

A DESCRIPTIVE STUDY OF SPEECH-LANGUAGE PATHOLOGISTS'
ROLES, RESPONSIBILITIES, AND KNOWLEDGE LEVELS
OF ALTERNATIVE NUTRITION

By

LORI A. DAVIS

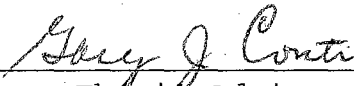
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Oklahoma State University
Stillwater, Oklahoma
1990

Master of Arts
Oklahoma State University
Stillwater, Oklahoma
1992

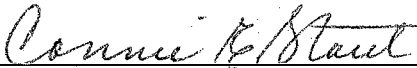
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Abstract

Innovations and advancements in health care have enabled people to live longer and healthier lives. Currently, the older adult population is growing quickly, and as individuals age there is an increased risk of chronic or acute illness. The increase in the aging population has resulted in the need for rehabilitation professionals who are trained in geriatric health issues. One disorder that is often exhibited by individuals after a neurological injury is impaired swallowing or dysphagia. Dysphagia often leads to nutritional dilemmas for the individual if there are safety concerns with oral nutrition, and the recommendation may be made for alternative nutrition. Speech-language pathologists are the rehabilitation professionals who diagnose and treat swallowing disorders and who often recommend non-oral feeding to the physician. Therefore, the purpose of this study was to describe the roles, responsibilities, and knowledge levels of speech-language pathologists who work in medical settings with patients with swallowing disorders who may need alternative nutrition.

The study was conducted through a mail survey sent to a national proportionally-stratified sample of speech-language pathologists working in hospitals, rehabilitation centers, and nursing homes. There were 138 speech-language pathologists who responded to the survey which resulted in a 28% return rate. The instrument gathered demographic, educational, employment, and knowledge data. Further quantitative and qualitative data were obtained through telephone interviews with respondents and non-respondents. Frequency distributions, factor analysis, discriminant analysis, cluster analysis, analysis of variance, and a t-test were used to analyze the data and describe the results.

Conclusions indicated that there are differing knowledge levels of alternative nutrition among speech-language pathologists. Variables were found with the discriminant analysis that could explain differences between groups of professionals. Factor analysis demonstrated four broad conceptual training areas for alternative nutrition and swallowing disorders: Foundations, Use, Complications, and Therapeutic Intervention. These training areas were

further analyzed with Bloom's Taxonomy to also determine the level of cognitive complexity required in each training area. Five distinct groups of professionals with different knowledge levels were discovered with the cluster analysis, and training needs can be differentiated for each group. The five groups were named Novices, Intermediates, Technicians, Generalists, and Specialists. The discriminant analysis revealed that the groups were differentiated by three processes: Initiation of Tube Feeding, Determination of Risks, and Education of Patient and Family. Implications for continuing education were found in content, level of cognitive complexity, and method of delivery. Areas for future research were also indicated by this study.

CHAPTER 1

INTRODUCTION

The sophistication of health care today and the rapidly increasing population of adults over age 65, have created more ethical dilemmas about appropriate medical care. Speech-language pathologists in medical work settings must have an extensive knowledge base about a wide range of areas and typically spend a significant portion of their time evaluating and treating patients with swallowing disorders. Swallowing disorders can create serious medical conditions such as malnutrition, pneumonia, and death. The cost created by these conditions is considerable both in financial and personal terms.

Nutritional decisions are often mandated when an individual has a severe swallowing disorder. Patients and their families must sometimes choose between oral and non-oral nutrition. Speech-language pathologists are an integral part of the medical team that provides options and information about methods of nutrition. Therefore, speech-language pathologists must have current and accurate knowledge and skills about the areas of swallowing and alternative nutrition in order to make recommendations and educate the patient, family, and other team members. The

problem was that the knowledge levels, roles, and responsibilities of speech-language pathologists working in medical settings with patients with dysphagia and dealing with issues related to alternative nutrition were unknown which made it impossible to design and implement training programs for professionals. The extent to which speech-language pathologists were involved with alternative nutrition was unclear as well as was the perceived and actual need for training and continuing education in these areas. Therefore, this study sought to describe the knowledge levels, roles, responsibilities, and training needs of speech-language pathologists in medical settings who were involved in the assessment and treatment of patients who may have or require alternatives to oral nutrition.

