Are Patients Satisfied with Telehealth in Home Health Care? A Quantitative Research Study in Congestive Heart Failure Patients

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Article Information

Received date: Sep 29, 2017

Accepted date: Nov 01, 2017

Published date: Nov 06, 2017

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Keywords Aging; Chronic disease; Heart
failure; Home health; Patient satisfaction;
Recidivism; Telehealth

Abbreviations ANCOVA: Analysis of
Covariance; HCSSI - R: Home Care
Client Satisfaction Survey; TELE:
Telehealth; UHH: Usual Home Health;
U.S: United States of America

Article DOI 10.36876/smggr.1009

Abstract

Study Background: The telehealth in home health care study aimed to determine patients' satisfaction with or without the use of telehealth technology in home health care. As the population continues to age and manage chronic disease, the use of tools such as telehealth assists the home health or visiting nurse to provide the best care and education to patients. Understanding patients' perceptions regarding telehealth technologies in home care allows the practitioner to further understand one's health belief and facilitate cues to changes in health behaviors toward management of chronic disease. The results of this study provide strength for the use of telehealth in home care and potentially contribute to the demand for reimbursement of telehealth.

Methods: Patient satisfaction was examined in older adult patients with heart failure in home health care. Eighty-six participants ranging in ages 59-99 with a mean age of 80.7 (sd = 8.9), voluntarily completed a questionnaire (HCSSI-R) of fifteen items. A comparison was made between and telehealth home health services and usual home health care.

To answer the research question regarding the difference in patient satisfaction for patients using either telehealth vs. usual home health services in patients diagnosed with heart failure; an analysis of covariance, frequency distributions and descriptive statistics were completed to answer the research question.

Results: The dependent variable, total patient satisfaction score, was determined for the UHH group (n = 53), as 54.96 (sd = 5.2) and the TELE group (n = 33), as 56.94 (sd = 3.8). Furthermore, an independent t-test comparing the mean patient satisfaction scores of the UHH and TELE groups found a statistically significant difference between the two groups (t (81.469) = -1.991, p<0.05) indicating that the telehealth home health group was more satisfied. When controlling for the demographic information of age, gender, prior home health services and living alone status, there was no significant impact on the patient satisfaction score.

Conclusion: It has been proven that telehealth in home care is cost-effective and produces favorable clinical outcomes in the management of chronic disease [1-3]. This study concludes that telehealth in home health care provides for a highly satisfied home health client managing chronic disease thereby contributing to the call for use and reimbursement of telehealth in home health care.

Introduction

In an increasingly aging population, the growing prevalence of chronic disease is a consistent concern in the healthcare industry [4,5]. As healthcare resources are strained to encompass the management of chronic care, the demand for greater efficiencies also grows. As earlier hospital discharges are prompted, home health care is quietly bearing the burden of chronic disease and the elderly in the health care system. For the purposes of this study telehealth is defined as using an interactive device to transmit patient information such as blood pressure, pulse oximetry, heart rate and weight. Telehealth provides an efficient means for the home health agency to manage patient care in the presence of chronic disease. Empirical data for telehealth and the effect of chronic disease management relative to healthcare cost effectiveness demonstrates the promise of a positive impact [1,6].

It is estimated that by 2030, people over the age of 65 will comprise over 20% of the total United States (U.S.) population. The growth of this population affects all aspects of our society, and this issue of global aging significantly challenges policy makers and health care providers. Since more than 70% of these persons continue to live in the community, the provision of health care can be effectively accomplished through home health care [4,7]. Additionally, chronic conditions are considered the leading causes of illness, disability and death, accounting for much of the healthcare resources used today [4,7-9]. In the U.S. over 75% of persons over the age of 65 have at least one chronic condition [4,7]. Additionally, over 12,000 home health agencies are caring for more than 5 million patients in the U. S., contributing to the demand for efficient and effective home health care [4,7,10]. In managing chronic conditions, the delivery of care in home health recognizes that congestive heart failure is the leading cause of recidivism. The cost of re-hospitalization for geriatric

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ISSN: 2576-5434

patients continues to burden the health care system and contribute to unfavorable health outcomes for patients. This begs the question, how do medical and nursing professional's best care for patients with co-morbidities in the community setting?

