double check with the family. We have a medication sheet, and we will go over all the medications with them and they gave him the right Med and all that. Any questions?" "We had the charts and, we would be able to review and double check the orders for them."	Yes, "We like it; it worked out well." "Well, it made it easy, especially during COVID that we can do all this. Because of the weather, the snow we up, I live upstate and it's getting a lot of snow here in that. So, with the ice, it was quite effective that way and it was easy for the family, the nurse and the patient to use."
P7 Admissions, cardiac patients	"So, I try to have like a system where you know either we do like a grid or even the pill bottles we will put like a marker, like it might be like a day l is red and a night is blue." "I can call my patients and observe them taking their meds".	Yes, "Telehealth is like a second set of eyes eyeballing the patient every day.
P8 Elderly	"Well, with telehealth, once we, you know, speak to patients, we go through the medication list you know individually and go through all side effects of the medications and explain what medications are being prescribed for."	Yes, "I feel like it works, and it works similar like a visit, as if they were in the office. I mean, it's just as you know, with technology and being able to teach, you know, patients compliant."
P9 Elderly	"Sometimes having a second nurse involved in the telehealth reinforces for patients, the importance of certain medications." "Well, my initial review with them is one thing, using telehealth we can go over it again, the second time, that reinforcement helps them to be more compliant."	Yes. "I mean, sometimes if the patient is willing to cooperate. Umm, it helps people to have more than one review."

| P10 Elderly | "Well, I mean you use telehealth, you know, during certain times. I mean if it's bad weather, you can't get there, you can use telehealth."

"So, when you go online through telehealth and they can see you, they remember you when you were there, so they have more confidence in what you're saying to them, it helps with compliance." | Yes, "If it's a new medication I would call, get on telehealth with them maybe every other day just to be sure that they understand the med they're taking, why they're taking it and to make sure they don't have any questions about it, and they're not frightened to take it for any rea until they're used to taking it, until they get used to the medication. And they are more likely to be compliant, so yes." |

Upon reviewing the identified codes several categories emerged in the data. The categories are listed in Table 3 for each interview guide question that is associated with research question one. For IGQ1, categories that emerged ranged from specific patient populations such as cardiac, transplant and elderly patients and admissions in the home care environment to Covid pandemic increases due to inability to make frequent home visits.

For IGQ2 which asked, "Can you provide an example of how you have used telehealth to incorporate medication compliance strategies for your patients?" categories that emerged were call, reinforce, explain, and go over.

For IGQ3 which asked, "Do you find using telehealth to incorporate medication compliance strategies useful? (yes, no, maybe) Can you please explain your response?" All participants found telehealth useful with the categories of monitoring, correspondence with others, joint venture, avoiding problems, a second set of eyes and that it is just like a visit emerging.

Table 3

Categories/Themes Research Question #1

Categories	Thematic analysis
IGQ1. Describe your experiences using telehealth practices to promote medication compliance of community-dwelling elderly patients? ❖ Cardiac patients ❖ Transplant patients ❖ Covid/pandemic ❖ Elderly ❖ Admissions	❑ **Nurses utilized telehealth primarily for cardiac and transplant patients. Telehealth use increases during pandemic**
IGQ2. Can you provide an example of how you have used telehealth to incorporate medication compliance strategies for your patients? ❖ Call ❖ Explain ❖ Observe ❖ Reinforce ❖ Go over	❑ **Telehealth was seen as a tool to oversee the care of the patient and reinforce education**
IGQ3. Do you find using telehealth to incorporate medication compliance strategies useful? (yes, no, maybe)? **Can you please explain your response?** ❖ Yes ❖ Monitoring ❖ Correspondence/joint venture ❖ Avoids problems ❖ Second set of eyes ❖ Like a visit	❑ **Nurses found using telehealth to incorporate medication compliance strategies useful**

Upon review and reflection on the codes and categories that emerged from the
participants responses to IGQ1-3, the following thematic analysis is proposed to address RQ1.
Home health nurses' experiences with telehealth practices to promote and manage medication
compliance of community-dwelling elderly patients **primarily focused on** utilizing cardiac and
transplant patient, as a tool to oversee patient care and reinforce education. Telehealth utilization
increased during the COVID pandemic. Ultimately, nurses found using telehealth to incorporate
medication compliance strategies useful. In response to the question of finding telehealth useful,
all participants P1-P10 stated.

Upon review and reflection on the codes and categories that emerged from the participants responses to IGQ1-3, the following thematic analysis is proposed to address RQ1. Home health nurses' experiences with telehealth practices to promote and manage medication compliance of community-dwelling elderly patients primarily focused on utilizing cardiac and transplant patient, as a tool to oversee patient care and reinforce education. Telehealth utilization increased during the COVID pandemic. Ultimately, nurses found using telehealth to incorporate medication compliance strategies useful. In response to the question of finding telehealth useful, all participants P1-P10 stated they found telehealth to be very useful. The categories pertaining to this response were monitoring, correspondence with others, joint venture, avoids problems, a second set of eyes and that it is just like a visit. Based on these categories P3 stated, "It allows correspondence/joint venture with pharmacy, medication administration can be monitored."

Visiting nurses found telehealth to be very useful. The categories pertaining to this response were monitoring, correspondence with others, joint venture, avoids problems, a second set of eyes and that it is just like a visit. Based on these categories P3 stated, "It allows correspondence/joint venture with pharmacy, medication administration can be monitored."

To address Research Question 2: What are home health nurses' knowledge regarding the use of telehealth technology as a strategy to manage and promote medication compliance of community-dwelling elderly patients? The following interview questions were explored: IGQ1. Can you please tell me how you learned about telehealth technology? IGQ2. Tell me how you keep yourself updated with new telehealth technology? IGQ3. What do you see as the benefits of utilizing telehealth to manage and promote medication compliance of community-dwelling elderly patients, and please provide an example? IGQ4. What do you see as the benefits of utilizing telehealth overall, and please provide an example? IGQ5. What do you see as the

negative aspects of utilizing telehealth to manage and promote medication compliance of community-dwelling elderly patients, and please provide an example? IGQ6. What do you see as the negative aspects overall of using telehealth, and please provide an example?