Health Care

Many individuals in today's society are able to live longer and healthier lives than in previous years because of advancements in medical technology and research. Healthcare professionals are now able to save many individual lives after a medical crisis and to extend the life of a patient with a chronic illness (Council on Ethical and Judicial Affairs, 1992, p. 2229). Consequently, professionals who work in medical settings

must update their skills frequently in order for their practice to encompass these rapid advances and changes in healthcare. Because there is an ever-increasing number of critically-ill patients who live longer and need the services of a comprehensive group of medical professionals, these professionals must have a complete knowledge base of current technology and treatment techniques in order to provide the best patient care possible.

The overall life span of individuals in the United States is steadily increasing. With increased longevity, the risk of critical and long-term illness is greater. The current life expectancy is 79 years for females and 72 years for males. Once adults reach the age of 65, they can usually expect to live 17 more years (U.S. Census Bureau, 1995). Additionally, the total proportion of older adults, those adults over age 65, is increasing dramatically. By 2030, the 65-and-older population will comprise 22% of the United States population outnumbering those age 18 and younger (Haber, 1994, p. 2).

With the increase in life span there is an accompanying risk of chronic and acute illnesses. According to a U.S. Senate Special Committee on Aging report, four out of five adults over age 65 report one or more chronic diseases, and many have multiple conditions

(Schlenker, 1993, p. 12). Also, older adults comprise the majority of patients that require a hospitalization, stay longer in the hospital than those under age 65, use more prescription drugs than younger people, and average more physician visits per year than the general public (Haber, 1994, p. 4).

Rehabilitation professionals in allied health and especially those in the fields of speech-language pathology, physical therapy, and occupational therapy are frequently employed in medical settings and play a critical role in acute and long-term management of debilitating medical events such as stroke, heart attack, brain injury, or dementia. Rehabilitation professionals work with the patients and their families in both direct intervention and in ongoing patient education in order to facilitate patients' independent use of new skills in their natural environment. The goal of rehabilitation is to help the individual to regain as much of their former skills and abilities as possible after an illness or injury by "restoring, enhancing, or preserving function or performance" (Fenderson, 1986, p. 4). Rehabilitation professionals also seek to facilitate the patient's return to an independent life style if possible (Kane, Ouslander, & Abrass, 1994, p. 248).

Although the need for rehabilitation services is rising as a result of the increase in the size of the older adult population and the increase in critically-ill patients, the simultaneous influence of managed care has limited and altered the amount of rehabilitation that a person may receive (Rao, 1999, p. 860). Most adults over age 65 rely on Medicare, a federally-sponsored health insurance program for individuals over age 65 or anyone who is permanently disabled, for their primary health insurance coverage. Medicare has also recently implemented measures to decrease benefits and control costs (Hartmann, 1998, p. 263; Rao, 1999, p. 858; Scott, 1999, p. 24).

Managed-care systems are insurance organizations that seek to control healthcare costs by monitoring the medical provider's treatment of patients and by evaluating the necessity, appropriateness, and efficiency of service delivery (Sonies & Frattali, 1997, p. 3; Weinper, 1989, p. 114). Examples of these types of insurance organizations include Health Maintenance Organizations (HMO's), Medicare HMO's, and Preferred Provider Organizations (Sonies & Frattali, 1997, p. 4). These groups vary in their control of and restrictions to the consumer as well as in the premium costs to the consumer and employer. It is conceivable that managed care could limit services at times

by using "gatekeepers" for patients to access specialists, by requiring referrals for specialists, by establishing limitations in the choice of providers, and by stringently reviewing specialized or costly procedures (Weinper, 1989, pp. 115-116). The influence of managed care requires that rehabilitation professionals be as well-trained as possible in order to provide optimal care in situations where there are limitations in the extent of service.

Further effects of managed care on rehabilitation services are demonstrated by changes in the length of time allowed for rehabilitation services, the number of different services available, restrictions in the number of visits, and payment caps. Recent legislative action with the Balanced Budget Act of 1997 created sweeping changes and limitations in home health care and in inpatient and outpatient rehabilitation coverage (Mackin & Forester, 1999, p. 13; Melvin, 1999, p. 944; Rao, 1999, p. 858).

