

Traditional Versus Telenursing Outpatient Management of Patients With Cancer With New Ostomies

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Purpose/Objectives: To measure the impact of telenursing on patients discharged with ostomies resulting from cancer treatment.

Design: Quasi-experimental design with surveys.

Setting: Large tertiary care center in the southwestern United States.

Sample: 28 patients with cancer in two groups: traditional home health and home health plus telenursing.

Methods: Recorded the number of home health and telenursing contacts, dates when ostomy self-care needs were met, supplies used, and distance traveled. Patients completed a satisfaction survey and Maklebust's Ostomy Adjustment Scale.

Main Research Variables: Type of care, costs, patient satisfaction, ostomy adjustment, and time to achieve ostomy self-care.

Findings: Telenursing patients indicated higher satisfaction. The home health group averaged one more home health visit per patient (telenursing \bar{X} = three visits). Overall costs for both types of visits were about equal. The home health group used an average of four more pouches per patient, with increased cost of \$52 per patient. Telenursing patients believed that nurses had increased understanding of their problems, and they were more comfortable with what nurses told them about ostomy. Telenursing participants believed that telenursing made care more accessible; they preferred telemedicine rather than waiting for face-to-face visits but still believed that face-to-face visits were best.

Conclusions: Combining traditional home health and telenursing is feasible for supporting discharged patients with new ostomies and enhances traditional home health, resulting in increased satisfaction overall.

Implications for Nursing: Oncology nurses should develop telenursing programs that include patient and family education regarding oncology issues.

Key Points . . .

- Patients with cancer with new ostomies have special needs that should be met.
- Once patients are discharged from the hospital, gaps can occur in the continuum of care.
- Telenursing is one program that provides clinical nurse specialist care via telecommunications to patients in the home.

cal hospital stay. In the diagnosis-related group, the colostomy length of stay (LOS) decreased to 5.8 days in 2003 from 7.6 days in 1995, and the urostomy LOS decreased to 6.4 days in 2003 from 9.7 days in 1995 (Hart & Schmidt, 2003; Lorenz, 1995). The shorter hospital stay reduces the amount of time that patients and their families have to become proficient in self-care, resulting in increased patient visits for education and support after discharge. Patients may need to travel long distances for these visits.

Nurses who specialize in ostomy care are extremely important to the continuum of care for patients with ostomies and their families. Rolstad (1987) and Doughty (1992, 2001) described the role of the enterostomal therapy (ET) nurse as determining the proper equipment, educating patients and family members, and providing supportive counseling, including adaptation (Hedrick, 1987). This spectrum of activity cannot be accomplished during a patient's hospital stay. ET nurses are integral to patients' follow-up care and education. Orem's

Patients with new ostomies resulting from treatment for a cancer diagnosis have special needs. Patients must adjust not only to the cancer diagnosis but also to a colostomy or urostomy (Broгна, 1985; Grant, Padilla, Presant, Lipsett, & Runa, 1983; Haas, 1999; Jenks, Morin, & Tomaselli, 1997; Kleinpell-Nowell & Weiner, 1999; Reilly, 1994). Patient education outcomes include the ability to perform self-care, the return to previous activities performed prior to surgery, and support for emotional adjustment. New psychomotor skills also must be learned so that patients are able to care for the ostomy. In addition, patients express anxiety and stress caused by a changed body image perception and are concerned about acceptance by their family, friends, and society.

In the changing healthcare environment, patients with new ostomies are being discharged earlier after their initial surgi-

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theory of self-care (Hartweg, 1991) identifies the process used by patients to ultimately achieve self-care. Orem's theory describes the role of nurses as assisting patients from dependence to independence. Nurses begin by providing total care and conclude at an educative and supportive level. Telemedicine technology improves patient access to such nursing specialists. Previous studies have shown that telemedicine is an effective mechanism to ensure continuity of care (Allen, 1998; Callahan, Hilty, & Nesbitt, 1998; Hornick & Kline, 1997; Ziegler, 1995). Telemedicine offers several advantages: improved access to healthcare in rural areas, fewer trips to the clinic, and increased accessibility to specialists. Vesmarovich, Walker, Hauber, Temkin, and Burns (1999) used telemedicine to successfully manage pressure ulcers in patients with spinal cord injury.

