Current Research

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Family Caregivers of Older Adults on Home Enteral Nutrition Have Multiple Unmet Task-Related Training Needs and Low Overall Preparedness for Caregiving

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ABSTRACT

Objectives We used stress process theory to identify family caregiving variables that are salient to the experience of managing older adults' home enteral nutrition. In this article, we describe the specific tasks family caregivers performed and their unique training needs in the context of caregiver preparedness, competence, effectiveness, and health care use.

Design Hospital billing lists from two university-affiliated institutions in Miami, FL, were used to identify older adults who had enteral tubes placed over a 6-month period. Consent was obtained from those older adults discharged for the first time on home enteral nutrition and their family caregivers at the first scheduled outpatient visit.

Subjects/Setting In-home interviews were conducted with a diverse sample of 30 family caregivers (14 white, 8 Hispanic, 7 African-American, 1 Asian) during their first 3 months (mean=1.83±0.69 months) of home enteral nutrition caregiving.

Statistical Analyses Performed Descriptive statistics were used to summarize data for all variables; χ^2 analysis was conducted to analyze differences in categorical variables. One-way analysis of variance was used to analyze mean differences among caregivers grouped by ethnicity for total number of hours and tasks performed. Post hoc comparisons were conducted using the Tukey HSD test. The Spearman rho correlations were calculated to assess bivariate associations between quantitative variables.

Results Caregivers reported providing from 6 to 168 hours of care weekly (mean=61.87±49.67 hours), in which they performed an average of 19.73±8.09 caregiving tasks daily. Training needs identified were greatest for technical and nutrition-related tasks. Preparedness for caregiving scores were low (mean=1.72, maximum=4.0) and positively correlated with caregiver competence ($P<.001$) and self-rated caregiver effectiveness ($P=.004$). Preparedness negatively correlated with health care use ($P=.03$).

Conclusions Caregivers of older adults on home enteral nutrition need training for multiple nutrition-related and caregiving tasks. Multidisciplinary interventions, involving dietitian expertise, are needed to better prepare caregivers to improve both caregiver effectiveness and enteral nutrition outcomes.

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The 1999 American Dietetic Association practice report on home care (1) described the need for registered dietitians (RDs) in home care. The influence of soaring health care costs and resultant managed care and early hospital discharge combined with the increased availability of home-based medical technologies—and an older and more diverse US population—has led to greater numbers and higher acuity of home health patients. The practice report also depicted RD characteristics and skills necessary for success in home care, and approaches that RDs can take to obtain home care positions. However, current Medicare reimbursement policy limits professional nutrition services in home settings to beneficiaries with diagnoses of diabetes or nondialysis renal disease. Only 1.1% of RDs are used by home health agencies (2). Because Medicare policy also limits the frequency and

duration of in-home nursing visits, over 75% of homebound older adults rely on informal caregivers (ie, family members, relatives, friends, or neighbors) to manage and monitor their home care, including administering home care technologies (3).

The array of medical technologies currently available in the home environment includes mechanical ventilation; cardiac electronic monitoring; hemodialysis and peritoneal dialysis; and home infusions such as chemotherapy, intravenous antibiotics, and home parenteral and enteral nutrition (4). An individual who is "technology dependent" needs such a "medical device to compensate for loss of a vital body function and requires ongoing care from either a lay person or professional" (5).

For some home care technologies, the responsibilities, training needs, and reactions of family caregivers have been investigated (6). Perceived gaps in training and preparedness for mastering technological care along with negative feelings of anxiety, fatigue, and depression are common to caregivers managing mechanical ventilation, end-stage heart failure, and home parenteral nutrition (6-8). Thus, in an earlier article we built on the suggestions in the practice report by describing the potential role for RDs in training family caregivers who manage home care technologies (4). Yet the specific responsibilities, training needs, and reactions of family caregivers of older adults on home enteral nutrition have not been explored. Differences may occur in the caregiving experience based on the type of technological care, the specific skills and tasks necessary to maintain the technology being used, the availability of skilled professionals in follow-up care, and potential complications of the technology.