The changes in health care policy have resulted in shorter hospital stays, patients returning to their homes more critically ill, and limited outpatient or home health benefits. Home health care and outpatient rehabilitation services are beneficial to the patient because they help to facilitate the transition back to the home setting (Scott, 1999, p. 24). Medicare has effectively slashed

rehabilitation services at every point of entry (Bern-Klug, 1997, p. 2172; Hartmann, 1998, p. 263). Therefore, it is critical that the rehabilitation provided to the patient be maximized for effectiveness with realistic and measurable objectives and an emphasis on patient autonomy and education (Martin-Harris & Cherney, 1996, p. 28; Rao, 1999, p. 864).

Speech-Language Pathology

Speech-language pathologists are an integral part of a comprehensive rehabilitation team. Speech-language pathology is a dynamic, expanding, and ever-changing field within the realm of healthcare. The scope of activities and responsibilities for speech-language pathologists evolves and expands quickly with new innovations and discoveries. A speech-language pathologist is "any person who evaluates, examines, counsels or provides rehabilitative services for persons who have or are suspected of having a speech, voice and/or language disorder" (Board of Examiners for Speech-Language Pathology and Audiology, 1998, p. 2). Speech-language pathologists also evaluate and treat swallowing disorders, which are referred to as dysphagia (American Speech-Language-Hearing Association, 1998).

A speech-language pathologist must obtain a master's degree from an accredited graduate level program and complete nine months of supervised, full-time employment. This allows the individual to receive the Certificate of Clinical Competence from the American Speech-Language Hearing Association, the national certifying body for the profession. Forty-four states also regulate speech-language pathology by requiring licensure from that state in order to practice in designated settings such as medical facilities. Of those states requiring licensure, 33 require some amount and type of annual continuing education (American Speech-Language-Hearing Association, 1999).

Oklahoma is one of the many states that require licensure in order to practice as a speech-language pathologist. Standards are reciprocal with the American Speech-Language-Hearing Association standards for certification. Criteria for both national certification and Oklahoma state licensure are as follows:

1. A master's degree from an accredited university in speech-language pathology.
2. 350 clock hours of directly supervised practicum experience.
3. Nine months of full-time, paid clinical experience in a speech-language pathology position under supervision of a licensed professional.

4. Successful completion of the Area Examination in Speech Pathology of the National Teachers Examination.
(Board of Examiners for Speech-Language Pathology and Audiology, 1998, pp. 14-20)

Additionally, the American Speech-Language-Hearing Association's Code of Ethics states that individuals should both "pursue continued professional development and practice within their competence level for their education and experience" (ASHA, 1994, p. 43). Some of the specialized areas speech-language pathologists may deal with in medical settings require professionals to seek training above that required for certification. Additional training beyond the master's degree becomes necessary because of changing or additional job responsibilities in order for the individual to practice appropriately and with the competence to fulfill all the job responsibilities.

"The knowledge explosion causes much of our training to be obsolete. Work has become more specialized with increased demands for ongoing continuing education just to keep up with job demands" (Darkenwald & Merriam, 1982, p. 4). This phenomenon is especially prevalent in the healthcare fields, and the changes in technology and medical advancements require speech-language pathologists to constantly update their knowledge and skills in order to practice competently and appropriately.

Even with the comprehensive coursework and practical experience required to obtain a master's degree in speech-language pathology, not every aspect of the field can be addressed extensively within the graduate curriculum. Much of the clinical knowledge base of the speech-language pathologist is acquired through practical experience in the job setting. Speech-language pathologists may be employed in a variety of settings including the public schools, hospitals and nursing homes, and higher education and professional training programs. To be prepared for any of these widely divergent work settings, the speech-language pathologist must often seek further education and specialization beyond the master's degree.

Professionals must also be self-motivated and astute in order to identify training needs and locate training opportunities when presented with new challenges in a current position or when changing to a different employment setting. This is especially prevalent in the medical workplace where technology and treatment techniques may change rapidly and dramatically. If speech-language pathologists do not constantly assess their professional knowledge base and abilities, individuals may be without the skills and knowledge to practice appropriately and most effectively.

