

# Development of Patient Education for Older Adults Receiving Chemotherapy

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The diagnosis of cancer is a significant and often overwhelming event. Older adults may have age-related physical and cognitive changes in addition to the stresses of cancer diagnosis and treatment. The combination can present significant barriers to learning readiness in older adults who choose chemotherapy. Older adults receiving chemotherapy need to learn self-care for risks such as neutropenia; however, patient teaching materials typically are not developed with consideration for this group of learners. This article reviews the current literature on effective chemotherapy patient education, the physical and cognitive changes related to aging learners, and strategies appropriate for teaching older adults. As described in this article, best practices were synthesized from the literature, and educational materials for teaching basic chemotherapy safety practices to older adults were developed. The materials then were pilot tested with a select group of older adults receiving chemotherapy, and their feedback was incorporated into recommendations for future research and practice.

**C**hemotherapy is a mainstay of oncology and presents incredible opportunities for cure, but it also poses potentially life-threatening risks to patients. For nurses administering chemotherapy, one of the most important responsibilities is the education of patients regarding side-effect management and appropriate responses to conditions during chemotherapy. In this teaching role, nurses must facilitate effective knowledge transfer for patient safety.

## Background

More than 40% of people in the United States will be diagnosed with cancer in their lifetimes (National Cancer Institute, 2010). Physical changes associated with aging can make older adults more prone to developing cancer; more than 57% of all cancers occur in those older than 65 years (Itano & Taoka, 2005). Almost two-thirds of cancer-related deaths occur in that age group; the higher mortality rates are believed to result from concurrent disease states and decreased tolerance of the myelosuppressive effects of chemotherapy (Hood, 2003). Cancer affects a disproportional number of older adults, and treatment with chemotherapy is increasingly dangerous in that population, yet “most health educational formats are developed on the basis of younger individuals’ preferences and abilities” (Thomas, 2007, p. 46). Because myelosuppression is life threatening, effective patient education materials that consider the physical and cognitive changes associated with aging are important to patient safety.

Manufacturers of chemotherapy drugs usually provide brochures to educate patients regarding side effects and management of problems likely to occur as consequences of chemotherapy. Although the brochures and pamphlets often

### At a Glance

- ◆ Cancer affects a disproportional number of older adults, yet teaching materials typically are developed to meet the needs of younger individuals.
- ◆ Because myelosuppression and other side effects of chemotherapy may be life threatening, effective teaching materials are important for patient safety.
- ◆ The existing body of research regarding the physical and cognitive changes associated with aging can assist oncology nurses in designing and delivering effective chemotherapy teaching to older adults.

are informative, they are not customized for older adults. In addition, they are specialized by drug, but patients often receive multiple drugs and therefore need numerous brochures to receive all of the important information regarding their therapy. Multiple resources can lead to contradictory advice and create more confusion than assistance for older adults.

The purpose of the project described in this article was to apply the principles of effective chemotherapy education

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through the filter of physical and cognitive changes associated with aging. Strategies for teaching older adults were applied to the principles, and educational materials were developed. The educational materials were used with older adults receiving their first doses of chemotherapy in an urban outpatient setting. Feedback was gathered from the patients via an orally administered survey. Nurses who used the materials were interviewed, and perceptions of the patients and nurses were used to develop recommendations for future practice.

## Theoretical Framework

Dorothea Orem's general theory of self-care deficit provided the framework for examining the problem of chemotherapy teaching for older adults. It incorporates her underlying self-care theory and self-care deficit theory (Johnson & Webber, 2005). Self-care theory asserts that humans have a therapeutic need for self-care. Self-care deficit theory proposes that circumstances exist in which people may be unable to perform self-care, and nursing is required to provide care. Often, people need assistance from nurses because they do not have the knowledge or skill needed to perform self-care. In such situations, nurses should assist people in gaining the needed knowledge or skill. Nurses take action based on a motivation to move patients in the direction of independence.

This framework is appropriate because a vast majority of patients want detailed information about treatment and older patients have an increased interest in self-care issues (Overcash & Balducci, 2003). Self-care theory aligns with an examination of the cognitive and physical changes associated with aging that may inhibit self-care in patients receiving chemotherapy. Identifying important components of effective chemotherapy education and then investigating educational techniques that support older adults during chemotherapy reflect self-care deficit theory.

## Review of the Literature

Review of the literature included an examination of physical and cognitive changes relating to aging learners, effective chemotherapy education, and strategies for teaching older adults. The concepts are central to the scope of the problem because a search for literature on chemotherapy teaching for older adults yielded little information. Collective analysis of the literature provides a basis for developing appropriate teaching materials.