Possible differences in types of technology-dependent caregiving can best be understood within the conceptual framework of caregiver stress process theory. Lazarus and Folkman's transactional model (9) and the caregiving model of Pearlin and colleagues (10), which emphasize the interaction between stressors (sources of stress), mediators (factors that mediate the interpretation of stress), and outcomes (adaptational end products), have been described in the nutrition literature (11). Smith adapted stress process theory to propose a model of caregiver effectiveness for technology-dependent caregivers that has been tested with caregivers of home parenteral nutrition recipients (12). In defining caregiving effectiveness, Smith incorporates providing the necessary "technical, physical, and emotional care that results in outcomes of optimal patient quality of life and physical condition, minimal technological side effects for the patient, and the maintenance of caregiver's health and quality of life." Smith's model of caregiver effectiveness reconstructs stressors as the caregiving context, mediators as the adaptive context, and outcomes as caregiving effectiveness outcomes.

We applied these stress process theories to study caregivers who manage home enteral nutrition for older adults. The stressors or caregiving contexts measured were caregivers' descriptive characteristics, the specific tasks that caregivers perform, their perceived unmet training needs, and the overload they experience. The mediators or adaptive context measured were caregiver preparedness and competence. The outcomes measured were self-rated caregiver effectiveness and health care use.

METHODS

Subjects

Thirty older adults were recruited from a population of patients aged 60 and over that had radiologically or surgically placed enteral tubes during a 6-month data collection period beginning in October 2000. Interviews were conducted at 1 to 3 months after discharge with the family caregiver, the individual identified by the older adult as primarily responsible for managing their home enteral care. Caregivers were age 21 or older, unpaid for caregiving, resided within 45 driving minutes of their care recipient's home, and spoke English or Spanish. The Institutional Review Boards of the 2 university-affiliated medical institutions in Miami, FL, that participated approved the study.

Sampling Procedures

Monthly hospital billing lists were reviewed to identify older patients with current procedural terminology codes for radiologic or surgical enteral tube placement. These lists yielded the names and hospital identification numbers of 90 patients. Attending physicians were contacted by telephone and/or email to describe the study, determine when patients would be discharged, and ensure that it would be the first discharge on enteral nutrition. Next, the hospital unit social workers were visited to determine whether the discharge would be to the patient's home. The 90 patients were visited in their hospital rooms to describe the study, obtain permission to contact them at home, and gather contact information. The 90 patients narrowed to 56 because of subsequent mortality, change of therapy to parenteral nutrition, discharge to chronic care settings, or removal of the enteral tube at discharge.

These 56 patients were telephoned at home within 2 weeks after discharge to review study procedures and request permission to meet with them and their family caregiver during their first scheduled outpatient visit. This telephone call confirmed that family caregivers met inclusion criteria and that no paid or formal home health caregivers were providing enteral nutrition care. Of the 56 telephoned, 45 dyads agreed to meet, provided written consent at the outpatient visit, and scheduled in-home interviews. Of the 45 consented dyads, seven caregivers withdrew consent at interview, four patients died between consent and interview, two chose not to continue enteral support, and two were readmitted.

Interview Procedures

The first author (H. J. S.), identified solely as a graduate student from Florida International University, conducted all interviews. Thus, in all communications with caregiving dyads no professional credentials or affiliation were shown. A Hispanic graduate assistant who was familiarized (by H. J. S.) with medical, technical, and nutrition terminology provided translation during interviews with Spanish-speaking caregivers.

The interview instrument was designed for this study and consisted of a Home Enteral Nutrition Caregiver Tasks checklist (Figure), three validated caregiver scales, and other original items derived from the caregiving and home enteral nutrition literature, existing patient education materials, and the first author's clinical nutrition support experience. Items were refined after review for content validity by a panel of experts. Clarity of items,

Instructions: I am going to read a list of tasks that you may or may not be responsible for in taking care of your relative. I want you to tell me if (1) yes, you perform this task or (2) no, you do not perform this task. Next, I want you to tell me if (1) you have had formal teaching and do not need more; (2) you have had formal teaching but feel a need for more; (3) you have not had formal teaching but feel a need for some; or (4) you have not had formal teaching and do not need any. There is no right answer; please give me your best response.