Table #4 provides each participant in vivo or descriptive codes identified from their responses to each interview guide question that was associated to research question 2.

Table 4

Results Research Question #2

IGQ1 Can you please tell me how you learned about telehealth technology?	IGQ2 Tell me how you keep yourself updated with new telehealth technology?	IGQ3 What do you see as the benefits of utilizing telehealth to manage and promote medication compliance of community dwelling elderly patients, please provide an example?	
P1 agency "I mean, I learned about it in school, obviously, but actually working with it hands on, it put things in perspective for me."	"Well, our job provides health stream, which is like an e-learning, so they keep us up to date with any changes in the telehealth system, and I try to utilize telehealth at least, two or three times a week, to stay up to date."	"Good for patients who live alone and may have dementia or difficulty remembering." "reminds patients to take their medications." "repetition with telehealth enables patients to state what medications are for and when to take them."	
P2 "agency, doing home care case management."	CEU Requirements Certifications Meetings Keeping up to date	"I can include multiple disciplines, like pharmacy, MD, dietician, PT, OT, a magnitude of disciplines all at once." "It allows collaboration in a zoom meeting which can include the patient and family." - Managing medication	
P3 Learned at work Hands on application	Training through the agency Mandatory in-services yearly	"I feel it decreases hospitalization rates tremendously."	
P4 Agency training During the pandemic	"I rely on other nurses with experience, and word of mouth."	Maintenance of medication compliance Face to face interaction Connecting during pandemic Seeing nurse and physician Ability to talk to someone "Ability to see another person (and) their facial expressions."	

P5 During pandemic Hands on experience	Agency on the job training Emailed links from office Hands on experience	"I think it is easier for everybody, we get quicker responses for requests."
IGQ1 Can you please tell me how you learned about telehealth technology?	IGQ2 Tell me how you keep yourself updated with new telehealth technology?	IGQ3 What do you see as the benefits of utilizing telehealth to manage and promote medication compliance of community dwelling elderly patients, please provide an example?
P6 "Ah, we have an IT guy and he's on call."	"When I learn it is with the IT department, oh and we get updates every three months I would say."	It's very consistent It is easy to use
P7 At the agency Hands on	"The good thing with my company, they're very hands on with anything that's new."	"And so, the benefits of having that on program is for that especially for the elderly that they there's like a comfort blanket, a second set of eyes."
P8 "we were taught during the pandemic, we were, you know, taught at the office when we were shut down, so we learned."	At work	"Well through, you know, the telehealth we are educating the patients on how to do it for example, how to monitor their blood pressure. It's all done through camera and they're able to take their medication and adjust things as needed. You know, we're educating them as we would in person on how to take the medication and you know educating them how to monitor their blood pressure since they aren't able to come into the office due to the pandemic."
P9 "Oh through the company that I worked for; it was really the first time I had used.	"I mean, I take it as it comes as it's assigned, I request telehealth if it's appropriate and then use it."	It allows repetition A second set of eyes
P10 "Well we actually had, uh, you know, a clinic to, you know, just to test pilot the telehealth and then in-services for you know the computer aspect of it and follow up in services and you always have it's a big organization. So, you always have the opportunity to say I don't think I'm getting it you know and there's always a supervisor or somebody there that's going to give you a hand."	"Basically, through my organization that I belong to, I mean the anything new that's coming along, they're the ones that usually generate the in-services for that and we're updated pretty frequently."	"It provides reminders and visualization of patients."
IGQ4 What do you see as the benefits of utilizing telehealth overall, please provide an example?	IGQ5 What do you see as the negative aspects of utilizing telehealth to manage and promote medication compliance of community-dwelling elderly patients, please provide an example?	IGQ6 What do you see as the negative aspects overall of using telehealth, please provide an example?
P1 Decreased medication errors	"I feel it is negative if the patient does not have access to the internet, or they are not able to utilize Telehealth technology." Patient must have necessary telehealth equipment.	Poor connection with the internet "I feel if the patient is hard of hearing, they may misinterpret medication directions." Telehealth may not always be accurate due to poor connection.

P2 Financial benefits Patient support	"You must be tech savvy, have training on this technology which may be intimidating."	"I feel that you are missing touch, missing interaction, you know human touch."
P3 "I think it is fantastic, it decreases hospitalization, and it decreases patients worry/provides security.	"I feel some nurses and the elderly are not capable of using telehealth."	"It is not being used enough and I feel that doctors are not using it enough."
P4 Focuses on medication compliance issues Helps with shortage of nurse Helps with pandemic Decreases depression in patients/mental health issues Decreases social isolation Helps people connect with others Blood pressure and vitals can be monitored	Inability to physically assess patient Inability to do physical vital signs Relying on telehealth monitor Telehealth monitor may display incorrect readings Difficult for elderly	Lack of in person visits Technology barriers
P5 Cost effective Treatments not being delayed Less back and forth Less phone messages Less time delays	Elderly not computer savvy Unable to use technology Some older colleagues can't use technology	Lack of in person connection Lack of developing trust
IGQ4 What do you see as the benefits of utilizing telehealth overall, please provide an example?	IGQ5 What do you see as the negative aspects of utilizing telehealth to manage and promote medication compliance of community-dwelling elderly patients, please provide an example?	IGQ6 What do you see as the negative aspects overall of using telehealth, please provide an example?
P6 "The patients able to call us right away with their results and we were able to adjust it and tell them what to do and make sure they took the right insulin and the right one and the right dose. And we would have him show us how they drew the insulin up. So, we were on top of it like that and it worked well. And it gave the families and the residents' confidence that they had a nurse help through the whole procedure."	"The only thing I feel is that it there's always a big difference in being in person with somebody versus like going through the computer and the pictures and with seniors, they're not computer literate and it's a little harder for them to realize, you know, they're talking to somebody, to the computer. So, it's a little different thing. I always like to do things in person, but it really is a is a big help."	"I feel it saves time and money and gives the patients and family security, but it is not the same as an in person visit."
P7 "And so the benefits of having a telehealth program are that for the elderly, there's like a comfort blanket, a second set of eyes on them."	"So, I you know that's the only downfall I see about that program is that it could become neurotic and obsessed, especially if a patient who may be dealing with dementia or Alzheimer's."	"I notice is that patients, when they have to send back the equipment, they're actually sad, they feel down because now they don't have someone eyeballing them every day."
P8 "Overall, it's been beneficial, you know, during the pandemic, a lot of people are afraid to seek medical attention due to everything that's going on, so they are more compliant with, you know, follow-ups and visits.	"Well, all I have to say, you know, again we're not able to physically examine the patient also, you know, with controlled substances. You know, we're not able to directly, you know, monitor compliance."	"Like I said since I prescribe controlled substances, I would like to monitor them more closely."