### Cognitive and Physical Changes in Aging Learners

Numerous myths regarding older adults merit consideration. Older people frequently are stereotyped as slow thinking and low performing (Fenter, 2002). They also are cast as resistant to change, unable to retain new information, and deferent to younger family members (Zurakowski, Taylor, & Bradway, 2006). Although the myth of failing intellectual ability prevails, substantial research shows that intellectual function typically is maintained through the aging process (Merriam, Caffarella, & Baumgartner, 2007).

Memory may change as aging occurs. Delayed recall of information declines with aging (Park, Morrell, & Shifren, 1999), but

the decline is not universal; individually, some older adults may have better delayed recall than adults several decades younger. A differentiating factor that may explain variances is that older adults take longer to learn new information than their younger counterparts (Park et al., 1999). Decline in delayed recall may be directly related to the speed at which information is presented; when information is presented verbally and rapidly, necessary inferences and connections are made through working memory (Park et al., 1999). Memory loss associated with aging is associated mostly with working memory, which may present problems with information storage and retention (Palmer, 2006). If older adults do not have sufficient time to learn new information, then delayed recall likely will decline (Wang & Snyder, 1998). Therefore, older adults should be allowed adequate time for learning to occur.

Intelligence can be conceptualized as crystallized or fluid. Crystallized intelligence is understood to be cumulative knowledge that is acquired over time, whereas fluid intelligence is the ability to make new connections among concepts and use abstract reasoning (Lamdin & Fugate, 1997). Loss of neurons and decreased cerebral blood flow can cause a loss of fluid intelligence. However, Wang and Snyder (1998) noted that blood flow to certain areas of the brain typically improves with age, which may explain differences in retrieval strategies within older adult brains. Only 5% of seniors have dementing illness, and crystallized intelligence typically increases throughout the lifespan, possibly offsetting the loss of fluid intelligence associated with aging (Zurakowski et al., 2006). Therefore, instructors should view typical older patients as competent learners within the framework of self-care theory.

Older adults rely more on organizational strategies for learning than younger learners (Nussbaum & Coupland, 2004). Taking notes and reviewing them later in the day or at bedtime are examples of organizational techniques that may assist retention. Senior learners also may have increased test anxiety, possibly related to fears of failing short-term memory. Fear of not testing well may materialize as decreased test performance (Nussbaum & Coupland, 2004).

Memory also may be impacted negatively during and after chemotherapy by cognitive dysfunction, a condition often referred to as "chemo brain" (Staat & Segatore, 2005). In one study, cognitive dysfunction was reported in 50% of patients undergoing chemotherapy (Staat & Segatore, 2005). It most often presents as decreased cognitive ability, slower reaction time, and decreased organizational skills (Staat & Segatore, 2005). Although not associated with aging, cognitive dysfunction may present additional challenges for older adults receiving chemotherapy.

Another important consideration when instructing older adults is diversity. Although older adults often are viewed collectively, the group includes ages of 50 years and more. Older learners have significant and diverse life experiences, making the group more heterogeneous than younger groups (Nussbaum & Coupland, 2004). Individual differences may be the most significant aspect of teaching older adults, as differences become more pronounced with age and experience (Sherron & Lumsden, 1990). Each learner should be approached as an individual.

Biologic and physiologic changes associated with aging warrant consideration in educational design. Vision and hearing, of great significance in most education-delivery methods, often deteriorate with age (Best, 2001). Visual acuity diminishes and the

ability to hear high-frequency sounds is impaired in many aging adults. Musculoskeletal changes associated with aging also can cause stiffness, which may limit the length of time older people can sit in educational sessions, and range of motion also may be limiting to dexterity of movement, such as turning pages or manipulating sheets of paper (Best, 2001).

Organ function commonly deteriorates with aging. Total body water decreases, which increases concentrations of circulating drugs. Hepatic function and glomerular filtration often decline, decreasing drug metabolism and drug clearance. The changes can increase the toxicity of chemotherapy in older adults (Hood, 2003). Newer oral chemotherapy drugs are being introduced to the marketplace, offering convenience but also new potential problems related to decreased intestinal absorption that often occurs with aging (Overcash & Balducci, 2003). Swallowing pills can be difficult for older adults, further complicating dose calculations and increasing the possibility of over- or under-medication (Overcash & Balducci, 2003).