Literature Review

No studies were found in the literature about the use of telemedicine or telehealth with patients with new ostomies. Articles were found on the definition of telehealth and how it relates to cost, quality, patient satisfaction, advanced practice nurses, and oncology. Bashshur (1995) defined telemedicine as "the use of telecommunications and information technologies to share and to maintain patient health information and to provide clinical care and health education to patients and professionals when distance separates the participants" (p. 21). Telehealth is a term at times used interchangeably with telemedicine. Some may make a slight distinction and refer to telehealth as less direct patient care (e.g., education), whereas telemedicine deals with direct patient care. Telenursing uses telecommunication provided by nurses. Home-based telemedicine, or telehomecare, uses telecommunication technology to move the point of care to patients' homes.

Healthcare use and cost are projected to increase as the population ages. Benefits of home-based telemedicine include decreased cost, increased healthcare access, increased privacy, and promotion of wellness and greater self-management (Bauer, 2001). Impediments to home-based telehealth include inflexibility of cultural change, lack of data, and lack of reimbursement. Harris (1999) estimated that 40% of in-home nurse visits could be replaced by telehealth nurse visits. This would enhance home health nurses' efficacy, allowing for 25 telenursing visits instead of 5–6 in-person visits. A telenursing visit for an uncomplicated patient can be completed in 15–20 minutes. Shaul (2000) demonstrated that an increased number of home health nursing visits during the first two weeks of home care reduced the incidence of rehospitalization. The average cost for a home health visit is \$90 versus \$20–\$30 for a telehome visit (Wheeler, 1998). A Kaiser Permanente pilot study indicated that telehealth was a dependable option for care (Johnston, Wheeler, & Deuser, 1997). The average telenursing visit was cost effective and time efficient, with the average traditional home health visit lasting 45 minutes and the average telenursing visit lasting 18 minutes—a 60% reduction over on-site visits. These assessments do not include the savings attributed to nurses' travel time. Satisfaction was positive with telehealth (Johnston et al.).

Telehomecare is one way of providing care to patients at home (Williams, Williams, & Doolittle, 1999). Patient information can be transmitted over ordinary phone lines to healthcare providers to monitor, assess, and provide care. Dansky, Palmer,

Shea, and Bowles (2001) showed that the telehealth group costs were lower than the control group. This supported the Kaiser Permanente study done by Johnston et al. (1997). Telehealth moves data, not people, which enhances quality of life and efficiency of care. Timely data retrieval, especially detecting early warning signs, can assist in the initiation of therapeutic interventions and decrease the cost of hospital or emergency room visits (Bondmass, 1997). Telehomecare has helped certain patients to maintain their independence and remain at home. The monitor used in telenursing gives physicians or nurse specialists access to detailed reports, graphs on vital signs, glucose readings, telemetry strips, and blood oxygen levels. Savings with telehomecare are a result of decreased travel, increased nurse productivity, decreased use of emergency rooms and ambulance services, and early intervention (Wilver, 2001).

A Texas homecare agency piloted a telehomecare project that combined video visits and face-to-face visits. The project estimated that telehomecare has the potential to cut costs by as much as 50% (Tanner, 1997). Telehomecare can improve access to health care for patients in rural and urban areas (Short & Saidon, 1998). Clinical nurse specialists (CNSs) can provide specialized care via home health telenursing. CNSs can ease the challenges brought on by shorter hospital stays, high patient acuity, and transitioning patient care to the home. They can develop innovative ways to deliver customized patient care in many different settings (Monturo, 2003). In one study, a wound CNS evaluated and coordinated care of patients with chronic wounds via telemedicine. The study showed improved healing rates and times, decreased number of home health visits, and decreased number of hospitalizations. The use of advance practice nurses (APNs) can increase quality of care, promote efficient use of resources, and decrease cost of care, but home health agencies may not have access to CNSs (Kobza & Scheurich, 2000). APN-centered discharge planning and homecare interventions promote positive outcomes and reduce costs (Naylor et al., 1999). Patients are satisfied with the care provided by CNSs (Graham, 2002). Telehealth can assist CNSs to reach new patients and provide expertise that is needed in the home (Hoyman, 2001).