P9 "Sometimes repetition is necessary to assist with compliance, especially if you're dealing with the elderly."	"Sometimes older folks don't like having more than one person involved in their care, they find it overwhelming and invasive, so it takes a bit of convincing."	"Sometimes people feel invaded, and they'd rather have in person visits, especially older folks because, you know, sometimes they're technologically not inclined and it's difficult for them. You know, they only want to see a person in person."
P10 "flexibility of knowing that, you know, she doesn't have to be right there at the patient's house, especially when you've got, you know, a roster of patients to see, and you can always be in touch with your patients face to face on telehealth. It is easier for the nurse to fit those necessary visits in and for the patient. It allows encouragement and the follow up and again most elderly well, I shouldn't say most, but many elderlies live alone, and they don't have the socialization or the support that they generally need. So, I think on both ends, it's very beneficial."	"I think that there are probably no negative aspects if you don't substitute real visitation with telehealth 100% of the time. I think it's always important to see your patients. I mean, there are other things that you might want to assess, things that when you walk right through the door, you notice that you're not going to notice if they're sitting in front of a screen."	"I'm going to go back to what I said before, if you're utilizing it as a substitute for regular visitation, you know, for a mandated visitation, then not all. Are you doing the wrong thing, but you're also cheating your patient out of a proper assessment."

Upon reviewing the identified codes several categories emerged in the data. The categories are listed in table 5 for each interview guide question that is associated with research question two. For IGQ1 categories that emerged focused on agency training such as IT department, clinics, and in-services. Nurses started using telehealth during the pandemic increasing hands on application reinforced its use as well as introduction of telehealth in nursing school.

For IGQ2 which asked, "Tell me how you keep yourself updated with telehealth technology?" Categories that emerged were agency/training, in-services, IT dept, hands on application, CEU requirements, certifications, meeting, keeping up to date, nurses with experience helping them. Upon review and reflection on the codes and categories that emerged from the participants responses to IGQ1-3, the following thematic analysis is proposed to address RQ1. Home health nurses' experiences with telehealth practices to promote and manage medication compliance of community-dwelling elderly patients primarily focused on utilizing cardiac and transplant patient, as a tool to oversee patient care and reinforce education. Telehealth utilization increased during the COVID pandemic. Ultimately, nurses found using telehealth to incorporate medication compliance strategies useful. In response to the question of finding telehealth useful,

all participants P1-P10 stated they found telehealth to be very useful. The categories pertaining to this response were monitoring, correspondence with others, joint venture, avoids problems, a second set of eyes and that it is just like a visit. Based on these categories P3 stated, "It allows correspondence/joint venture with pharmacy, medication administration can be monitored."

For IGQ3 which asked, "What do you see as the benefits of utilizing telehealth to manage and promote medication compliance of community dwelling elderly patients, please provide an example?" categories that emerged were decreased medication errors, financial benefits, patient support, decreased hospitalization, decreased patient worry, patient security, a focus on medication compliance issues, assistance with the nursing shortage, allowing visits during the pandemic, decreasing depression in the patients, decreases social isolation, enabling vital signs and weight to be monitored, providing a second set of eyes, allowing follow up, and that it is flexible and easy to use.

For IGQ4, which asked, "What do you see as the benefits of utilizing telehealth overall?" categories that emerged were decreased medication errors, financial benefits, patient support, decreased hospitalization, decreased patient worry, provides patients security, focuses on medication compliance issues, helps with the nursing shortage, helps during the pandemic, decreases depression in patients, decreases social isolation, vital signs and weight can be monitored, provides a second set of eyes, follow up, flexibility, easy, less back and forth so problems are addressed immediately, less time delays, less phone messages, and it encourages patients.

For IGQ5, "What do you see as the negative aspects of utilizing telehealth to manage and promote medication compliance of community-dwelling elderly patients, please provide an example? Categories that emerged were patients may not have internet access, the nurse and the

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patient must be tech savvy and have training on this technology, technology may intimidate, nurses do not have the inability to perform a physical assessment on patients or take vital signs, they have to rely on the telehealth monitor, the telehealth monitor may display incorrect readings, technology may be difficult for the elderly to use, the nurse is not physically present with the patient, cannot directly monitor compliance, and many people involved on telehealth conference can be overwhelming to the patient.

For IGQ6, "What do you see as the negative aspects overall of using telehealth, please provide an example? categories that emerged were poor connections with the internet, missing human touch, missing human interaction, telehealth is not being used enough by nursing agencies, telehealth is not being used enough by physicians, technology barriers, lack of developing trust with patients and telehealth is not the same as an in-person visit.

Table 5

Categories/Themes for Research Question #2

Categories	Thematic Analysis
IGQ1 Can you please tell me how you learned about telehealth technology? • Agency/training • School • Hands on application • IT department • Clinics/training • In-services • During pandemic **IGQ2 Tell me how you keep yourself updated with new telehealth technology?** • Agency/training • In-services • IT dept/training • Hands-on application • CEU Requirements • Certifications • Meetings • Keeping up to date • Nurses with experience • Word of mouth	❑ Telehealth training was offered at agency nurses worked at, clinics, IT department training and in-services. Nurses verbalized that they gained knowledge through hands on experience utilizing telehealth during the pandemic. ❑ Nurses keep themselves updated with telehealth technology during meetings held at work concerning telehealth applications and updates. Nurses with experience also helped fellow colleagues with telehealth use and positive word of mouth of acceptance and positive experiences reinforced telehealth use. ❑ Younger participants learned of telehealth technology at the University
IGQ3 What do you see as the benefits of utilizing telehealth to manage and promote medication compliance of community dwelling elderly patients, please provide an example?	