Hematologic toxicities related to myelosuppression also are more significant in older adults (Hood, 2003) perhaps because of decreased hematopoietic reserve; older patients are, therefore, more affected by the anemia of chemotherapy, which diminishes independence and quality of life. A critically important aspect of myelosuppression is neutropenia. Infection is the leading treatment-related cause of mortality in older patients with cancer, and the risk of infection is related directly to the severity and duration of neutropenia. Risks of neutropenia may lead to suboptimal dosing of chemotherapy in older adults (Hood, 2003).

Although toxicities may increase for older adults receiving chemotherapy, the effectiveness of chemotherapy may be decreased in this population (Hood, 2003). Tumor cells in older adults have been found to have a decreased capacity for apoptosis, an important mechanism of chemotherapy-induced cellular death for tumors. This illustrates the importance of older adults receiving full-dose chemotherapy, which may directly relate to outcomes. Decreased sensitivity in tumor cells and increased sensitivity in hematologic cells create a complex scenario for successful treatment. Supportive measures and effective patient education to manage toxicities are critically important to chemotherapy treatment in older adults (Hood, 2003).

## Importance of Chemotherapy Education

Figure 1 provides an example of a patient education sheet for older adults. Considering the significance of myelosuppression in older adults receiving chemotherapy, topics such as the importance of full doses of chemotherapy delivered on time require emphasis. Schedules and the importance of blood draws, injections of growth factors, office visits, and chemotherapy appointments should be included in orientation to chemotherapy (Mueller & Glennon, 2007). Major side effects associated with low red blood cell counts, white blood cell counts, and platelets should be outlined. Self-care techniques that minimize the impact of side effects should be highlighted; for example, the fatigue associated with chemotherapy-induced anemia can be improved with scheduled rest periods and daily exercise (Malone, 2007).

Immunosenescence is the changing function and structure within the immune system and is associated with aging. Senescent neutrophils may have a lessened functional response in older adults. The result of the changes is increased vulnerability

to infection and atypical presentation of infection in older adults. Neutropenia has been associated with 5%–30% of cancer deaths in patients aged 70 years and older (Crighton & Puppione, 2004). Neutropenia risks are significant and can be minimized with daily monitoring of signs of infection (e.g., fever), frequent hand washing, and avoiding crowds (Mueller & Glennon, 2007). Bleeding associated with thrombocytopenia can be minimized by avoiding injury (Malone, 2007). Educating older patients about these important self-care activities can assist them in achieving optimal chemotherapy dosing and schedule adherence.

## Strategies for Teaching Older Adults

**Learning theory:** Adult learning theory and older adult learning theory merit consideration during development of educational materials for older adults. Andragogy is the science of adult learning, and Knowles (1990) constructed an andragogical model of adult learning that received considerable attention in the literature. Knowles' theory is based on several distinct assumptions about adult learners: Adults need a reason to learn; the motivation to learn stems from the belief that the knowledge will be useful or beneficial. Adults are self-directed and learn best when their experiences and accumulated knowledge can be applied as a resource and are therefore made relevant to the new material.

John (1988) further developed adult learning theory with the concept of geragogy, which is the process of supporting learning in older adults. John's theory of geragogy contrasts with Knowles' theory of andragogy on several points. Although adults are considered independent learners, older adults are viewed as interdependent learners. Motivation is another distinction between the two concepts. Motivation in adult learners stems from primarily internal motivations such as self-esteem and job satisfaction (Knowles, 1990). Senior adult learners are motivated by the need to be useful and the desire for independence (John, 1988). Independence as motivation is consistent with Orem's general theory of self-care deficit and equally applicable to chemotherapy teaching.

**Educational design:** Numerous design recommendations that are consistent with adult learning theory and geragogy were presented throughout the reviewed literature, the first focused on self-direction. "Older adults are better at self-paced and self-directed learning than at instructor-directed learning" (Zurakowski et al., 2006, p. 356). Zurakowski et al. (2006) recommend handouts and articles that can be taken home for self-paced review. Thomas (2007) suggested bulletin boards combined with one-on-one education. Bulletin boards can be viewed multiple times as reinforcement, they are informal and nonthreatening, and older adults can spend whatever amount of time they need viewing them. All of these recommendations are based in self-directed learning.

Another point of consensus is the need to learn what is most important first. Decreased energy levels in older adults demand short sessions; therefore, basic information should be the primary focus until learned (Best, 2001). "Whatever an older person hears first tends to be best remembered" (Fenter, 2002, p. 20). Additionally, Zurakowski et al. (2006) suggested that instructors "prepare a teaching plan for the 'necessary to know,' but be ready to include the 'nice to know' if the client asks" (p. 359). Prioritization of information is viewed as an important aspect of effective educational design for older adults.