TASKS	(1) Yes I do this	(2) No I do not do this	(1) I have received teaching. I do not need more.	(2) I have received teaching But I need more.	(3) I have not received teaching. But I need teaching.	(4) I have not received teaching. I do not need any.
1. Bathing and personal hygiene of care recipient						
2. Lifting and positioning care recipient						
3. Helping care recipient walk						
4. Washing hands using aseptic/sterile technique						
5. Preparing, measuring, and mixing tube feeding formula						
6. Storing the tube feed formula						
7. Hooking up/connecting the feeding set and tubing						
8. Turning the feeding pump on and off						
9. Flushing the feeding tube						
10. Changing and/or cleaning the tubing						
11. Monitoring how long the bag of formula hangs						
12. Caring for skin at the tube site						
13. Administering other medications						
14. Organizing home care services						
15. Organizing blood work and/or lab services						
16. Setting-up clinic and doctor appointments						
17. Managing inventory of feeding equipment and supplies						
18. Communicating with the insurance agency						
19. Providing transportation						
20. Doing shopping						
21. Doing household chores						
22. Managing finances						
23. Responding to emergencies						
24. Managing nausea and/or vomiting						
25. Managing stomach cramps and/or gas						
26. Managing diarrhea and/or constipation						
27. Managing a feeding tube leak						
28. Checking formula residuals						
29. Checking the position of the tube						
30. Managing a clogged feeding tube						
31. Monitoring for infection						
32. Monitoring for weight loss or gain						
33. Monitoring for dehydration						

Figure. Home Enteral Nutrition Caregiver Tasks checklist. Authors recommend adding "Monitoring for nutrient and medication interactions" as a 34th item.

response choices, and the interview procedure were pilot tested with a multiethnic sample of six family caregivers of older adults on home enteral nutrition. Survey questions were read while caregivers were shown 3×5 cards with printed response choices. Responses were recorded verbatim.

The first portion of the interview battery allowed collection of demographic and descriptive information about the caregivers. This included their age, gender, ethnicity, employment status, education level, income, relationship to their care recipient, living situation, and duration of caregiving. Caregivers were asked how many hours of each day they spent providing care. Caregiving hours were confirmed by having caregivers recall their schedules of the prior 3 days and by conversation with care recipients.

The second part of the interview was administration of the Home Enteral Nutrition Caregiver Tasks checklist. The checklist is composed of 33 enteral nutrition and caregiving-related tasks that were categorized into four groups: functional, care management, technical, and nutrition-related. For each task, caregivers were asked, Do you perform this task as part of your caregiving duties? Responses were recorded as yes or no. Cronbach alpha was .94 for the Tasks checklist. The Tasks checklist was also used to assess perceived unmet training needs. For each of the 33 tasks, caregivers were asked to choose: (a) I have received teaching and do not need more; (b) I have

received teaching but need more; (c) I have not received any teaching but I need it; or (d) I have not received teaching and do not need any. Descriptive information about caregiver training was obtained by asking: (a) Who trained you to care for someone with a feeding tube? (b) Where did you receive this training? and (c) When did you receive this training?

Next, three scales were administered to measure caregiver overload, preparedness, and competence. Pearlin Caregiver Overload scale (10) allowed caregivers to rate their level of burnout (ie, how overwhelmed they felt by the amount and complexity of tasks performed) on four items using a 4-point Likert scale, from "Not at all" (1 point) to "Completely" (4 points). The Overload scale has an alpha reliability coefficient of .80 in family caregivers of older adults with chronic disease and .85 in this sample.

The Preparedness for Caregiving scale, a subscale of the Family Caregiving Inventory developed by Archbold and Stewart (13), consists of eight items that measure physical, emotional, social, and general preparation for caregiving. Caregivers used a 5-point Likert scale to rate their preparedness from "Not at all prepared" (0 points) to "Very well prepared" (4 points). The Preparedness scale has a reported alpha reliability coefficient of .92 and .88 in this sample.