Decreased medication errors • Financial benefits • Patient support • Decreased hospitalization • Decreases patient worry • Provides patients security • Focuses on medication compliance issues • Helps with the nursing shortage • Allows visits during the pandemic • Decreases depression in patients • Decrease social isolation • Vital signs and weight can be monitored • Provides a second set of eyes • Follow up • Flexibility • Easy	❑ Visiting nurses stated that application of telehealth technology decreases medication errors, provides financial benefits, provides a sense of security and support to the patient and family and decreases hospitalization. ❑ Visiting nurses found that telehealth technology helps provide nursing visits that would have been decreased due to the nursing shortage and during the pandemic when visits were limited. ❑ Visiting nurses noted that depression and social isolation were decreased due to telehealth visits. ❑ Telehealth technology enabled monitoring of vital signs, allowed follow up, flexibility, a second set of eyes, and it was easy to use.
IGQ4 What do you see as the benefits of utilizing telehealth overall and please provide an example? • Decreased medication errors • Financial benefits • Patient support • Decreased hospitalization • Decreases patient worry • Provides patients security • Focuses on medication compliance issues • Helps with the nursing shortage • Helps during the pandemic • Decreases depression in patients • Decrease social isolation • Vital signs and weight can be monitored • Provides a second set of eyes • Follow up • Flexibility • Easy • Less back and forth problems addressed immediately • Less time delays • Less phone messages • Encourages patients	❑ Visiting nurses stated that application of telehealth technology, decreases medication errors, provides financial benefits, provides patient's a sense of security and support to the patient and family and decreases hospitalization. ❑ Visiting nurses found that telehealth technology helps provide nursing visits that would have been decreased due to the nursing shortage and during the pandemic when visits were limited. ❑ Visiting nurses noted that depression and social isolation was decreased due to telehealth visits. ❑ Telehealth technology enabled monitoring of vital signs, allowed follow up, flexibility, a second set of eyes, and it was easy to use. ❑ Visiting nurses stated that less medications errors occurred, less back and forth making phone calls, and leaving messages and that delays in time were avoided. ❑ All visiting nurses stated that the use of telehealth technology encourages patients to take control of their health needs.
IGQ5 What do you see as the negative aspects of utilizing telehealth to manage and promote medication compliance of community-dwelling elderly patients, please provide an example? • Patients may not have internet access • The nurse and the patient must be tech savvy, have training on this technology • Technology may intimidate. • Nurses have inability to perform a physical assessment on patients or take vital signs • Relying on telehealth monitor • Telehealth monitor may display incorrect readings • Technology may be difficult for the elderly • The nurse is not physically present with the patient • Cannot directly monitor compliance • Many people involved can be overwhelming to patient	❑ Telehealth access may be limited by lack of internet access or necessary telehealth equipment ❑ Nurses and patients may not be educated on telehealth technology ❑ Technology may be intimidating to nurses and patients ❑ The ability to do physical exams and assess patients is limited ❑ Inability to do vital signs manually ❑ Telehealth equipment may be faulty and display incorrect information ❑ Telehealth may involve several disciplines and be overwhelming to the patient
IGQ6 What do you see as the negative aspects overall of using telehealth, please provide an example? • Poor connections with the internet • Missing human touch • Missing human interaction • Telehealth is not being used enough by nursing agencies • Telehealth is not being used enough by physicians • Technology barriers • Lack of developing trust with patients • Not the same as in person visit	❑ Internet availability may be hindered ❑ Human touch and human interaction may be limited ❑ Telehealth visits do not provide the same quality as in person visits ❑ Nursing agencies and physicians are not using telehealth to capacity ❑ It is harder to develop a trusting relationship with patients without in person visits

Upon review and reflection of the codes and categories that emerged from the participants responses to IGQ1-6, the following thematic analysis is proposed to address research question RQ 2: Home health nurses' knowledge regarding the use of telehealth technology as a strategy to manage and promote medication compliance of community-dwelling elderly patients primarily focused on telehealth training that was offered at the agencies that nurses worked at, clinics, IT department training and in-services. Nurses verbalized that they gained knowledge through hands on experience utilizing telehealth during the pandemic. Nurses kept themselves updated with telehealth technology during meetings held at work concerning telehealth applications and updates. Nurses with experience also helped fellow colleagues with telehealth use, positive word of mouth, acceptance and positive experiences reinforced telehealth use. The younger participants learned telehealth technology in nursing school. Visiting nurses stated that the application of telehealth technology decreases medication errors, provides financial benefits, provides patient's a sense of security, support to the patient and family and decreases hospitalization. Visiting nurses found that telehealth technology enabled nursing visits that would have been decreased due to the nursing shortage and pandemic when visits were limited, Nurses noted that depression and social isolation were decreased due to telehealth visits, monitoring of vital signs was possible, telehealth allowed follow up, flexibility, a second set of eyes, and it was easy to use. Nurses stressed that less medication errors and back and forth making phone calls to MD offices and agencies helped decrease delays in time. All Participants P1-P10 stated that the use of telehealth technology encourages patients to take control of their health needs. When relating to negative aspects of using telehealth technology nurses stated that telehealth access may be limited by lack of

internet access or necessary telehealth equipment, nurses and patients may not be educated on telehealth technology, technology may be intimidating to nurses and patients, the ability to do physical exams and assess patients is limited, inability to do vital signs manually, telehealth equipment may be faulty and display incorrect information and the use of telehealth may involve several disciplines and be overwhelming to the patient. Visiting nurses P1-P10 were concerned that human touch and human interaction may be limited, telehealth visits do not provide the same quality as in person visits, nursing agencies and physicians are not using telehealth to capacity, and it is harder to develop a trusting relationship with patients without in person visits.