## Schedule

The best results come from getting the right dose of chemotherapy at the right time. Bloodwork, shots, doctor visits, and chemotherapy must be completed on time.

### To Do

- ✓ Keep one central calendar that lists dates, times, and places for your appointments.
- ✓ Call the clinic for advice if you are unable to keep any scheduled appointment.



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## Blood Counts

Blood counts are critically important to your safety. Most chemotherapies have negative effects on blood counts, which must be monitored to keep you safe. Your blood will be drawn at regular intervals



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to monitor your counts, and chemotherapy doses may be changed based on your individual results. This is because an unsafe drop in your blood

counts can be life threatening. Three types of blood cells can be affected by chemotherapy: red blood cells, white blood cells, and platelets.

Red blood cells give you energy and provide oxygen to your organs. If chemotherapy is harming your red cells, you may feel more tired. A certain number of red blood cells are essential for life; this is why your red count will be monitored. If your counts become low, medications or transfusions can keep you safe.

### To Do

- ✓ Listen to your body! Plan for rest periods during the day.
- ✓ Try to maintain your normal activity level, building in rest periods.

White blood cells protect you from infection and work as part of your immune system. If chemotherapy is harming your white cells, you will be at increased risk of infection. If your white count becomes too low, infections can be deadly. For this reason, your white blood cells will be regularly monitored. Medications may be given that will help rebuild your white blood cells, if needed.

### To Do

- ✓ Take your temperature at least once a day.
- ✓ Report any temperature over 100.5°F or shaking chills immediately.
- ✓ Frequent hand washing is your best protection against infection.



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Platelets are the fragments in your blood that help you form clots. If chemotherapy is harming your platelets, you may have problems related to bleeding. If platelet counts become too low, medications or transfusions may be ordered to keep you safe.

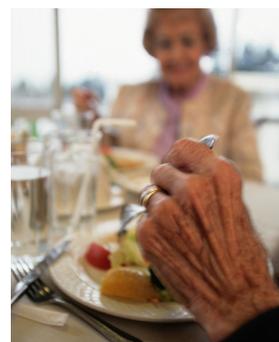
### To Do

- ✓ Prevent injury by avoiding falls and contact with sharp objects.
- ✓ Get to the closest emergency room if bleeding starts and does not stop with pressure.

## Nausea, Vomiting, and Appetite

You will receive medications to prevent nausea and vomiting prior to each chemotherapy dose. You also may receive a prescription for medicine to take at home if you start to have problems with nausea and vomiting. These medications work for most people.

Loss of appetite happens more often than nausea and vomiting. Foods may taste different during chemotherapy, and you may lose interest in eating and drinking. Do not stop eating and drinking. Weight loss is not good during chemotherapy, as you need energy from food to fight the side effects of treatment. Getting too weak often causes delays in treatment. Dehydration also can quickly cause serious problems in people receiving chemotherapy. To protect yourself, keep eating and drinking. If you are unable to eat or drink, you should call the clinic.



### To Do

- ✓ Keep track of how much fluid you are drinking daily. Have a daily goal.
- ✓ Try small, frequent meals instead of large meals if food is not appealing.
- ✓ Try foods at room temperature; avoid spicy or greasy foods.

*(Continued on next page)*

## Figure 1. Patient Education for Older Adults Receiving Chemotherapy



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- ✓ Add milkshakes, ice cream, or nutritional drinks.
- ✓ Call the clinic if you are having problems eating or drinking.

## Other Problems

Bowel problems can be hard to predict during chemotherapy.

You may encounter diarrhea or constipation during treatment, but you may not. If either problem occurs, call the clinic for specific advice. Consider keeping some loperamide (Imodium®, McNEIL-PPC, Inc.) at home, as this may be recommended as initial treatment for diarrhea. It is available over the counter at any pharmacy.

Chemotherapy can cause sores inside your mouth. They not only make eating or drinking difficult but also can be a risk for infection. If you notice any

sore spots inside your mouth, please report them to the clinic.

Hair loss often occurs as a side effect of chemotherapy. If you lose your hair from chemotherapy, it will grow back. Sometimes hair becomes thin, and sometimes it comes out completely. Your head should be covered outdoors. Use at least sunscreen in the summer and a hat or wig in the winter. Clinic staff can offer resources for wigs or other head coverings.

## To Do

- ✓ Report diarrhea or constipation to the clinic.
- ✓ Clean your mouth frequently with a soft toothbrush.
- ✓ Report any mouth sores to the clinic.
- ✓ If you lose hair, remember to cover your head.