Dysphagia

Dysphagia is a disorder or disruption in the swallowing process that can occur at any of three stages of the swallow--oral, pharyngeal, or esophageal (Logemann, 1983, p. 3). Dysphagia is also defined as difficulty with the transfer of material from mouth to the stomach (Groher, 1997, p. 1; Logemann, 1995). The signs and symptoms of a swallowing disorder may involve the structures of the mouth, pharynx, larynx, or esophagus. Swallowing disorders occur frequently in older patients and especially those with neurological damage from illnesses such as cerebrovascular accident, Parkinson's Disease, dementia, head injury, anoxia, or respiratory failure.

Dysphagia has been found to occur in 13-14% of acute care patients, 30-35% of rehabilitation patients, and 40-50% of patients in nursing homes (Logemann, 1995, p. 145). Total yearly cases of dysphagia may reach 300,000 to 600,000 (U.S. Department of Health and Human Services, 1999, p. 2). The occurrence of dysphagia is often seen in stroke patients and in those patients in intensive care settings (Groher, 1997, p. 2).

Since the population is aging, there will be an increase in the number of older adults with chronic or acute illness and an increase in the number of potential

patients with dysphagia. Patients who are diagnosed with dysphagia may have a range of nutritional impairments and even be unable to eat orally due to health risks. Researchers estimate that of the 12-14% of hospitalized patients who have dysphagia, more than 90% will be nutritionally compromised (Sitzmann & Mueller, 1988, p. 38). Health risks of dysphagia include choking, inhalation of materials into the airway, and malnutrition. The ramifications of these conditions indicate the severity and critical nature of swallowing disorders.

Even though swallowing disorders have been identified for many years, dysphagia became recognized as a condition amenable to therapeutic intervention and became prominent as a field or subspecialty of speech-language pathology only in the last two decades (Robbins, 1992, p. 56). Prior to the initiation of dysphagia treatment in the 1970's, patients with severe swallowing disorders were relegated to permanent tube feeding (Groher, 1997). Radiographic studies that use X-ray technology to visualize the oral, pharyngeal, and esophageal stages of swallowing began in 1972 and have since been refined and expanded to become the objective evaluation measure of choice for most professionals who treat dysphagia (Logemann, 1983, 1995).

Dysphagia is a potentially life-threatening disability because difficulty with swallowing can lead to weight loss, choking, a compromised airway, aspiration, or even death. Aspiration refers to "food or liquid penetrating the airway below the vocal folds" (ASHA, 1990, p. 8). The dangers of aspiration are increased risk of pneumonia, possible scarring of the lungs, or even death especially in a medically fragile patient. Aspiration pneumonia is a frequent cause of death among the elderly, and it may account for as much as 50% of the overall mortality rate especially among those who are chronically ill (Patel & Thomas, 1990, p. 390).

Patients with severe dysphagia or with decreased levels of consciousness may be unable to safely or to physically eat enough in order to obtain adequate nutrition. As a result, patients may require an alternative means for nutrition. The most common method of alternative nutrition utilizes a feeding tube inserted either into the nose or the stomach. Patients may receive all or a portion of their nutrition through their feeding tube. Since speech-language pathologists treat, evaluate, and diagnose patients with dysphagia, they are frequently providing therapy services for patients who have feeding tubes and also frequently conduct the initial swallowing

evaluation and make recommendations to the physician for non-oral feeding. Thus, alternative nutrition is an area requiring a critical competency level by the speech-language pathologist due to the frequency with which nutritional issues accompany swallowing disorders.

Adult Education

The overall purpose of adult education is to "assist adults to increase their competence, or negotiate transitions in their social roles... to gain fulfillment in their personal lives, and to assist them in solving personal and community problems" (Darkenwald & Merriam, 1982, p. 9). Adult education principles and learning strategies apply in various ways to both the speech-language pathologist and to the adult patients and families whom they serve. The speech-language pathologist is an adult learner and has a need to receive and participate in continuing education related to new treatment techniques and medical advances.