To address Research Question 3: What are home health nurses' attitudes regarding the use of telehealth to manage and promote medication compliance of community-dwelling elderly patients regarding using telehealth technology as a strategy? The following interview questions were explored: IGQ1. Please describe your attitude (feelings/ thoughts) towards utilizing telehealth to incorporate medication compliance strategies? IGQ2. Would you recommend this technology to the other nurses/employees at your agency? Please explain why?
Table 6 provides each participant in vivo or descriptive codes identified from their response to each interview guide question that was associated to the research question 3.

Table 6

Results Research Question #3

IGQ1 Please describe your attitude (feelings/thoughts) towards utilizing telehealth to incorporate medication compliance strategies?	IGQ2 Would you recommend this technology to the other nurses/employees at your agency?
P1 "Its very convenient and beneficial, minor issues can be solved, a good follow up and the way of the future."	Yes, "I think it is beneficial to everyone."
P2 "It is a win, win, time saver, its easy and I have never had a bad experience with it."	Yes
P3 "All I have to say is that it is awesome."	Yes, "Definitely."

P4 "I love telehealth, it helps maintain medication compliance for my patients."	Yes, "I would recommend it. It's just more convenient at times."
P5 "I love telehealth."	Yes, "With telehealth I was able to get in touch with the office. I was able to get a provider on the phone. They were able to do visit, I would because of the ability to be present at the side of your patient while you're using this technology."
P6 "I prefer to see my patients in person, but I love telehealth."	-Yes, "Well, first of all, I'm an old nurse, so I would recommend it to the young ones, I know that's what they love doing. Everything on the computer and their iPhones. So, I would recommend it and it is, you know, if it works for them, I think it's great."
P7 "I like telehealth, it gives them an incentive, it gives them autonomy and it gives them involved like that. What do they call like self-efficacy."	Yes, "Keeps me in the loop with my patients, I would because the way how the industry is, a lot of people are being referred to home care. It's like you're getting like a large influx of people coming home."
P8 "I feel that it works overall and that it is beneficial."	Yes, "I feel like it works, and it works similar as if they were in the office. I mean, it's just as you know, with technology and being able to teach, you know, patients compliant, it helps with compliance and everything with the care of the patient."
P9 "I think it is very effective and beneficial."	Yes, "On the whole, I'm fine with it. You know, anything that kind of helps to smooth things out and make things run easier for folks."
P10 "I think it's a positive. I don't think there is a negative aspect I mean; I think it is one of the best things."	Yes, it adds to the practice, it's really an important feature, it's really an asset to providing care."

Upon reviewing the identified codes several categories emerged in the data. The categories are listed in Table 7 for each interview guide question that is associated with research question three. For IGQ1, "Please describe your attitude (feelings/thoughts) towards utilizing telehealth to incorporate medication compliance strategies?" Nurses' attitudes were very positive they stated that telehealth was convenient, beneficial, effective, a good way to follow up with their patients, it promoted autonomy and self-efficacy in their patients. Telehealth was the way of the future and one of the best things in healthcare. For IGQ2 which asked, "Would you

recommend this technology to other nurses/employees at your agency? Please explain why?

Categories that emerged were that telehealth was beneficial, convenient, it's great, it works, and

they would highly recommend it. Nurses stated that it makes things run much smoother. It's an

asset to patient care, it helps patients remain compliant, it adds to the health care practice and is

an important feature in healthcare.

Table 7

Categories/Themes for Research Question #3

Categories	Thematic Analysis
IGQ1 Please describe your attitude (feelings/ thoughts) towards utilizing telehealth to incorporate medication compliance strategies? • Convenient • Beneficial • Effective • Good follow up • Way of the future • Promotes patient autonomy • Promotes patient self-efficacy • One of the best things in healthcare	❑ Visiting nurses stated that using telehealth technology makes things run much easier, adds to health care and is an important feature in the health care system. ❑ Visiting nurses agreed that telehealth technology is an asset to providing patient care
IGQ2 Would you recommend this technology to the other nurses/ employees at your agency? Please explain why? • Beneficial • Would recommend • Convenient • It's great • It works • Helps patient remain compliant • Makes things run much easier • Adds to the health care practice • Important feature in healthcare • An asset to providing patient care	❑ Visiting nurses stated that they would recommend telehealth technology because it is beneficial, convenient, great and that it works to maintain patient compliance

Upon review and reflection on the codes and categories that emerged from the participants

responses to IGQ1-1, the following thematic analysis is proposed to address RQ1. Visiting nurses

stated that using telehealth technology makes things run much easier, adds to health care and is an

important feature in the health care system. Visiting nurses agreed that telehealth technology is an

asset to providing patient care. IGQ2, "Would you recommend this technology to the other nurses/ employees at your agency? Please explain why?" All participants P1-P10 Visiting nurses stated that they would recommend telehealth technology because it is beneficial, convenient, great and that it works to maintain patient compliance.

To address Research Question 4: What are home health nurses' beliefs regarding the use of telehealth technology as a strategy to manage and promote medication compliance of community-dwelling elderly patients? The following interview guide questions were explored: IGQ1. (Results shown below in table #8)

Table 8

Results for Research Question #4

IGQ1 Can you describe your beliefs regarding the use of telehealth technology as a strategy to manage and promote medication compliance	P1 "I believe Telehealth is useful Elderly population who have difficulty remembering, it's useful if patient has no one at home to assist with medication, it decreases medication errors, and is suitable for nurses and the elderly. Overall, it's a great system and we will Continue using it since pandemic to treat and reach our patients without seeing them live." P2 "So, I believe technology does enable people to be home So, you know telehealth is it is the way of the future there's not enough medical staff to be there and there's not enough, you know, hospital beds to care for people and the financial side is also tremendous. I think it's very positive. I think that my belief is that it enables the professional caregiver to devote their time to strategy and, really, managing the care of the patient." P3 "Personally love it, provides extra security it's a good teaching tool, and there is a need to advance telehealth and a need for more Apps, a connection of telehealth system to phone." P4 "I think it is helpful, especially because then the resident is seeing their physician face to face and they're getting the instructions from them face to face, I think that it's good if they had the choice to be seen, and are able to be seen in person, then that's number one, but if they're not, this is a great way to still connect them to their different providers and be able to manage their plan of care and their medication regimens." P5 "I believe it's easier, convenient, provides flexibility, coordinates care." P6 "I believe there is a place for it." P7 "So I just feel that my belief with the whole telehealth system is that once you can get the elderly population comfortable with using technology which a lot of them are scared of, I think it will be, a benefit all of them and the nurses."