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**Figure 1. Patient Education for Older Adults Receiving Chemotherapy (Continued)**

Much of the reviewed literature acknowledges the importance of considering the sensory needs of the learner. Speaking slowly in a normal tone of voice and choosing a quiet setting with minimal distractions and background noise are important (Zurakowski et al., 2006). “Lighting must be soft-white, with little glare, and patients who have glasses or hearing aids need to wear these aids during the session” (Best, 2001, p. 48). Group presentations also are discouraged, as older patients may be intimidated or distracted by other individuals in the group (Best, 2001).

**Educational content:** The incorporation of pictures, diagrams, or illustrations is critically important (Billek-Sawhney & Reicherter, 2005). Illustrations reinforce messages and can be more effective than words. Simple, clear illustrations representing a single concept are recommended. Pictures should be framed in open space to allow them to stand apart from text (Ruholl, 2003).

Simple language and presentation is another recurrent theme in the literature. “Older persons have great difficulty filtering out irrelevant stimuli and often are less able to develop new automatic processes, making learning with high contextual interference more challenging” (Fenter, 2002, p. 17). Although individual differences exist in the preferred amount of detail, Zurakowski et al. (2006) recommended a strategy of preparing an essential presentation with supplemental information available as needed. “Printed educational materials should be written on a level the elderly adult can understand, as low literacy has a direct impact upon the elderly patient’s ability to learn about and comply with health education” (Best, 2001, p. 51).

Recommended reading level varies from below the fifth-grade level (Billek-Sawhney & Reicherter, 2005) to a fifth- through eighth-grade level (Best, 2001). This is further complicated by research that shows that education level does not reliably

indicate reading level (Best, 2001). Additionally, the ability to meaningfully process medical information cannot be accurately predicted by education level (Hayes, 2005). Consistent recommendations are to use tools such as the Flesch Reading Ease score or the SMOG index to evaluate reading level of material, and to replace words with three or more syllables with more common one- or two-syllable words (Thomas, 2007). For ease of reading, a font size of 14 points in black Times New Roman font on a white, nonglare background is recommended (Best, 2001). Additionally, contrasting uppercase and lowercase letters are easier to read than all capital letters (Ruholl, 2003).

**Learning style and retention:** Excessive and nonessential information may cause disinterest or confusion (Thomas, 2007). Patient education materials should use short sentences and active voice, use white space to make material easy to follow, and focus on key concepts instead of extensive details (Billek-Sawhney & Reicherter, 2005). Allowing sufficient time for processing new information also is important. Delivering brief and distinct messages not only simplifies but also acknowledges the importance of after-imaging (mental images that persist after the stimuli that produced the images are gone). This behavior is consistent with the decrease in fluid intelligence that often accompanies aging. By waiting for a response and encouraging questions from a patient before introducing a new concept, the generated pause in information flow can allow after-images to fade and improve accurate recall (Ruholl, 2003).

Another common theme is the need for repetition to promote effective learning in older adults. Asking patients to paraphrase or recount information after teaching is a helpful technique (Billek-Sawhney & Reicherter, 2005). One of the features of bulletin boards as a teaching strategy is the ability for learners to view information multiple times for reinforcement, as “most

adults older than 65 need more repetition and time to learn and retain new health information than do younger adults” (Thomas, 2007, p. 46). A list of basic tips for teaching older adults lists reinforcing, clarifying, and incorporating time for a return demonstration as important elements of the teaching plan (Best, 2001). “All learners need a certain amount of practice, but the amount required for effective learning varies by individual. Repetition is essential to maintain habits or skills just as infrequent use of skills weakens them” (Fenter, 2002, p. 16). “Learning is even more effective if the elder can practice as the teaching is going on” (Zurakowski et al., 2006, p. 359). Educators of older adults should allow for and encourage repetition and reinforcement.

Capitalizing on crystallized intelligence is another recurrent theme in the literature. Best (2001) observed:

Assessment must include identification of the extent and accuracy of the patient’s existing knowledge of the subject. New materials will be accepted or rejected based on what the patient already knows. . . . Learning will only take place if the patient values the information as important (p. 48).

The educational and occupational background of the patient is a way to link new information to what the patient already knows through previous experience (Zurakowski et al., 2006). “To optimize adult learning, materials or skills should be presented through experience. . . . Information that is important and timely to the adult is more likely to be learned” (Fenter, 2002, p. 13). New knowledge also can be reinforced when patients provide examples of appropriate behavior changes as a response to new information (Ruholl, 2003).