Additionally, adult education principles apply to the daily patient and family education that the speech-language pathologist must perform in order to provide maximally effective treatment. Speech-language pathologists are both adult educators and students of adult education. Adult education is a flexible and multifaceted endeavor and

involves both the process of adult learning and the methods for teaching adults. The education of adults occurs in both formal and informal settings (Merriam & Cafarella, 1999, p. 21).

Speech-language pathologists are continuously involved in teaching and training their patients, families, and co-workers about issues specific to patient care and to the field of dysphagia in general. A large proportion of the patients in the healthcare system are adults due to the simple increase in the average age of individuals in American society. The forum for adult education today is not limited to the traditional classroom, and many persons employed in non-typical educational roles like therapists may teach adults in many ways and at many times (Darkenwald & Merriam, 1982, p. 15).

Recently, there has been an impetus in the medical field to improve treatment efficacy through patient and family educational programs. These programs should aid in the generalization or transfer of learning from one environment to another and should also facilitate the patient's overall progress (Gilroth, 1990, p. 30). Patient and family education can ease the transition from the medical setting back to the home or other discharge site by

empowering patients to manage their own care (van den Borne, 1998, p. 91).

Additionally, effective patient and family education and training are critical since patients may receive less actual in-patient treatment time by a skilled professional than in the past due to faster hospital discharges and shorter hospital stays (Gilroth, 1990, p. 30; McClennan, Anderson, & Pain, 1996, p. 191). Patients who have well-designed home therapy programs may actually progress faster at home due to the comfort and familiarity of their surroundings and because their treatment program is being implemented by a close family member. Also, by the time patients return home, their overall health and endurance should have increased from their status at the onset of the illness so that they are more able to fully participate in a home treatment program (Gilroth, 1990, p. 30).

Proper education and training for the patient and family is critical when the patient will leave the medical setting with a device like a feeding tube. The patient and family must be able to operate the device properly, to troubleshoot for any problems or malfunctions, and to administer an adequate nutritional supply. The patient may be allowed to have some nutrition orally, and swallowing precautions designed by the speech-language pathologist

must be strictly adhered to in order to insure safety and continued recovery and to increase the possibility of resuming oral feeding. In order to perform successful training and patient education, the speech-language pathologist must be knowledgeable and comfortable with the subject areas of dysphagia and alternative nutrition. Also, the professional must be able to teach other adults effectively in order to maximize interactions with the patient and family. There must be educational opportunities available for speech-language pathologists to match their identified needs for training in specialty areas and fields of rapid change such as dysphagia.

There are established adult education principles that apply to speech-language pathologists and their work with adult patients. Adult learners are different from children and traditional students in many obvious ways but are also different in less-obvious ways that apply to learning (Knowles, 1980). Adults have been shown to be self-directed learners who are intrinsically motivated (p. 43). Also, adult learners are motivated to learn by their social roles and responsibilities at the time, and they seek immediate applications of knowledge. Thus, knowledge that is irrelevant to the situation at hand is less likely to be attended to and internalized.

Since adults are busy people with multiple responsibilities, many are less likely to have the luxury or desire to learn simply for the sake of knowledge (Knowles, 1980). Many adults choose continuing education activities that are practical in nature and oriented toward a current problem in their work or home setting (Merriam & Caffarella, 1999, p. 47). The role of adult education is to assist learners in their social or professional roles and to help individuals to perform these roles better. Adult education should be an enhancement of what the learner already knows, building upon their existing knowledge base (Darkenwald & Merriam, 1982, p. 77).

As self-directed learners, adults also exhibit critical reflection skills which enable them to analyze any inadequacies of their current knowledge and actively seek to change this situation (Brookfield, 1986). Professionals use critical reflection when they take the initiative to increase their knowledge in job-related areas through professional journals, workshops, textbooks, or networking. This concept of critical reflection of one's ability to perform current roles or job responsibilities applies to speech-language pathologists who may need to analyze their job performance and competence level. Professionals may decide to seek an avenue of continuing education to

increase their skills in a specific area such as dysphagia and alternative nutrition.