Research relevant specific to heart failure and telehealth found that cost-effectiveness can be achieved in heart failure patients with the use of telehealth when compared to usual home health visits. [1]. DelliFraine and Dansky further completed a meta-analysis to determine that twenty-nine studies over the course of six years (2001-2007) demonstrated that telehealth positively affected the clinical outcome(s) of clients across different a variety of patient populations [11]. Additionally, systematic reviews specific to patients with heart failure to determine that telemonitoring is a promising strategy to provide improved clinical outcomes and cost reduction. [12,13].

Historically health care is a late adopter of information technology. Overcoming resistance to combine health information technology with medical care has been a challenge in the healthcare industry as the literature consistently demonstrates. [5,11,14-16]. Although, not currently reimbursed to home health agencies, telehealth care in home health is rewarded through improved clinical outcomes such as reduced hospitalizations and improved functional status of the patient. In the use of telehealth, the nurse is able to remotely assess critical information to monitor patients and their chronic conditions through an interactive device, thus allowing the nurse to care for more patients in the same amount of time [14].

Through the concepts of telehealth, the nurse is able to increase the number of contacts made with a single patient and increase the number of patients per day having contact with a professional nurse [2,3,17]. This is especially true of patients living in rural or remote areas, thereby improving overall home health care access. The value added service of telehealth continues to be examined in the literature, although patient satisfaction has had little attention.

The literature supports the notion that home telehealth when used as a part of coordinated, comprehensive care has demonstrated quality improvement in care, provision of care that is equal or superior to traditional home health care [1,3]. Traditionally, home health services have consisted only of part-time, intermittent home health visits to the home by a registered or licensed practical nurse. These visits consist of skilled nursing observation, assessment, implementation and evaluation of the patient's response to a medical or surgical illness or injury and this is known as Usual Home Health Care (UHH). The application of Telehealth (TELE) in home health care is considered to be a newer component of home health technology, allowing healthcare providers in a central office to monitor a patient's vital signs, medication administration and pulse oximetry [14,16]. Thus, telehealth has begun to address the issue of promoting self-care and efficiently managing life-threatening, chronic illnesses.

Use of telehealth in the home care setting is proving to be an effective method in managing resources in an aging population with a shortage of health care workers. By the nature of the service provided, home health care is consistently more cost-effective when compared to hospital care, making it a viable and efficient option. These beginning steps provide the industry of home health care the opportunity to be an active voice in the restructuring of a struggling healthcare system. As newer technologies emerge, it is the responsibility of the health care industry to ensure these applications

are not ignored for the maximum benefit of the patient and the health care provider. As home health care continues to provide care for a greater percentage of the population than in decades past, this unique and valued health care delivery system of telehealth care will need to lead the way instead of inheriting a "trickle-down" effect of a broken system.

Theoretical and Conceptual Framework

Originally introduced by the discipline of psychology in the 1950's, the Health Belief Model was adapted from the behavioral science theories to assist in the examination of health problems and related behaviors [18,19]. The Health Belief Model, is described by the explanation and prediction of a patient's health-related behavior is guided by five conditions: (1) perceived vulnerability or susceptibility to the health problem, (2) perceived seriousness of the health condition, (3) perceived barriers to the health behavior, (4) cost and benefits related to the health issue and (5) cues to action relative to behavior change [19]. This model truly frames the concept of home health care. Here, in the patient's own familiar setting, the nurse is able to observe the patient's vulnerability, perceived severity and barriers of his or her condition. As home health care continues over days, weeks or months, the benefits and costs are continually addressed as the patient works toward his or her optimal level of wellness. When the point of discharge or independent self-care arrives, cues to action are set in place to assist the patient and caregiver(s) to be self-reliant in health care needs related to chronic disease management [2].