The Skaff Caregiver Competence scale (10) was used to measure caregivers' perceived levels of competence. Caregivers rated 4 items that questioned their competence, confidence, and coping using a 4-point Likert scale from "Not at all" (1 point) to "Very much" (4 points). The Competence scale has a reported alpha reliability coefficient of .74 and .87 in this sample.

In the final portion of the interview, caregivers were asked to rate their effectiveness as caregivers. Effectiveness was defined as the quality of care they were providing. Response options were Poor, Fair, Good, Very Good, or Excellent. Lastly, health care use was measured by asking: (a) How many times (since the discharge) have you made a telephone call to a health care provider for problems or questions related to the feeding tube? (b) When you needed more instructions who did you call? and (c) How many times (since the discharge) have you brought your care recipient to a hospital, doctor's office, clinic, or emergency room for a problem related to the feeding tube that was not part of their scheduled follow-up care? Both health care use and training received were confirmed by communications with the respective health care providers and review of patient medical records.

Statistical Analysis

Internal consistency reliability of scales was estimated using Cronbach's alpha. Descriptive statistics were used to summarize data for all variables; χ^2 analysis was conducted to analyze differences in categorical variables. One-way analysis of variance was used to analyze mean differences among caregivers grouped by ethnicity for total number of hours and tasks performed. Post hoc comparisons were conducted using the Tukey HSD test. Spearman rho correlations were calculated to assess bivariate associations between quantitative variables. Results were considered significant at the .05 level. Calculations were performed using SPSS for Windows (version 10.0; 1999; SPSS, Inc; Chicago, IL).

Table 1. Characteristics of caregivers (N=30) and older adult care recipients on home enteral nutrition (N=30)

Characteristic	N
Caregiver	
Gender	
Female	24
Male	6
Race	
White	14
Hispanic	8
African American	7
Asian	1
Married	17
Employed (13 full-time, 2 part-time)	15
Education	
High school or less	15
2 y college	9
4 y college or more	6
Income	
<$7,000	5
$7,000–$14,000	9
$15,000–$35,000	9
≥$36,000	7
Relationship to care recipient	
Spouse	14
Adult-child	11
Other relative	5
Living with care recipient[a]	20
Care recipient	
Gender	
Female	10
Male	20
Medical diagnosis	
Head and neck cancer	23
Swallowing disorder	4
Bowel malabsorption	2
Head trauma	1
Type of feeding tube	
Gastrostomy	23
Jejunostomy	7
Infusion schedule	
Bolus	20
Continuous	10

[a]Ten caregivers traveled to their care recipient's home daily.

RESULTS

In-home structured interviews, averaging 67±17 minutes, were conducted with 30 caregivers at 1 to 3 months (mean=1.83±0.69 months) after care recipient discharge. Caregivers ranged in age from 21 to 76 years old (mean age=52.3±14.9 years) and care recipients were from 60 to 80 years old (mean age=68.4±7.2 years). Other descriptive characteristics of caregivers and care recipients are presented in Table 1. Caregivers reported providing from 6 to 168 hours of direct care per week (mean=61.9±49.7 hours). There was a significant difference among ethnicities in mean number of caregiving hours, $F(2,26)=6.11$, $P=.007$. Hispanic caregivers provided more hours weekly (106.4±40.9) than white caregivers (40.4±41.9), $P=.005$.

Table 2. Caregivers' reported task performance, training, and training needs[a] (N=30)

Measure	Performed task[b] n	Trained for task n	Need training n
Functional tasks			
Shopping	29	2	1
Cleaning/household chores	28	4	3
Providing transportation	26	4	3
Walking assistance	11	2	3
Lifting/positioning	10	2	24
Personal hygiene	8	3	4
Care management tasks			
Arranging medical appointments	27	13	10
Managing supplies and equipment	26	10	7
Managing finances	25	3	10
Responding to emergencies	25	7	18
Organizing home care services	21	8	14
Communcating with insurers	21	5	6
Organizing laboratory services	20	10	8
Technical tasks			
Formula storage	24	12	9
Connecting feeding tube	24	14	10
Setting infusion pump (n=21)	10	4	8
Formula preparation	22	14	13
Flushing tube	21	12	22
Administering medications	21	17	10
Monitoring hang time	20	10	15
Tube site skin care	20	12	21
Cleaning tubing	18	9	19
Managing tube clogs	15	4	27
Managing tube leaks	13	0	30
Checking formula residual	10	2	28
Checking tube position	9	1	27
Sterile hand washing	2	0	28
Nutrition-related tasks			
Managing stomach cramps and gas	17	0	29
Managing diarrhea and constipation	17	1	29
Managing nausea and vomiting	16	0	30
Monitoring weight	16	0	29
Monitoring for infection	10	1	28
Monitoring dehydration	10	0	29