The literature identifies important physical and cognitive changes that are associated with aging. It also provides functional applications of those changes by offering effective teaching strategies for older adults and examines the most important teaching points associated with chemotherapy. Although the literature contains a void regarding the specific topic of chemotherapy teaching for older adults, the collective body of literature provides a foundation for construction of an intervention—patient education materials designed to meet the learning needs of older adults receiving initial chemotherapy.

## Operational Questions

The chosen framework of Orem’s general theory of self-care deficit prompted the operational questions for this project. Self-care deficit theory leads nurses in a direction of closing self-care informational gaps for patients. This project sought to identify what specific content is broadly applicable to older patients receiving chemotherapy and critically important for their safety. Secondly, this project sought to determine whether educational materials developed from the literature were generally successful in completing the essential chemotherapy knowledge transfer to older adult patients with cancer.

## Methodology

The operational questions of this project were addressed through an intervention on a group of older adults receiving chemotherapy. Existing literature was used to develop teaching materials appropriate for this group of patients, and the group received

patient teaching that followed the outline of materials developed through this project. Patient teaching of adults receiving chemotherapy at the author’s institution has traditionally followed the outline of educational brochures supplied by chemotherapy drug manufacturers. The brochures typically are more detailed than materials developed for this group of patients. Manufacturer brochures still were made available to the patient group, but the content of the brochures was not referenced within the teaching session. The brochures were offered and mentioned as optional, supplemental material available to the patients.

Teaching sessions were conducted by one of five RNs trained and experienced in the administration of chemotherapy. The group of nurses previewed and discussed the educational materials and had an opportunity to suggest modifications; suggested changes were screened for congruence with recommendations from the literature and applied as appropriate. The nurses also were informed regarding the purpose of the project. The proposed educational sessions were modeled for the nurses to promote consistent delivery and application of developed materials. The nurses were asked to keep personal notes on each teaching session completed, and they were interviewed later for feedback on the materials. The University of Wyoming institutional review board approved the project before the teaching sessions.

The setting was the infusion center of a private oncology practice in Glen Burnie, MD. Participants were selected from patients who were scheduled to receive initial chemotherapy at the practice infusion center. The patient population is culturally and economically diverse but has little geographical diversity because the patients live in a suburban to urban area near Baltimore, MD. Criteria for selection were age older than 65 years and no history of previous chemotherapy. Patient history and physical information as documented by the oncologist were reviewed, and patients with known cognitive impairment were excluded. Application of the criteria generated a group of 25 older adult participants who had a safety need for effective chemotherapy teaching and a presumed ability to learn (see Table 1 for sample characteristics). Of the 25 patients, 21 returned to the clinic for subsequent cycles of chemotherapy and completed the outcomes survey. Of the 4 patients who did not return, 1 was hospitalized for future cycles of chemotherapy because of insurance coverage, 1 declined further treatment, and 2 did not receive additional chemotherapy because of overall deterioration in health. Outcomes were assessed through an oral survey of the participants, which evaluated patient perceptions of the clarity and quality of the materials and patient retention of key information delivered in the teaching session. Surveys allow for evaluation of people’s knowledge without an experimental design (Polit & Beck, 2004).

The survey was administered by one of the five trained nurses three to four weeks after the initial teaching session. Participants were given the option of not participating in the survey. In the interest of reducing patient anxiety, the same nurse who conducted the initial teaching administered the survey. The survey questions were asked as written, and nurses encouraged patients to elaborate on their responses. Patient responses were documented, and the notes were collected and synthesized as project results.

The survey design was supported by recommendations for evaluation methodology in the literature. An informal method for assessing knowledge transfer is suggested, such as asking

**Table 1. Participants' Characteristics and Answers to Survey Questions**

CHARACTERISTIC	n
<b>Age (years)</b>	
65–69	7
70–74	5
75–79	4
80–84	3
85–90	2
<b>Gender</b>	
Female	10
Male	11
<b>Race</b>	
African American	4
Caucasian	17
<b>Cancer type</b>	
Breast	2
Colon	1
Myelodysplasia	1
Head and neck	2
Pancreatic	1
Lymphoma	7
Lung	7
<b>Reasons for keeping chemotherapy schedule<sup>a</sup></b>	
Not sure	1
Best results	16
Manage side effects	11
<b>Strategies to manage infection risk<sup>a</sup></b>	
Other	3
Avoid sick people and crowds.	11
Check temperature.	8
Wash hands.	19
<b>Strategies to manage fatigue<sup>a</sup></b>	
Not sure	1
Maintain activity.	11
Eat well.	6
Take rest periods.	12
<b>Strategies to manage bleeding risks<sup>a</sup></b>	
Not sure	2
Avoid nose blowing.	3
Use a soft toothbrush.	3
Wear slippers.	3
Avoid injury.	6
Avoid sharp objects.	14
<b>Strategies to manage nutrition<sup>a</sup></b>	
No problems	7
Increase liquid nutrition.	7
Eat frequent, small meals.	8
<b>Issues to report to the clinic<sup>a</sup></b>	
Not sure	1
Other	3
Numbness and tingling	2
Weakness	2
Bleeding	5
Nausea	7
Fevers	18
N = 21	
<sup>a</sup> Participants could provide more than one answer.	