In addition to the health belief model, the sociological perspective of symbolic interactionism completes the world view of this impact of telehealth on chronic disease management. The nature of symbolic interactionism is based on three premises: (1) human beings act toward objects based on the meanings that the objects have for them (2) the meaning of these objects arises from social interaction and (3) these meanings are interpreted through a process used by the person when dealing with the object he or she encounters [20]. The symbol of the interactive telehealth device is individualized by the meaning that each home health patient attaches to this tangible object. For this study the agencies used three different brands a telehealth monitoring device all providing the same patient information for those in the telehealth group. Vital information of the patients' health status such as blood pressure, heart rate, weight and pulse oximetry were transmitted to the home health agency through a land-line phone line on a daily basis. By using the a telehealth monitoring device to assist in self-care, a positive connotation toward the device may enhance cues to action toward managing chronic disease such as heart failure.

Purpose of the Study

The specific purpose of this research is to examine the use of telehealth in home health care as it relates to patient satisfaction of home health care for participants with heart failure. The independent variable of telehealth home health services (TELE) was compared to the control of Usual Home Health Service (UHH). The dependent variable was defined as patient satisfaction and covariates that were controlled for included: age, gender, prior home health services and living alone status.

The research question that was examined: What is the difference in patient satisfaction for patients using either telehealth vs. usual home health services in patients diagnosed with heart failure after

removing the effect of age, gender, prior home health services and living alone status? It is further postulated by the researcher that patients with TELE services are as satisfied or more satisfied with care when compared to patients receiving UHH.

Methods

In this descriptive, quasi-experimental research design, the population was patients with heart failure receiving home health care. The sample was taken from patients of independent home health agencies in rural, northeastern central Pennsylvania. Subjects were included in the study if they met the following inclusion criteria:

1. Adult client aged 18 or older with a confirmed diagnosis of (congestive) heart failure as the primary, secondary or tertiary diagnosis receiving home health care by a Medicare-certified home health agency.
2. Home environment supportive of telehealth equipment, that being electricity and operating telephone land line.
3. Cognitive ability of patient and/or primary caregiver to use telehealth equipment in the home determined by comprehensive registered nursing assessment on admission to home health services.
4. Patients were included regardless of the type or category of pay source for the said home health care services.

Participants were entered in to the study when they were discharged from home health services. The researcher made available to the agency, a supply of mailings for both the Usual Home Health Group (UHH) and the telehealth home health group (TELE), labeled accordingly on the outside and inside return envelopes as UHH for usual home health and TELE for telehealth home health care. Participants were identified by the agency and were entered into the study only once. Therefore, the sample consisted of unduplicated patients. The data collection time frame was a total of four months when the targeted number for each group was achieved. Institutional Review Board approval was granted by all participating agencies.

A participant gave consent to participate in the study by receiving a letter to participants. The definition of UHH was the provision of traditional part-time, intermittent, skilled nursing care in the residential setting measured by home health visits made by a licensed practical or registered nurse by a participating home health agency. Subsequently the definition of TELE was the use of a daily, interactive device for managing vital signs, weight, pulse oximetry, pacemakers and other signs and symptoms of chronic disease to enhance patient self-care management in addition to occasional home health visits by a licensed practical or registered nurse. The patient information gathered through the device was transmitted back to the agency where it was assessed by a registered nurse. Telehealth care was then measured by care provided by a participating home health agency as defined specifically by the agency within the parameters of the global definition of telehealth [1,21]. If the participant had experienced both types of care during the home health admission, the participant was included in the group for which he or she received the majority of the care as determined by the home health agency.

A questionnaire was used to determine the difference in patient satisfaction scores between patients using usual home health care or telehealth home health care. There were two questionnaire instruments

for this study including the first instrument of four self-report, demographic questions of: age, gender, prior home health services and living alone. As these were just four demographic questions, there was no established psychometrics for these questions. The second instrument consisted of the questionnaire known and documented as the Home Care Client Satisfaction Survey (HCSSI-R) developed specifically for home health care [22]. This tool is a measurement of client satisfaction with home health services through a five point Likert scale for questions 1-12. The answers include the following choices: Very satisfied, satisfied, uncertain, dissatisfied and very dissatisfied [22-24]. Questions 13-15 are answered on a scale of 1-10 reflecting the patient's perception of being very satisfied (1) or very dissatisfied (10). For the purposes of this research, only the first 12 questions were used with permission by the author of the instrument. Reliability and validity has been shown for this tool as a reliability of 0.59 and a validity of 0.37 [24]. Although, the validity of the HCSSI-R is not strongly represented, it is the only tool that has been used and/or tested specifically in the home health discipline. Therefore, additional content validity was established through a review of the instrument by two professional home health care consultants. By using the two tools as described above, patient satisfaction with home health services and demographics were collected. Analysis was completed using the computer analysis data program of SPSS 19.0.