[a]Results from the Home Enteral Nutrition Caregiver Tasks checklist.
[b]Mean number of tasks performed daily: Functional tasks=3.73±1.62, range=0–6. Care management tasks=5.50±1.68, range=0–7. Technical tasks=7.63±4.18, range=0–14. Nutrition-related tasks=2.87±2.37, range=0–6.

Training, Tasks, and Overload

Twenty-one (70%) of the caregivers received training from nurses. Three (10%) were trained by physicians, two (7%) by dietitians, and two reported that medical equipment company drivers instructed them after delivering enteral supplies. Half of the caregivers received training in the hospital before care recipient discharge, nine were trained at home, four in an outpatient clinic, and two never received any training.

Table 2 presents results from the Home Enteral Nutrition Caregiver Tasks checklist. Caregivers performed an average of 19.7±8.1 of the 33 tasks daily. A difference by ethnicity was seen for mean number of tasks performed, F (2,26)=3.46, P=.04. Hispanic caregivers performed more tasks (25.0±4.4) than white caregivers (16.6±8.2), P=.04. On the whole, the number of tasks for which caregivers reported needing training exceeded the number for which they reported having received training (17.9±5.4 vs 6.3±6.04 tasks, respectively).

Caregiving hours were greatest with performing more functional tasks, r=0.58, P=.001. About one-third of caregivers performed activities of daily living (ADLs) such as personal hygiene, lifting, and walking assistance. Almost all provided assistance for instrumental activities of daily living (IADLs) such as house cleaning, shopping, and providing transportation. Overall, fewer than 14% received training for functional tasks. Although less involved in ADLs than IADLs, 80% of caregivers reported needing training for lifting and positioning of care recipients.

From two-thirds to 90% of caregivers performed care management tasks including arranging medical appointments, managing enteral formula and supply inventory, managing household finances, and organizing home care

Table 3. Caregiver preparedness items[a] by frequencies and means (N=30)

Measure	Not at all n	Not too well n	Somewhat prepared n	Pretty well n	Very well n	Mean±SD
To make care activities pleasant	2	7	11	7	3	2.07±1.08
To handle emergencies	3	6	10	8	3	2.07±1.14
To take care of physical needs	2	11	11	3	3	1.80±1.06
To find and set up services	2	13	9	2	4	1.77±1.14
General preparedness for caregiving	2	10	14	3	1	1.70±0.88
To get help from health care system	2	16	6	3	3	1.63±1.10
To take care of emotional needs	4	14	8	2	2	1.47±1.04
For the stress of caregiving	6	12	0	11	1	1.27±0.91
Overall preparedness						1.72±0.77

[a]Stewart and Archbold's Caregiver Preparedness scale (13); 0=not at all prepared, 4=very well prepared.

services and insurance payment. Most (83.3%) were responsible for emergency care, and 60% reported needing training for this.

Caregivers were highly engaged in technical and nutrition-related tasks. Although from half to 80% of caregivers performed technical tasks, less than half reported receiving training. Notably, they were not taught how to clean the tubing, manage tube clogs, use the infusion pump, check for formula residual, check tube placement, manage tube leaks, or perform an aseptic hand washing technique. A little more than half of caregivers reported managing stomach cramps, gas, diarrhea, constipation, nausea, and vomiting. Yet nutrition-related tasks were least common in caregiver training because over 90% reported needing training for managing gastrointestinal symptoms. Likewise, reported training needs were unmet for monitoring for signs of infection, body weight changes, and dehydration.