Patient education is extremely important, especially to patients with new ostomies. Patients and family members need to learn how to change the ostomy pouch and how to live with an ostomy. Having a new ostomy is compounded by a diagnosis of cancer. Use of electronic modes of patient education has increased. Many cancer centers are developing computerized tools to meet patient needs. Patients who are well informed are likely to work better with the team and have greater overall satisfaction (Stewart, Hawkins, & Gustafson, 2001). Educated patients understand the role of multidisciplinary treatment and are comfortable participating in every aspect of care. Patients and family members must have time to ask questions and voice their concerns (Stewart et al.). Telehealth can facilitate patient and family education and follow-up.

Patient satisfaction with telenursing has been evaluated. Patients stated that advantages to telemedicine include reduced appointment times, improved access to care, reduced travel time, and reduced costs. Some disadvantages to telemedicine are nervousness about the use of new technology, difficulty communicating to healthcare providers via television systems, and an experience of emotional distance between patients and providers. Overall, studies have shown that patients were satisfied with telemedicine. Given the choice between

a telemedicine visit and a face-to-face visit, most patients preferred a face-to-face visit, as long as they did not have to wait days for that visit (Whitten & Mair, 2000).

The purpose of this study was to examine telenursing in the context of patients with cancer whose treatment required creating an ostomy. Specifically cost, patient satisfaction, patient adjustment, and self-care were examined in a telenursing program involving a CNS.

Methods

Selection of Subjects

A CNS in ostomy management assessed a convenience sample of 28 subjects with ostomies resulting from treatment for a cancer diagnosis. All subjects were 18 years of age or older, were able to read and write in English, and had a permanent ostomy. All subjects needed to have a working phone line in their residence to be included in the study. All subjects had their surgery in and were discharged from a southwestern university teaching hospital.

After discharge from the hospital, patients were assigned to one of two groups: (a) home health visits only or (b) home health plus telenursing contact. The home health group received home health visitation by a nurse who continued evaluation and education according to current management protocols. The ET nurse was available for consultation as needed. The telenursing group received twice weekly contacts by an ostomy CNS until patients or family members were competent with the care of the ostomy. All patients in the telenursing management group were supplied with a home health 8" x 8" monitor and equipment for connecting to a television. Instructions and a demonstration regarding the equipment were done with the patient and family either prior to discharge or in their home after discharge, whichever was easier for the patient. A test run was performed with the patient to confirm the connection. Patients in the home health plus telenursing group had home health nursing visits as per routine plus twice-weekly telenursing visits.

Data were collected on the number of traditional home health visits and telenursing contacts, dates when ostomy self-care needs were met, and amount of supplies used. Each patient completed a six-week follow-up satisfaction survey regarding each type of visit. At three months the patients completed the Maklebust (1985) Ostomy-Adjustment Scale Survey.

Description of Instruments

The **satisfaction surveys** were mailed to patients five to six weeks after discharge. The satisfaction surveys were designed to evaluate how satisfied subjects were with home health and/or telenursing visits. The subjects were asked to use a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). The telemedicine department developed the telenursing satisfaction survey. The home health satisfaction survey was developed and the questions were similar to the telenursing questions, but the term "home health" was substituted. The telemedicine department gave consent to use its tool.

Maklebust's (1985) **Ostomy Adjustment Scale** was used and mailed to patients three months after discharge from the hospital. This scale tests the social readjustment of patients with ostomies. Maklebust tested the scale for validity and reliability. Five expert ostomy nurses tested the validity. The tool consists of questions about demographics and 18 ques-

tions about readjustment after having an ostomy, which were rated on a Likert scale ranging from 1 (strongly agree) to 7 (strongly disagree). The first 12 demographic questions were filled out in the hospital by the CNS. A few additional questions on demographics and the 18 questions on readjustment were mailed to the patient three months after discharge.

Data Collection

The proposal for this study was approved by the human subjects committee at the affiliated university and hospital prior to data collection. The subjects gave consent prior to any data collection. A standardized educational program was developed so that the subjects received the same educational materials and teaching while in the hospital. Three ostomy experts provided education in the hospital and follow-up education for the subjects in the telenursing group.

Analysis

Correlation, descriptive, and inferential techniques were used to analyze the data. A chi-square test was used for comparing the various demographic variables, the satisfaction survey, and the adjustment survey. A t test was used to analyze the cost data.