At the time of the patient's discharge from home health services, the agency addressed the envelopes and completed the mailing of the letter to the participants and questionnaire to the potential participant. This was completed within one week from the time of discharge. A follow-up phone call was completed by the agency to the potential participant within to the patient 7-10 days after discharge as a reminder to complete the survey. When the researcher received the questionnaires, they were labeled on the return envelope as UHH for usual home health and TELE for telehealth home health and sorted accordingly for data entry and analysis, thus questionnaire were anonymous to the researcher.

Results

Results were examined using the Analysis of Covariance (ANCOVA). Further analysis of frequencies and description was used to analyze the demographic data.

A total of 176 surveys were sent and a total of 86 returned for a total response rate of 48.8% as shown in table one. Within the Usual Home Health (UHH) group there were 110 surveys sent and 53 returned for a response rate of 48.2% and the Telehealth (TELE) group demonstrated a response rate of 50% with 66 surveys being sent and 33 surveys returned. Overall, the response rate was favorable and consistent in both groups and overall total response as shown in table 1. The total response rate per agency ranged from 41.6% to 57.5%.

All research participants were recently discharged home health clients that had received home health care either by UHH or TELE care. All participants were identified to have heart failure as a primary, secondary or tertiary diagnosis for home health care. The total mean age was 80.7 (sd = 8.9), while the median was 82 with an age range of 59-99 years. For the respective groups of UHH (n = 53) and TELE (n = 33), the mean age was 80 (sd = 5.3), while the median was 82 with an age range of 61-99 in the UHH group. In the TELE group, the mean age was 79.3 (sd = 4.2) with a median of 81 and an age range of

Table 1: Response Rate of All Questionnaires.

	Usual Home Health (UHH)	Telehealth (TELE)	Total
Surveys Sent	110	66	176
Surveys Returned	53	33	86
Response Rate	48.2%	50%	48.8%

59-94. The majority of all participants were female 59.3% (n = 51) and males represented 37.2% (n = 32). The majority of total participants had received prior home health services (68.6%, n = 59) but did not live alone (52.3%, n = 45) as demonstrated in table 2.

In the UHH and TELE groups, the percentage of respondents were consistent, having more female respondents than male respondents. Additionally, for those having prior home health experience the response was yes for both the UHH and TELE groups making this consistent with the overall responses. Living alone status was more equally balanced throughout the UHH and TELE groups. Therefore, the overall profile of the majority of respondents was a female who had had a prior home health experience who may or may not have lived alone. This profile was represented equally for the UHH and TELE groups.

In order to determine statistical significance among the demographic variables, a total of three chi-square tests were conducted to examine the gender, prior home health experience and living alone status. No significant relationship was found for gender ($\chi^2(22) = 0.759$, $p > 0.05$); prior home health ($\chi^2(27) = 0.653$, $p > 0.05$); or living alone status ($\chi^2(21) = 0.949$, $p > 0.05$).

To answer the research question frequency distributions were initially performed to clearly describe the data specific to the HCCSI questionnaire. The Analysis of Covariance (ANCOVA) then examined the question of patient satisfaction. The significance level established to be $p < (or\ equal\ to) 0.05$. Participants were overwhelmingly satisfied with services.

For all participants, the questions demonstrating the most satisfaction were in the specific areas of: question four, respect shown by staff (q 4); question ten, staff's response to concerns (q 10) and

Table 2: Demographic Information of Respondents.