Performing more tasks was associated with greater overload, $r=0.48$, $P=.01$. Caregivers' mean score for the four overload items combined was 2.36±0.75 (out of 4.0). All but one caregiver agreed with "You are exhausted when you go to bed at night", and all but four with "You have more things to do than you can handle."

Preparedness, Competence, and Effectiveness

Table 3 presents results of the preparedness scale. Mean preparedness for caregiving score was low (1.72±0.77) compared with that reported for other caregivers of frail older adults (3.0±0.68) (17). Preparedness was not significantly associated with the total hours of caregiving or the total number of tasks performed. However, caregivers with lower preparedness had greater overload, $r=-0.49$, $P=.008$, and reported more unmet training needs, $r=-0.46$, $P=.01$.

Although 21 (70%) caregivers rated their effectiveness as caregivers as "fair" or "good," only 14 agreed "very much" with "You feel that you are a good caregiver." Less than one-third agreed "very much" that they feel "competent" or "self confident" as caregivers. Greater competence was associated with greater overall preparedness, $r=0.65$, $P<.001$. Both greater competence and overall preparedness were associated with higher self-rated caregiver effectiveness ($r=0.57$, $P=.001$, $r=0.51$, $P=.004$, respectively).

Health Care Use

Just over half (n=17) of the caregivers reported that they telephoned health care professionals 1 or 2 times per week for further instructions. Of the calls made, 37% were to physicians' offices, 27% to nurses, and 23% to emergency rooms. More calls were associated with more frequent unscheduled visits to physicians' offices, outpatient clinics, or emergency rooms, $r=0.67$, $P<.001$. Unscheduled visits occurred for 22 (70%) care recipients, with 12 making one visit, nine making two to three visits, and one making six visits during these 1 to 3 months after discharge. More visits were associated with caregivers reporting greater unmet training needs, $r=0.45$, $P=.01$. In contrast, fewer visits were associated with greater overall preparedness, $r=-0.40$, $P=.03$. For 24 (80%) care recipients, outpatient follow-up did not include an RD.

DISCUSSION

This study delineated the specific tasks that family caregivers of older adults on home enteral nutrition performed during the first 3 months after hospital discharge. On average, caregivers performed 20 of 33 functional, care management, technical, and nutrition-related tasks daily. This array of tasks is consistent with those undertaken by caregivers providing other types of technology-dependent care and with those deemed necessary for efficacious home nutrition support (12). No differences were observed between caregivers who lived with their care recipients and those who did not. Nor were there differences between those who had family assistance with other caregiving tasks and those who did not. The tasks performed were related to the number of caregiving hours, which far exceeded the estimated national average of 18 to 24 hours weekly (3,14).

Overall, the care provided showed a low level of involvement in managing home enteral nutrition by the care recipient himself or herself. The scope and intensity of caregiving activities reported indicates the kind of caring that Pearlin defined as unidirectional, dependent, and stressful (10). The findings suggest that caregiving for older adults on this type of home care technology requires constant care (3). Most remarkable was the inordinate amount of hours and tasks performed reported by Hispanic caregivers. It has been suggested that cul-

tural values, beliefs, and norms affect the caregiving experience (15).

In contrast to studies of caregiver training for home parenteral nutrition recipients, numerous gaps in training and task performance were identified in this study (16). Importantly, caregivers were not trained in the technical and nutrition-related tasks that are necessary to maintain function of the feeding tube and equipment, and that often prevent side effects of enteral support. Schumacher and colleagues (17) described the level of skill required for such tasks as being comparable to professional clinical skill and requiring the same type of education and training that clinicians receive.

The high percentage of unmet training needs left caregivers unprepared for mastering these skills as well as unprepared for caregiving overall.

The high percentage of unmet training needs left caregivers unprepared for mastering these skills as well as unprepared for caregiving overall. This was evident not only by the amount and variety of unmet training needs and low preparedness scores, but also by a lack of competence and confidence, and moderate perception of the effectiveness of care provided. Caregivers who performed the most tasks, in particular the most functional and technical tasks, were the least prepared and competent in their caregiving role. As with other technology-dependent caregivers, it may be that these first months are when they are most challenged by this new role (18).