Findings

Sample

Twenty-eight patients were included in the sample. Fourteen subjects (11 urostomy and 3 colostomy) comprised the home health group, and 14 subjects (7 urostomy and 7 colostomy) were in the telenursing group. Sixty-eight percent of the subjects were male (12 home health, 7 telenursing), and 32% were female (2 home health, 7 telenursing). The average age was 66.5 years, with a standard deviation (SD) of 9.68 years. Eighty-nine percent of the subjects were Caucasian, 7% were Hispanic, and 4% were African American (see Table 1). No statistically significant differences were evident between the two groups.

Sixty-four percent had surgery for bladder cancer (11 home health, 7 telenursing), 32% for colorectal cancer (3 home

Table 1. Patient Demographics

Variable	Home Health n	Telenursing n	Overall %
Education			
Some college education	8	8	55
Some high school education	3	4	26
Grade school	3	2	19
Marital status			
Married	11	11	77
Widowed	1	—	4
Divorced	1	—	4
Never married	1	3	14
Employment			
Not employed	—	—	78
Religion			
Protestant	6	5	39
Catholic	4	3	25
Other	1	2	11
No affiliation	3	4	25

N = 28

Note. Because of rounding, percentages may not equal 100.

health, 6 telenursing), and 4% for cervical or ovarian cancer (1 telenursing). Three readmissions occurred within six weeks in each group. None of the readmissions was related to nursing care. The average LOS was 8.86 days (SD = 3.72) for the home health group and 8.36 days (SD = 3.23) for the telenursing group. Seventy-nine percent said their spouse was their support source (11 home health, 11 telenursing), 11% indicated their daughter (2 home health, 1 telenursing), and 4% each indicated sister (1 home health), brother (1 telenursing), and parent (1 telenursing). No statistically significant differences existed between the two groups on type of cancer, LOS, or support source.

Number of Visits

The home health group had a mean of 6.29 visits (SD = 4.25, range = 1–17). The telenursing group had a mean of 5.43 face-to-face visits (SD = 3.03, range = 1–13) and a mean of 3.57 telenursing visits (SD = 1.28, range = 2–6) (see Table 2).

Independence With Pouch Change

The home health subjects could change their pouches independently in an average of 15.07 (SD = 8.42) days after surgery or 6.79 (SD = 7.49) days after discharge. The telenursing subjects could change their pouches at 13.71 (SD = 14.39) days after surgery or 6.14 (SD = 12.04) days after discharge. This difference was not statistically significant.

Self-Care Survey

All of the subjects stated that their family was a great source of support during surgery. Ninety-six percent of the subjects stated that an ET nurse participated in their care. One hundred percent of the subjects stated that the ostomy surgery was explained so that they understood it. The people who most helped the subjects in adjusting to the ostomy included family (36%), ostomy nurse (36%), doctor (11%), staff nurse (11%), and other (4%). None of the questions revealed statistically significant differences.

Satisfaction Survey

Ninety-three percent of patients were satisfied with the telenursing visit, whereas 81% were satisfied with the home health visit. This result was statistically significant. The sat-

isfaction survey had two questions that were statistically significant ($p \leq 0.1$): (a) Does the nurse seem to understand your problems? and (b) Were you comfortable with what the nurse told you about your ostomy? The telenursing group was more satisfied and comfortable with the ostomy care compared to the home health group.

Telenursing Visit

One hundred percent of the subjects agreed that the telenursing visit made care more accessible. Eighty-seven percent said they would prefer a telenursing visit rather than waiting for a face-to-face visit. Seventy percent agreed that they would prefer a face-to-face visit even though 85% agreed that the telenursing visit was as good as a face-to-face visit. Fifteen percent of the telenursing subjects said that the camera and new technology embarrassed them.

Cost

Telenursing visit: The cost for airtime (i.e., phone line charges and a prorated cost for equipment and maintenance) was 4 cents per minute. The average visit was about 30 minutes, yielding a total airtime of \$1.20 plus \$17.70 (\$15 nursing base salary + 18% benefits). The total cost of an average telenursing visit was \$18.90.

Home health visit: The average cost for the home health visit was \$63 (direct cost) plus round-trip mileage at 34 cents per mile. The average distance traveled for the home health group (one way) was 12.36 miles (SD = 10.80). The average distance traveled by the home health nurse from the telenursing group was 10 miles (SD = 9.69), but this difference was not significant. The average distance to travel to see the ostomy nurse specialist was estimated by the patient as 90.94 miles (SD = 93.57), with an average travel time of 2.72 hours (SD = 3.29).