	UHH		TELE		Total	
	n	(%)	n	(%)	n	(%)
Gender						
Male	19	-37.30%	13	-40.60%	32	-38.50%
Female	32	-62.70%	19	-59.40%	51	-61.50%
Total	51		32		83	-100%
Prior Home Health Experience						
Yes	37	-75.50%	22	-71%	59	-73.80%
No	12	-24.50%	9	-29%	21	-26.20%
Total	49		31		80	-100%
Living Alone Status						
Yes	24	-46.10%	15	-46.80%	39	-46.40%
No	28	-53.80%	17	-53.10%	45	-53.60%
Total	52		32		84	-100%

question twelve, having the same staff consistently (q 12). This demonstrated a frequency of 78% (n = 67) respondents answering very satisfied or satisfied for total participants. In the area of dissatisfied or very dissatisfied, there were only two responses (n = 2) representing 2% of the participants. The areas were: question 11, scheduling care at times you wanted (q 11) and question 12, having the same people consistently (q 12). This is shown in Appendix A.

The most satisfied responses for the UHH group were in the areas of: question four, respect shown by staff (q 4); question five, staff's knowledge of the patient's health problems (q 5) and question ten, staff's response to patients' concerns (q 10). There was a consistent number of participants in the UHH group that answered very satisfied or satisfied to all questions representing 80% (n = 69) of the respondents. In the area of dissatisfied or very dissatisfied, there were only two responses (n = 2) as indicated above in the total responses. It is noted that both of the above responses for dissatisfaction came from the UHH group. However, it is also noted that in the category of uncertainty for the UHH group, 15 of the total 17 responses came from the UHH participants, making the UHH group the least satisfied overall as shown in Appendix B.

In the TELE group, the most satisfied responses were in the areas of: question 4, respect shown by staff (q 4); question three, dependability of staff (q 3) and question 12, having the same people consistently (q 12). There were 94% (n = 31) of participants in the TELE that indicated being very satisfied or satisfied in these respective areas. In the areas of uncertainty, the TELE group had only 2 responses for a total of 6% (n = 2) in this category. There were no responses in the areas of dissatisfied or very dissatisfied for the TELE group. Overall, it is clear to see as shown in Appendix C, the areas of importance for patients in home health care as respect shown my staff and staff's response to concerns especially in the UHH group. There were no responses in the category of very dissatisfied among the participants.

The dependent variable, total patient satisfaction score, was calculated using reverse scoring for all satisfaction questions, such that the higher the number, the greater the satisfaction and a lower number indicated dissatisfaction. The mean, total patient satisfaction score (n = 86) on the HCCSI -R questionnaire was 55.72 (sd = 4.8), with a median of 58 and a range of 40-60. For each of the two groups, UHH and TELE, the patient satisfaction score was determined also. For the UHH group (n = 53), the mean satisfaction score was 54.96 (sd = 5.2) and the median was 57 with a range of 40-60. For the TELE group (n = 33), the mean satisfaction score was 56.94 (sd = 3.8), with a median of 58 and a range of 47-60. The Z scores for total patient satisfaction demonstrated that all scores were within three standard deviations for the UHH

(-2.83/+0.95) and TELE (-2.55/+0.78) groups respectively, giving further support to the normality of the dependent variable, patient satisfaction.

The main effect of patient satisfaction was significant ($F(1.69) = 4.257$, $p < 0.05$), with TELE having a significantly higher patient satisfaction score. Co-variables, age ($F(1.69) = .372$, $p > 0.05$), gender ($F(1.69) = 3.578$, $p > 0.05$), prior home health experience ($F(1.69) = 1.195$, $p > 0.05$) and living alone status ($F(1.69) = 2.526$, $p > 0.05$), were not significant related to patient satisfaction. The effect size was 0.058 indicating a moderate effect size.

Since the analysis of covariance produced non-significant results relative to the covariates, an independent samples t-test was completed to examine patient satisfaction based on the groups (UHH and TELE). An independent t-test comparing the mean patient satisfaction scores of the UHH and TELE groups found a significant difference between the two groups ($t(81.469) = -1.991, p < 0.05$). The mean of the UHH group was significantly lower ($m = 54.96, sd = 5.2$) than the mean of the TELE group ($m = 56.94, sd = 3.8$). Reliability was conducted for the HCSSI using Chronbach's alpha demonstrating the reliability coefficient as 0.94.