Unlike some of the other rehabilitation disciplines, speech-language pathology is an autonomous field functioning independently of physicians. Physician's prescriptions are required under specific circumstances for speech-language pathology services but only as a stipulation of the payment source such as Medicare and not by the speech-language pathology licensure or certification bodies. Speech-language pathologists typically work closely with a patient's physician; this is especially true in the case of a serious medical condition like dysphagia. The speech-language pathologist is usually the professional recommending an alternative to oral feeding because of severe swallowing disorders feeding tube, but the physician, patient, and family make the ultimate decision. The physician can choose to ignore or override the speech-language pathologist's recommendation.

Autonomy is a characteristic exhibited by adult learners. Autonomy in individuals has been closely linked with self-direction which is characterized by independence and by the ability to make critical judgments (Chene, 1983, p. 39). All adults move from dependence toward autonomy at different rates and vary in their level of autonomy by the

situation and by their role in that situation (Knowles, 1980, p. 30). Four major variables impact whether an adult is able to be autonomous in a situation like the workplace. These variables include "technical skills used in learning, familiarity with the subject, sense of personal competence and motivation to learn at that moment (Merriam & Caffarella, 1999, p. 310).

A professional or layperson who is not strong in all of these variables may not be in a position to exercise autonomy in learning at that point in time. Also, it cannot be assumed that all adults will seek the information and knowledge that they need to perform their professional roles at all times. Their current life circumstances will have an impact on their autonomy and self-direction or at least an impact on their action toward continuing education. Beyond motivation to improve their skill level, professionals also need to be aware of educational opportunities; to have resources including time and money to attend a course or purchase a text; and to have options of educational opportunities that are close in proximity and convenient to work schedules and demands (Merriam & Caffarella, 1999, p. 57).

Adults seek knowledge in many ways including through formal educational settings like colleges and universities

and through continuing education courses hosted by professional or private organizations. These formal settings are the traditional vehicles for adult education and are viewed by many as the only means of adult education. However, learning also occurs frequently and unobtrusively in informal situations that occur naturally in an adult's social setting, and this learning is often unplanned (Darkenwald & Merriam, 1982, pp. 152-153).

Informal learning includes self-education in which an individual actively seeks knowledge independently such as referring to a textbook or a clinical practice journal. Additionally, many adults network on their own or join groups such as professional associations, support groups, or gardening clubs. Private instruction from an expert in an area is also a means of informal education (Darkenwald & Merriam, 1982). Accurate knowledge of the specific settings in which adults like speech-language pathologists currently learn can facilitate effective teaching and help to reach the most learners possible in settings outside of the traditional classroom.

Problem Statement

Speech-language pathologists evaluate and make recommendations for patients with swallowing disorders which may include the use of non-oral nutrition through a

feeding tube. Although the evaluation and treatment of patients with dysphagia is within the scope of practice of speech-language pathologists, it was unclear what specific knowledge and skill levels professionals had regarding alternative nutrition. It was also unclear where and how these skills were acquired and how confident and satisfied professionals were with their current knowledge base.

Speech-language pathologists are the healthcare providers who assume the primary role in diagnosing and providing treatment and education for patients with swallowing disorders. Dysphagia evaluation and treatment is included in the scope of practice of speech-language pathologists (ASHA, 1998, p. 4; ASHA, 1992, p. 28). Speech-language pathologists are uniquely qualified for this role due to their knowledge of the structures and functions of the musculature involved with swallowing and the head and neck region. In 1997, over 50% of speech-language pathologists across settings and 95% of those practicing in hospitals indicated that they provided treatment for patients with dysphagia (ASHA, 1997, p. 8).

Since dysphagia diagnosis and treatment is a relatively new area, the level and consistency of expertise among currently practicing speech-language pathologists regarding alternative nutrition was unknown. Many speech-

language pathology programs have only recently begun including coursework on dysphagia, and this coursework which may have only minimal information on alternative nutrition. There is no required course on dysphagia or components that must be included in a dysphagia course mandated by the American Speech-Language-Hearing Association; curriculum varies by the institution (ASHA, 1999, p. 6). Many speech-language pathologists have pursued continuing education courses or other forms of education in order to effectively and competently practice in the field of dysphagia. However, continuing education is not uniformly mandated and depends upon many factors. These factors include the professionals' opinion of their own knowledge level as well as cost, time, employer support, motivation, and reward factors.