Overall cost: The total home health visit costs were an average of \$63 plus travel times the number of visits, equaling \$444.52 (SD = 304.29). The telenursing visit average cost was \$377.31 (SD = 198.36) for the home health portion and \$67.50 (\$18.90 times the number of visits) for the telenursing portion (SD = 24.26). No statistically significant differences were found between the cost of the visit for the two groups. The home health group used an average number of

Table 2. Summary of the Findings

Parameter	Home Health (HH)	Telenursing (TN)	Overall Results
A. Average number of visits	6.29 visits	HH = 5.43 visits TN = 3.57 visits	The HH group had one more HH visit; the TN group had one less HH visit but 3.5 TN visits.
B. Average number of days after surgery to independence with pouch change	15.07 days	13.71 days	The TN group was independent 1.36 days earlier than the HH group.
C. Satisfaction survey results	81% were satisfied with HH	93% were satisfied with the combination of HH and TN	Satisfaction was 12% higher in the TN group ($p < 0.01$).
D. Average cost for nursing visits	\$63 + travel (salary + mileage)	TN = \$18.90 (salary + airtime + equipment) HH = \$63 + travel	HH visits cost \$44.10 more than TN visits.
E. Average cost for pouches used	\$123.22 per patient	\$70.73 per patient	The average cost per patient for pouches was \$52.49 higher in the HH group than in the TN group.
Final cost = line A x D	\$444.52	\$377.31 HH \$67.50 TN Total = \$444.81	The TN group had more visits without increasing costs. The overall results showed that money was saved by decreasing the number of pouches used.

12.5 pouches in six weeks (SD = 10.80) with an average cost of \$123.22 (SD = 138.80). The telenursing group used an average of 8.28 pouches (SD = 4.10) with an average cost of \$70.73 (SD = 45.69). Although the total average cost for the telenursing group was lower, it was not statistically significant.

Discussion

This study reveals some recommendations and limitations. The study needs to be replicated in multiple institutions using a larger sample. The study should expand to include subjects who speak Spanish and other languages. Subjects who do not have phone lines in their homes also should be included in future studies that place phone lines in their homes or use different equipment that do not require phone lines. The outcome of adjustment could be looked at six months and one year after discharge from the hospital. Studies could be done on different patient populations such as those with asthma, chronic obstructive pulmonary disease, or diabetes, as well as patients with other problems related to cancer diagnoses.

Data were not collected on how the home health nurse perceived telenursing. The home health nurse had access to the ostomy nurse expert during the telenursing visit. The home health nurse was included in some of the telenursing visits, especially if the patient needed hands-on assistance with the instructions from the ostomy expert. For instance, during one visit, the ostomy nurse expert gave instructions and watched the home health nurse remove the stents from a urostomy. The home health nurse never had removed stents before, so the patient would have had to make a trip to the doctors' office to have the stents removed had it not been for telenursing. A rec-

ommendation for another study would be to assess how telenursing affects home health care.

Cost for the telenursing equipment and maintenance was prorated for this study. Factors to be investigated before implementing telenursing are defining the population to be served, expected use, and time for long-distance charges. Another study could be done to evaluate certain populations with telenursing home care and no home health care.

Issues are involved with telenursing and how patients perceive the images. One area of Arizona had problems with the phone lines, which made scheduling and completing telenursing visits more difficult. Sometimes the images were blurry, and patients needed further instructions on how to magnify and focus the camera.

Conclusions

The telenursing group was more satisfied with care after discharge from the hospital. The telenursing group required fewer pouch changes, so it was less expensive because of the decreased number of pouches used. The subjects in the telenursing group believed that the ostomy nurse understood their problems more than the home health nurse did. The subjects in the telenursing group were more comfortable with information provided by the ostomy nurse. The telenursing group received care from nurse specialists who were able to individualize patient care, decrease cost, and improve patient satisfaction.

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For more information . . .

- American Nurses Association: Telehealth: Issues for Nursing
www.ana.org/readroom/tele2.htm
- International Society for Telemedicine
www.isft.org
- Telemedicine Today
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