	P8 "I feel I feel that it works and well, you know that it's helpful, it assures that the elderly patient is getting help, and you are educating the family also."
	P9 "I believe it is a second set of eyes, I believe it can be helpful if the patient is receptive, it is helpful in catching medications errors and promotes medication compliance."
	P10 "I think it's just the encouragement and the follow up and again most elderly well, I shouldn't say most, but a large number of elderly live alone so it provides socialization and support for the elderly."

Upon reviewing the identified codes several categories emerged in the data. The categories are listed in table 9 for the IGQ question that is associated with the research question. For IGQ1 categories that emerged were positive in regard to telehealth use. Telehealth was found to be, useful, helpful, decreases medication errors, is suitable for nurses and elderly patients, a great system, continued use since pandemic, enables people to remain at home, telehealth is the way of the future due to limited staff and limited financial resources, it enables the professional caregiver to devote their time and strategy to manage the care of their patients, it is a good teaching tool, there is a need to advance telehealth, a need for more telehealth apps, helps to manage the plan of care and medication regimens, provides extra security, it's easier, more convenient, flexible, Coordinates care, there is a place for telehealth, its beneficial, it works well, assures that the elderly are getting health care, educates the family, a second set of eyes, promotes medication compliance, encourages patients, provides follow up, provides socialization and support to the elderly.

Table 9

Categories/Themes for Research Question #4

Categories	Thematic Analysis
IGQ1 Can you describe your beliefs regarding the use of telehealth technology as a strategy to manage and promote medication compliance • Useful • Helpful • Decreases medication errors	❑ Visiting nurses agreed that the application of telehealth technology was useful, helpful, and decreased medication errors. Visiting nurses found telehealth technology to be suitable for both nurses and elderly patients. ❑ Visiting nurses stated that since the pandemic they will continue to utilize telehealth and that it is a great system

• Is suitable for nurses and elderly patients • A great system • Continue to use it since pandemic • Enables people to remain at home • Telehealth is the way of the future due to limited staff and limited financial resources • It enables the professional caregiver to devote their time and strategy to manage the care of their patients • Good teaching tool • There is a need to advance telehealth • A need for more telehealth apps • Manages plan of care and medication regimens • Provides extra security • Easier • More convenient • Flexible • Coordinate care • There is a place for telehealth • Beneficial • It works well • It assures that the elderly are getting health care • Also educates the family • A second set of eyes • Promotes medication compliance • Encourages patient • Provides follow up • Provides socialization to the elderly • Provides support for the elderly	that enables their patients to stay at home; they feel it is the way of the future Visiting nurses state due to limited staff and financial resources it enables them to devote their time and strategy to manage the care of their patients and there is a need to advance telehealth with more apps. Nurses agree that telehealth is a good teaching tool which helps them to manage the plan of care and medication regimen of their patients ❑ Visiting nurses stated that telehealth technology is easy to use, convenient, allows flexibility and the ability to coordinate care using an interdisciplinary approach. Nurses believe there is a place for telehealth in home care and that it ensures that the elderly population is receiving assistance by providing a second set of eyes. ❑ Visiting nurses state that they are able to educate the patient as well as the family to promote medication compliance, encourage the patient and provide follow up via telehealth visits if the nurse cannot visit in person. ❑ Visiting nurses agreed that telehealth provides socialization and support to the elderly population

Upon review and reflection on the codes and categories that emerged from the participants response to IGQ1, the following thematic analysis is proposed to address RQ1. Visiting nurses agreed that the application of telehealth technology was useful, helpful, and decreased medication errors. Visiting nurses found telehealth technology to be suitable for both nurses and elderly patients. They stated that since the pandemic they will continue to utilize telehealth and that it is a great system that enables their patients to stay at home; they feel it is the way of the future, due to limited staff and financial resources it enables them to devote their time and strategy to manage the care of their patients and there is a need to advance telehealth with more apps. Nurses agree that telehealth is a good teaching tool which helps them to manage the plan of care and medication regimen of their patients, telehealth technology is easy to use, convenient, allows flexibility and the ability to coordinate care using an interdisciplinary approach. Nurses believe there is a place for telehealth in home care and that it ensures that the elderly population is receiving assistance by

providing a second set of eyes, they are able to educate the patient as well as the family to promote

medication compliance, encourage the patient and provide follow up via telehealth visits if the

nurse cannot visit in person. Visiting nurses agreed that telehealth provides socialization and

support to the elderly population.

To address Research Question 5: "How ready are home health nurses to use telehealth

technology as a strategy to manage and promote medication compliance of community-dwelling

elderly patients?" The following interview guide questions were explored: IGQ1 Describe how

prepared you feel (ready) to utilize telehealth technology to incorporate medication compliance

strategies? IGQ2. Describe ways in which you have prepared yourself to utilize telehealth?

IGQ3. Can you describe the resources you believe would be helpful to increase readiness to

utilize telehealth technology? Table 10 provides each participant in vivo or descriptive codes

identified from their responses to each interview question that was associated to research

question 5.

Table 10

Results for Research Question #5

IGQ1 Describe how prepared you feel (ready) to utilize telehealth technology to incorporate medication compliance strategies?	IGQ2 Describe ways in which you have prepared yourself to utilize telehealth?	IGQ3 Can you describe the resources you believe would be helpful to increase readiness to utilize telehealth technology?	
P1 "I feel pretty confident, I'm very tech savvy, I have been utilizing it for a while."	"I have many meetings and in-services at work."	"Conferences and training, step by step on how to use it, reaching out to IT department, promotion of technology by colleagues."	extra support from col
P2 "I feel very ready."	"In-services at work and practicing."	"YouTube videos are helpful."	
P3 "Completely comfortable, I use a lot at agency, on a daily basis."	"E-mail links offered through the agency I work at."	"In nursing school by putting telehealth education into curriculum."	