open-ended questions to determine the quality of the knowledge transfer (Billek-Sawhney & Reichert, 2005). Knowledge assessment in older adults may be best accomplished through discussion, as written evaluation may be perceived as intimidating and stressful (Gessner & Armstrong, 1989).

Outcomes also were assessed through a group interview of the participating nurses to determine their perceptions of problems and successes with knowledge transfer. Feedback from the survey participants and the nurses was incorporated into recommendations for future practice.

Bias may have been inherent in the design of this project. The nurses administering the survey were coworkers of the researcher, and the personal relationships may have influenced the integrity of feedback. A possible dependent relationship between patient and oncology nurse also may have caused bias. Patients receiving chemotherapy may be psychologically vulnerable, having fears about diagnosis and treatment. The vulnerability may have impaired their ability to objectively evaluate the quality of teaching conducted by the nurses.

## Results

### First Operational Question

The first operational question of the project was determining what specific content is broadly applicable to older patients receiving chemotherapy and critically important for their safety. Information gathered through review of the literature was used to generate new teaching materials appropriate for older adults. Information on anemia, neutropenia, and thrombocytopenia is important to patient safety. Other significant and common side effects of chemotherapy include nausea, vomiting, and decreased oral intake. Nausea and vomiting should be emphasized as treatable, and use of antiemetics should be explained. Patients should be encouraged to notify the clinic if the prescribed plan for prevention of nausea and vomiting is not effective. Decreased oral intake can be prevented with small, frequent meals. Avoidance of spicy, greasy, or hot foods; alcohol; and caffeine should be recommended. Patients should be encouraged to eat a variety of foods and monitor food and beverage intake in addition to body weight (Malone, 2007).

Changes in bowel function, mucositis, and hair loss are frequent consequences of chemotherapy that should be included in patient education. Patients should be encouraged to report diarrhea or constipation to the clinic, and hydration should be emphasized. Mucositis should be explained, with emphasis on mouth care with a soft toothbrush and avoidance of commercial mouthwashes. Sores or white patches in the mouth should be reported to the clinic (Malone, 2007). Hair loss occurs in varying degrees but should be addressed in patient teaching; providing patients with information on wigs and other options for head cover allows for a proactive response to hair loss (Mueller & Glennon, 2007).

One topic that typically is covered in chemotherapy teaching is the importance of birth control and preservation of fertility. This topic was excluded from the developed teaching materials because it is not relevant for older adults. Strategies for teaching older adults and information on the cognitive and physical changes that are common in older adults were integrated into information about managing these important side effects.

### Second Operational Question

The second operational question of the project was to determine the effectiveness of the developed teaching materials.

**Question 1:** The first survey question asked for overall feedback on the teaching materials. The patient participants gave positive feedback on the materials; 20 of 21 said they found the teaching materials useful. One participant stated she did not specifically remember the initial teaching session; however, she was able to answer every other question on the survey accurately and completely. Ten of the participants specifically mentioned the value of having the teaching materials all together in a package so they could review them again.

The remaining survey questions allowed for more than one response. All responses were counted; therefore, more than 21 responses could be collected. Responses to the survey questions are discussed as follows and summarized in Table 1.

**Question 2:** “You probably have more appointments for blood work, and maybe more chemotherapy and doctors visits coming up during the next few weeks. Can you tell me why it is important to keep those appointments?” All but one of the participants were able to articulate at least one valid reason to keep their scheduled appointments.

**Question 3:** “We talked about the risks of infection that first day. Can you give me any examples of things that you should do to protect yourself from infection?” Every participant was able to articulate at least one of the valid methods of preventing infection that was included in the teaching materials.

**Question 4:** “We talked about people feeling tired during chemotherapy. Can you tell me any actions you can take to improve your energy level?” One participant could not recall any specific techniques of managing fatigue, but all of the other participants could provide at least one example.

**Question 5:** “We also talked about the risks of bleeding during chemotherapy. Can you give me any examples of things that you can do to prevent problems with bleeding?” Two of the participants were unable to recall any specific ways to manage this risk, but all other participants provided at least one example.