Supplemental analysis was conducted on gender relative to the dependent variable, patient satisfaction. It was noted that the significance level for this covariate was 0.57, the closest of all covariates to a significant level. A t-test showed that by Levene's test for equality, that equal variances could be assumed and the significance was 0.131, demonstrating that gender ($n = 51$) with a mean satisfaction score of 56.31 ($sd = 4.48$) was not significant in relation to patient satisfaction.

Since three different agencies were utilized in the study and contributed to the participants or sample, a chi-square test of independence was used to examine a possible relationship of three agencies to the groups (UHH and TELE). A significant interaction was found ($\chi^2(2) = 0.000, p < 0.05$) in that Agency 2 had a higher percentage of satisfied participants in the TELE group compared to the other two agencies (Agency 1 and 3). Upon further analysis, using the results of the ANCOVA, no co-variate was statistically significant as was expected, due to no significance found in the chi-square test of independence results reported in the demographic section. However, the results of the above chi-square test of independence related to the relationship of agencies to the groups (UHH and TELE) prompted a last ANCOVA with the groups of UHH and TELE as a fixed factor utilizing the agency as a co-variate and the total satisfaction score as the dependent variable. This revealed that the main effect for agency was not significant ($F(1.83) = 0.536$).

Study limitations that were identified in this research were the descriptive, quasi-experimental design with convenience sampling inhibiting the ability to generalize the findings to a larger population. This design did not support a cause and effect relationship for the findings.

Conclusion

As one of the largest generations, the baby boom generation, entered the Medicare eligible age group in 2011. These persons with chronic disease will consume more and more of the total health care dollars spent in the United States [5,9,15]. In addition to taxing the health care system, there is shortage of nurses in supply to meet this demand. Implementation of telehealth devices is not reimbursed and therefore the cost of using this technology for the benefit of patient care must be absorbed solely by the agency [21]. The benefit of telehealth is practically recognized by agencies and administrators of home health care but the value must be proven to health insurers in order to use this technology to its greatest benefit in managing chronic disease for an aging population.

The specific diagnosis of heart failure was chosen for this study due to the high rate of re-hospitalization and thus the high cost of care associated to this disease. It has been well documented that the high prevalence rate of heart failure combined with high cost care

and poor self-management create a challenging issue especially in persons living in the community [1,17,25]. By applying evidence-based knowledge to home health care delivery, the use of telehealth in home care demonstrates the patient's comfort level with using an electronic device when the nurse cannot be there.

In the examination of patient satisfaction, one is able to gain insight toward patients' perception of a telemonitoring device to symbolic interactionism and theorize that telehealth care is not a barrier to a patient's comfort level with home care services. This goes beyond the traditional methodology of basic patient education and uses the object of telemonitoring as an external influence to promote positive health behaviors toward the management of heart failure. Within the philosophy of working smarter and not harder or doing more with less, this appears to be a valuable pursuit.

Although patient satisfaction is a common variable in health care, it has not been researched in relation to comparing these two types of health care delivery in the area of home health. The comparison of cost-effectiveness and clinical outcomes has been minimally researched by comparing usual home health and telehealth care, but patient satisfaction has not been included as a variable. Therefore, this study aimed to explore patient satisfaction in this unique population. It was hypothesized that patients receiving telehealth care would be as satisfied or more satisfied with their home health care. Although the sample was small, there was a statistically significant difference in patient satisfaction when comparing telehealth to usual home health care supporting the hypothesis.

This research focused on a basic premise of a unique application of technology to an age-old practice of the visiting nurse. The finding of a significant difference in patient satisfaction in telehealth compared to usual home health care is another important piece of the puzzle in caring for individuals with chronic disease. In an aging population and a broken health care system, the practical cost of investing in newer technologies in relation to the benefit of the efficiency of using a telehealth system appears an obvious solution. By allowing a home health nurse to effectively manage potentially more patients with improved patient satisfaction the home health industry moves forward in the battle of doing more with less. This investigation of patient satisfaction reinforces the importance of taking action in the home health industry to use telehealth as a reimbursable service and case management tool.

Acknowledgement

The researcher wishes to thank the home health agencies who participated in this study. There was no grant funding for this research.

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