P4 "I feel confident in in using it now; it's taken some time to get used to."	"Hands on application and in-services."	"Agency training and YouTube videos."
P5 "Pretty ready, comfortable."	"At the agency that I work at, we have many in-services."	"In-services at work."
IGQ1 Describe how prepared you feel (ready) to utilize telehealth technology to incorporate medication compliance strategies?	IGQ2 Can you describe ways in which you have prepared yourself to utilize telehealth?	IGQ3 Can you describe the resources you believe would be helpful to increase readiness to utilize telehealth technology?
P6 "Well I think I am prepared."	"At the agency, meetings and training."	"IT person at agency on call and other colleagues."
P7 "Very prepared."	"In-services at work."	"On the job training and in-services."
P8 "I feel ready, have been using it for a couple years on a daily basis."	"E-mail links at work."	"Agency system updates, helping others use it, and hands-on practice and online resources."
P9 "I feel very prepared." -	"Hands on experiences, application."	"Educational e-mails sent from agency and hands on training."
P10 "I feel very prepared."	"During Covid I utilized it a lot."	"Excellent training at agency."

Upon reviewing the identified codes several categories emerged in the data. The categories are listed in table 11 for each interview guide question that is associated with research question 4. For IGQ 1 categories that emerged were that visiting nurses felt confident, comfortable and very ready to utilize telehealth.

For IGQ2 which asked, "Can you describe the ways in which you have prepared yourself to utilize telehealth?" Nurses stated that telehealth application increased during the COVID pandemic providing more hands-on application of telehealth technology. Nursing agencies provided in-services and, e-mail training links to educate nurses.,

For IGQ3, "Can you describe the resources you believe would be helpful to increase readiness to utilize telehealth technology?" Several responses included, e-learning, in-services, nurse educators, mentors and other colleagues, positive word of mouth, conferences, training on the job from the IT department, and continued promotion of technology at the agency. Outside of employment nurses found YouTube videos to be extremely helpful and younger nurses stated they learned about telehealth application in Nursing School.

Table 11

Categories/Themes for Research Question #5

/Categories	Thematic Analysis
Q1 Describe how prepared you feel (ready) to utilize telehealth technology to incorporate medication compliance strategies? • Confident • Very ready • Completely comfortable • Very prepared	❑ Visiting nurses stated that they feel confident, comfortable, prepared and very ready to utilize telehealth technology
Q2 Can you describe ways in which you have prepared yourself to utilize telehealth? • In-services • At the agency • E-mail links at work	❑ Visiting nurses stated that they received telehealth training at the agencies in which they were employed. Agencies provided in-services and e-mail links via agency e-mail that provides step by step training modules

• Hands on application • During Covid	❑ Visiting nurses stated that they had to prepare quickly through hands-on experience during the COVID pandemic.
IGQ3. Can you describe the resources you believe would be helpful to increase readiness to utilize telehealth technology? • E-learning • In-services • Nurse educator at agency • Mentor on nursing visits from agency • Word of mouth • Other nurses • Conferences • Training on the job • IT department • Support from other colleagues • Continues promotion of technology at agency • YouTube videos • In nursing school	❑ Visiting nurses stated that the agency where they were employed provided e-learning, in-services, conferences, IT department support as well as nurse educators and nurse mentors ❑ Visiting nurses mentioned that word of mouth and support of other nurse colleagues increased their confidence in utilizing telehealth ❑ Visiting nurses who were recent graduates stated that they learned about the use of telehealth technology in home care in school ❑ Visiting nurses stated that YouTube videos were also helpful to learn about telehealth technology

Upon reflection on the codes and categories that emerged from the participants responses to IGQ1-3, the following thematic analysis is proposed to address RQ1. Visiting nurses stated that they feel confident, comfortable, prepared and very ready to utilize telehealth technology.

IGQ2. "Can you describe ways in which you have prepared yourself to utilize telehealth?" Visiting nurses stated that they received telehealth training at the agencies in which they were employed. Agencies provided in-services and e-mail links via agency e-mail that provided step by step training modules. Visiting nurses stated that they had to prepare quickly through hands-on experience during the COVID pandemic.

IGQ3. "Can you describe the resources you believe would be helpful to increase readiness to utilize telehealth technology?" Visiting nurses stated that the agency where they were employed provided e-learning, in-services, conferences, IT department support as well as nurse educators and nurse mentors. Visiting nurses mentioned that word of mouth and support of other nurse colleagues increased their confidence in utilizing telehealth. Visiting nurses who were recent graduates stated that they learned about the use of telehealth technology in nursing

school. Outside of employment visiting nurses stated that YouTube videos were also helpful to learn about telehealth technology.

In conclusion, all interviews visiting nurses were very positive in using telehealth applications to manage and promote medication compliance in the home care environment for the elderly dwelling adult.

Chapter V

DISCUSSION

The Diffusion of Innovation theory (DOI) was effective as a lens through which to assess visiting nurses' knowledge, attitudes, and beliefs regarding employing telehealth technology in the home care environment to assist the elderly dwelling patient with medication management strategies. This study provided insight that visiting nurses accept telehealth technology, are supportive of its continued use, and are willing to be educated on future advancement in this technology to assist the elderly home care patient with medication compliance strategies. Visiting nurses also identified that they enjoyed utilizing telehealth technology, that it was easy to use and convenient, and that it enabled them to fill the visit void related to limited staff and financial restraints.