Feeding tubes are an alternative means of nutrition, and nutrition is basic to the maintenance of human life and healing after an illness or injury. Feeding tubes may be recommended by the speech-language pathologist for patients with severe dysphagia. Patients, families, and other professionals must be provided with accurate, complete, and consistent information from the speech-language pathologist in order for them to make informed decisions and to complete their treatment regimens. Individuals without

complete information may make inaccurate decisions and resolve not to use a feeding tube which could result in a poor prognosis, a prolonged recovery, or even death. ASHA's Code of Ethics states as one of its principles that professionals must "fully inform persons they serve of the nature and possible effects of services provided and products dispensed" (ASHA, 1994, p. 43). Speech-language pathologists cannot appropriately fulfill their ethical and professional obligations without a complete knowledge base, and patients and families need well-educated professionals who are comfortable with and knowledgeable about this topic. The well-prepared speech-language pathologist can provide information about all options for nutritional support and facilitate patient and family decision-making.

Despite the significant role played by speech-language pathologists in alternative nutrition decisions and recommendations, there is no research to provide information about where, when, or to what extent speech-language pathologists have learned about feeding tubes. This information is critical for continuing education programs, university speech-language pathology programs, and healthcare organizations; for program planning; and for curriculum design. The trend toward continuing education requirements for licensure renewal will certainly continue

to grow. Clearly, training for speech-language pathologists will be an ongoing area of need.

Moreover, the need for training specific to alternative nutrition and other issues with dysphagia will increase. There will likely be a rise in the prevalence of dysphagia and the use of alternative nutrition with the increase in geriatric and critically-ill patients. Currently there is no uniform course or training requirement for speech-language pathologists about alternative nutrition in either university or employment settings. The American Speech-Language Hearing Association (1999) Accreditation standards simply state that the curriculum of a graduate program should "offer appropriate courses and clinical experience on a regular basis...so that students enrolled in the program may satisfy the requirement for a graduate degree in speech-language pathology... for entry into professional practice" (p. 6).

Speech-language pathologists who treat dysphagia are frequently in a critical role in the recommendation of alternative nutrition. The speech-language pathologist is often the primary professional to educate the patient and family regarding the feeding tube and the prognosis for a return to oral intake because of their involvement in the assessment and treatment of swallowing disorders. However,

it was unknown if these professionals had acquired the knowledge and skills through education or clinical experience in order to understand all of the risks and ramifications associated with the different types of alternative nutritional methods.

There are no clearly defined roles or parameters for speech-language pathologists and alternative nutrition. Roles and responsibilities of the speech-language pathologist may vary by medical facility, region, the individual, or many other dynamics. The current roles and responsibilities of speech-language pathologists with patients with alternative nutrition needed to be determined. Additionally, the perceived appropriate roles for speech-language pathologists who work with patients and families with alternative nutrition needed to be identified. This information was critical for designing and determining the content of continuing education programs.

Purpose Statement

The purpose of this study was to describe the knowledge levels, perceptions, and roles of speech-language pathologists working in healthcare settings related to alternative nutrition. Professionals' perceptions of their knowledge as well as an objective measure on a knowledge

test were obtained. Demographic data about employment, education, work setting, and region were also gathered. Additionally, information was obtained about speech-language pathologists' level of involvement and specific responsibilities with patients with alternative nutritional methods. The critical knowledge components for continuing education as perceived by speech-language pathologists related to alternative nutrition were also determined.

Research Questions

1. What is the demographic profile of the speech-language pathologist working in medical settings with patients with alternative nutrition?
2. What are the relationships between the variables of demographics, education, experience, employment setting, and knowledge levels of speech-language pathologists in medical settings?
3. What are speech-language pathologists' actual and perceived knowledge levels related to alternative nutrition?
4. What differences, if any, exist between speech-language pathologists who work with patients with alternative nutrition on knowledge or demographic variables?
5. What training needs exist for speech-language pathologists related to alternative nutrition?
6. What do speech-language pathologists perceive as the critical knowledge components that should be included in speech-language pathology training programs in order for professionals to successfully perform their roles?
7. What are the speech-language pathologists' current roles in medical settings with patients

related to alternative nutrition?