The urgency for meeting the training and preparedness needs of caregivers of older adults on home enteral nutrition is further evidenced by the number of telephone calls to health care professionals and unscheduled health care visits. The frequency of calls and visits to emergency rooms especially shows the potential for the inappropriate use of health care labor and increasing health care costs. It should be noted that over three-fourths of these caregivers had annual family incomes below $35,000. Thus, their limited financial resources preclude obtaining formal in-home assistance.

Compounding this situation is the absence of RD involvement in home enteral nutrition training and follow-up care. The low level of caregiver preparedness supports the need for more training, which could occur with greater RD involvement. RDs have been acknowledged by the Institute of Medicine (19) as the best-trained professionals for education and management of interventions designed to reverse malnutrition, ie, medical nutrition therapy. The absence of medical nutrition therapy is likely related to lack of referrals and the current state of Medicare nonreimbursement. It seems unrealistic for nurses to shoulder the full responsibility of meeting the span of skill training needs of these caregivers. A multidisciplinary approach to meeting caregivers' training needs may offer more efficacious care (20).

Although the sample size was small, a well-defined inclusion criterion was used to identify all potential caregiving dyads during the 6-month data collection period. The caregivers interviewed represented more than half (54%) of those managing home enteral nutrition for older adults discharged from these two institutions and allowed for 80% power in testing for correlations of .5 or greater at a .05 significance level (21). Another limitation was that the care recipients had varied diagnoses with comorbid conditions that could affect the number and type of caregiving tasks performed. Thus, it is possible that some other differences in caregivers' training needs were not detected. Nevertheless, significant differences were seen among caregivers grouped by ethnicity. Thus, caregivers may need interventions that are tailored to their distinct cultural traits. Another study with larger, more representative samples of caregivers is necessary to further explore differences in characteristics of caregivers of older adults on home enteral nutrition. An important remaining question is whether Hispanic caregivers differed in caregiving hours and tasks because of culture or reasons directly related to home enteral nutrition care.

This study may also have underestimated caregivers' needs because it was not possible to systematically evaluate differences between participating caregivers and those who refused. The reason for refusal most often voiced was "feeling extremely overwhelmed." In this study, it was important that participation not be considered an additional source of burden. Because caregiver stress may escalate (10) or caregivers may adapt to technological care (12), a longitudinal study is needed to measure changes in older adult home enteral nutrition caregiving over time.

Despite some limitations, this study targeted a caregiver population that has received little attention. Investigations usually focus on the complication or mortality rates of the older adult on home enteral nutrition. This study provides insight into understanding the challenges and needs of their caregivers. Being adequately trained and prepared may result in caregivers who feel competent, provide efficacious care, have lower health care use, and ultimately help contain health care costs.

APPLICATIONS

- Dietitians can design protocols based on caregiving factors elucidated in stress process theory for use at discharge and in follow-up care. Applying Smith's model (12), these protocols should target improving caregiver effectiveness and reducing health care use. Nurses and dietitians could team up to develop comprehensive training plans using the Home Enteral Nutrition Caregiver Tasks checklist. The checklist can be used to create or revise home enteral nutrition education materials because it identifies the skill set for which training is needed. Caregiver training strategies could also use instruments such as the Preparedness for Caregiving scale to evaluate overall preparedness. For example, a Preparedness score of 2.0 might be considered the lowest acceptable level of preparedness because it indicates a level of being at least somewhat prepared. Additionally, the skills of caregivers in managing home enteral nutrition should be monitored in the home setting.
- Although the findings of this study cannot be generalized to the entire population of family caregivers of older adults on home enteral nutrition, it shows the need for further research in home care technologies that incorporates family caregiving factors. Working with dietetics professionals, researchers can expand on these findings to evaluate the effectiveness and outcomes of caregiver ed-

ucation and training interventions that include dietetic practice. By identifying the nutrition-related skills and needs of technology-dependent caregivers and the benefits of training programs that include RDs, family caregiver and home health policy can be influenced. Lobbying efforts that advocate for expansion of Medicare benefits for nutrition therapy should include coverage for training of caregivers in the management of home enteral nutrition.

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