Based upon the work of Carl Rogers, the Diffusion of Innovation Theory states that the adoption of innovation depends upon individual characteristics and attributes. Rogers stated an "individual's perceptions or acceptance of technology predicts the rate of adoption of innovation." Rogers also noted that although there is a lot of research exploring the diffusion theory and characteristics of the adopter categories, there is a lack of research on the effects of the perceived characteristics of innovation on the rate of adoption. Rogers defined the rate of adoption as "the relative speed with which an innovation is adopted by members of a social system." Therefore, the findings of this study which evaluated the knowledge, attitudes, and beliefs of visiting nurses on their use, acceptance or rejection of telehealth application in the home care environment, showed visiting nurses agreed that telehealth use improves care in regard to medication compliance in the elderly home care population. Additionally, as nurses

began to utilize this accepted telehealth technology, they encouraged other colleagues to utilize it at the intra-level within the agency. According to Rogers, the visiting nurse was the change agent that encouraged and promoted telehealth use in the home care environment. While Rogers's Diffusion of innovation was effective as a lens to explore visiting nurses' acceptance and adaptation to telehealth technology, the Knowledge, Attitudes and Behavior (KAB) theory was instrumental in exploring the behaviors of the visiting nurses. Specifically, the KAB theory provided a lens for exploring the cognitive constructs associated with the intervention, allowing a justifiable reason for innovation acceptance. Guided by the KAB model the study findings support that behavior changed gradually and as knowledge accumulated in the health behavior domain, changes in the nurses' attitudes were initiated concerning their use of telehealth technology. Over time, as a result, a positive attitude developed and resulted in a behavioral change. The nurses' positive attitude and behavior change showed that they also encouraged and recommended other colleagues to utilize telehealth technology.

Chapter VI

CONCLUSION

The Centers for Medicare and Medicaid recognize that the discharge planning process should ensure patients and caregivers are prepared to be active partners and advocates for their healthcare and community support needs (Centers for Medicaid and Medicare Services-CMS, 2015). Adherence to medication plans in the home care setting in relation to hospital readmission is one of the many major issues among the Medicare population impacting their ability to live well at home. The lack of adherence to medication plans is also a key factor in costly hospital readmissions for the Medicare population who live independently. Recognizing that visiting nurses are in a key position to provide care after hospital discharge, which can promote medication adherence and reduce the chance of hospital readmission the findings from this study which sought to understand visiting nurses' knowledge, attitudes and beliefs regarding the innovation of telehealth to incorporate medication compliance strategies offered foundational insight that can be used to guide nursing practices in home care.

The use of telehealth technologies by visiting nurses can be used to monitor self-care, coach, and supervise elderly patients to continue to live well at home. Competent and effective utilization of telehealth technology and equipment by nurses in provision of healthcare must be the goal (Day et al., 2016).

Ensuring that visiting nurses are informed and ready to take on this role is imperative. Nursing educational programs and home health agencies must provide evidenced based educational opportunities that promote nurses' ability and confidence to utilize telehealth technology in order for it to be successful.

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Appendices

Appendix 1A: Institutional Review Board Approval

SETON HALL ||||||| UNIVERSITY
1 8 5 6

03/23/2022

Diane Logan
Seton Hall University

Re: Study ID# 2022-302

Dear Diane,

The Research Ethics Committee of the Seton Hall University Institutional Review Board reviewed and approved your research proposal entitled "Visiting Nurses' Knowledge, Attitudes and Beliefs Regarding Telehealth to Promote Medication Compliance in the Elderly Population" as resubmitted. This memo serves as official notice of the aforementioned study's approval as exempt. Enclosed for your records are the stamped original Consent Form and recruitment flyer. You can make copies of these forms for your use.

The Institutional Review Board approval of your research is valid for a one-year period from the date of this letter. During this time, any changes to the research protocol, informed consent form or study team must be reviewed and approved by the IRB prior to their implementation.

You will receive a communication from the Institutional Review Board at least 1 month prior to your expiration date requesting that you submit an Annual Progress Report to keep the study active, or a Final Review of Human Subjects Research form to close the study. In all future correspondence with the Institutional Review Board, please reference the ID# listed above.

Thank you for your cooperation.

Sincerely,

Mara Podvey

Mara C. Podvey, PhD, OTR
Associate Professor
Co-Chair, Institutional Review Board

Phyllis Hansell

Phyllis Hansell, EdD, RN, DNAP, FAAN
Professor
Co-Chair, Institutional Review Board

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Appendix 1B: Informed Consent Form

Institutional Review Board Application for a New Human Subjects Research Investigation

Informed Consent Form

Title of Research Study: Visiting Nurses' Knowledge, Attitudes and Beliefs Regarding Telehealth to Promote Medication Compliance in the Elderly Population

Principal Investigator: Diane Renee Logan MSN, RN, CSN- Doctoral Student

Department Affiliation: Department of Interprofessional Health Sciences and Healthcare Administration, PhD in Health Sciences Program, Seton Hall University

Sponsor: This research is supported by Health Recovery Solutions and Seton Hall University

Summary about this research study:
The following summary of this research study is to help you decide whether or not you want to participate in the study. You have the right to ask questions at any time.

Since home care nursing visits are limited, visiting nurses can utilize telehealth to fill the visit void and address medication noncompliance issues daily. However, nurses' knowledge, attitudes, and beliefs, regarding this innovation and their readiness to employ it may negatively impact their utilization of this strategy. Therefore, the purpose of this study is to understand, what are home health nurse's knowledge, attitudes, and beliefs, regarding employing Telehealth practices to promote medication compliance of community-dwelling elderly patients and their perception of their organizations readiness to support telehealth practices.

You will be asked to participate in an online one-on-one semi-structured interview. The PI will arrange via email a Microsoft Teams' conference meeting. Consent will be obtained via email prior to scheduling the interview. The interview will be conducted using Microsoft Teams and audio recorded only via Microsoft Teams for later transcription by the PI. The interview will take approximately 45 min to 1 hour on one day. Exploring visiting nurses' knowledge, values and beliefs organizations readiness to support the use of telehealth technology by visiting nurses will enhance the quality of life for the elderly home dwelling population. There are no primary risks to participating in the study. There are no main benefits of participation other than the positive feeling you may have from knowing that you are helping to advance knowledge specific to visiting nurses' knowledge, values and beliefs, and overall acceptance of telehealth technology.

Purpose of the research study:
You are being asked to take part in this research study because you meet the inclusion criteria, which are the following:
- licensed registered nurses employed by a home health agency that worked with the elderly population.