**Question 6:** “We talked about how important it is that you are eating and drinking throughout your treatment. Have you had any problems with eating or drinking? Have you done anything to help yourself drink or eat more?” Seven of the participants said only that they had no problems with their appetites and therefore were not using any of the strategies. The remaining 14 participants provided examples of useful strategies.

**Question 7:** “We talked about a few possible side effects that should be reported to the clinic. Can you recall any examples of problems that should be called into the clinic?” All but one of the participants were able to provide at least one example of a situation that should be reported to the clinic immediately.

**Question 8:** The last survey question asked for suggestions on improving the teaching session. Two participants had suggestions, and the remaining 19 could not think of anything that would improve the teaching session. The two suggestions were to reinforce the materials during every scheduled treatment and to include written information about managing side effects of one specific injection received as part of that individual participant’s treatment plan. This information normally would have been provided, and its absence was an oversight by the nurse conducting the teaching session for that participant.

**Survey of nurses:** All five of the trained nurses involved in the project participated in the nurse interview and shared their opinions and observations. The nurses unanimously agreed

that the educational materials were beneficial in teaching older adults receiving chemotherapy. Specific reasons were that they were clear and concise, and the nurses believed that the patients understood the materials. They also liked that the information helped patients understand why the topics mattered. One nurse commented, “The patients seem to retain more if they see the connection between taking these actions and feeling better. . . . If they don’t see a reason to remember it, they are not likely to remember it.” Others commented that the visual reminder of the teaching materials was good, and they believed that the patients were referencing the materials repeatedly.

When asked whether they believed if any particular teaching method for older adults was more effective than another, the nurses all cited repetition. Several also believed that the single sheet titled “Things to Remember About Chemotherapy” was particularly beneficial in reinforcing what was most important. All of the nurses believed that many of the participants were referring to that resource after chemotherapy.

When asked to reflect on the feedback they received from patients during the teaching session and the follow-up survey, the nurses provided a few suggestions to enhance teaching. The first suggestion was to incorporate a follow-up phone call to the patient several days after the initial chemotherapy is given. This would be an additional opportunity to reinforce teaching. The only other suggestion was more controversial; one nurse wanted to add alcohol avoidance to the teaching materials. The other nurses disagreed, feeling that the advice was sometimes appropriate but not necessary for all patients. The nurses universally agreed that the teaching sessions reinforced the importance that caregivers attend teaching session. All of the nurses believed that the caregivers or family members present for the teaching sessions became more engaged and involved in helping the patients apply the teaching at home.

The participating nurses were asked whether they planned to continue using the materials for their older adult patients. They all stated they would because of the perceived effectiveness of the materials and the concise presentation, which helped the nurses manage their time during teaching. They also liked being able to deliver a complete copy of everything that was stated as a reference for patients and their families. Prior to the development of this package, much of what was said in the initial teaching session was undocumented. The teaching materials have been adopted by all offices of the medical practice and are being used for patients of all ages. That decision was based on the positive feedback from the nurses and patients involved.

## Discussion

As patient advocates, oncology nurses promote patient safety by encouraging effective self-care. Tailoring chemotherapy education to address the needs of older adults has the potential to enhance patient safety and quality of life. From a clinical perspective, effective teaching of older adults receiving chemotherapy also can promote schedule adherence and tolerance of optimal dosing. Based on the feedback from the participating patients and nurses, the materials developed through this project have had a positive impact on chemotherapy teaching for older adults treated at the author’s institution.

Although no statistical comparison can be made to document the impact of the project, the patients generally were able to recall and provide examples of how to manage the most important side effects of chemotherapy. In addition, the nurses caring for the patients perceived improved understanding and retention of the material among the patients. The nurses were very pleased with the overall responses of the patients during the teaching and survey sessions; unsolicited positive feedback from the participating nurses was the catalyst for the materials being adopted for all patients and in all offices of the practice.

The positive response to a strategic and targeted approach for teaching older adults receiving chemotherapy highlights the inadequacy of previously available patient education materials. Within the framework of Orem's general theory of self-care deficit (Johnson & Webber, 2005), educational materials designed for older patients can help them meet their own needs while receiving chemotherapy and identify situations when they may need assistance. If the goal of chemotherapy is to extend life and quality of life, addressing self-care needs is critically important.

Because this project was not research based, the next step in meeting the educational needs of older adults receiving chemotherapy might be the design and implementation of a research study comparing teaching methods and materials. This project is foundational for a research study, as no existing research on this subject was identified. As nursing and medical research continues to add years to the human lifespan, it is increasingly important to consider the needs of older adults in health education.

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