8. What are the professionals' perceptions of appropriate roles for the speech-language pathologist related to working with patients with alternative nutrition?

The demographic information about speech-language pathologists was obtained through the use of a mail survey and was analyzed with frequency distributions and measures of central tendency. The data to describe the relationships between demographic, educational, experience, employment, and knowledge levels of the respondents were obtained through the mail survey. These data were then analyzed with frequency distributions, analysis of variance, and cluster analysis. Actual and perceived knowledge levels related to alternative nutrition were obtained through the Knowledge Assessment section of the survey, and the data were analyzed with frequency distributions and measures of central tendency. Differences between speech-language pathologists on knowledge and demographic variables were obtained through the survey and were analyzed with cluster analysis and discriminant analysis. Information about training needs was gathered through the Knowledge Assessment portion of the survey and through follow-up interviews with respondents. These data were analyzed through cluster

analysis that demonstrated differences between groups of speech language pathologists and through frequency counts of the trends reported by respondents in the interviews. Speech-language pathologists' perceptions of the critical knowledge components needed in training programs about alternative nutrition were gathered through interviews with respondents. These data were analyzed with frequency counts. Information about speech-language pathologists' current roles with alternative nutrition was obtained through the survey and the follow-up interviews, and frequency distributions were used for analysis. Speech-language pathologists' perceptions of their appropriate roles with alternative nutrition were gathered through follow-up interviews and were analyzed with frequency counts.

Definition of Terms

Acute-Care Hospital: An institution for medical, surgical, or emergency care. The individual generally requires immediate medical attention, and the disorder is potentially threatening to life or function (Webster's II New Riverside Dictionary, 1984).

Andragogy: The art and science of facilitating adult learning (Knowles, 1980).

Adult Education: Natural, unplanned learning and deliberate, sustained efforts to acquire new knowledge (Darkenwald & Merriam, 1982, p. 7).

Adult Learning: Learning that results "from a transaction among adults in which experiences are interpreted, skills and knowledge acquired, and actions taken" (Brookfield, 1986, p.4).

Advance Directives: Written documents including but not limited to living wills and durable powers of attorney for health care completed by an individual in advance of an incapacitating illness or injury that describe what types of treatment the person would or would not want should they become incapacitated (Davitt & Kaye, 1996, p. 42).

Alternative Nutrition: Temporary methods of feeding for persons unable to take nutrition by mouth (Logemann, 1998, p. 350).

Aspiration: Material enters the airway below the level of the vocal cords before, during, or after the swallow (Logemann, 1998, p. 5).

Autonomy: The right to control one's own destiny and to exert one's will (Kane, et al., 1999, p. 485).

Critical Thinking or Reflection: Identifying and challenging assumptions and generating alternatives to these assumptions (Brookfield, 1987, p. 15).

Dementia: General mental deterioration due to organic factors (Stedman's Medical Dictionary, 1990, p. 410).

Dysphagia: A disorder or difficulty in swallowing (Nicolosi, Harryman & Kresheck, 1983, p. 80).

Empowerment: Having the opportunity to learn, discuss, decide, and act upon decisions. Professionals collaborating with and encouraging patient decision-making (Haber, 1994, p. 34).

Enteral: By way of the gastrointestinal tract (Stedman's Medical Dictionary, 1990, p. 516).

Esophagus: The portion of the digestive tract between the pharynx and the stomach (Stedman's Medical Dictionary, 1990, p. 537).

Gastroesophageal Reflux: Backward flow of the contents of the stomach into the esophagus and possibly into the pharynx and trachea where they can be aspirated into the lungs (Stedman's Medical Dictionary, 1990, p. 1338).

Gastrostomy Tube: A tube placed into a new opening made in the stomach (Stedman's Medical Dictionary, 1990, p. 637).

Larynx: The part of the respiratory tract between the pharynx and the trachea (Stedman's Medical Dictionary, 1990, p. 842).

Long-Term Care: Sustained care to maintain persons in their maximum state. The setting is often a nursing home (Dunkle & Kart, 1990, p. 225).

Patient Education: A planned learning experience using a combination of methods such as teaching, counseling, and behavior modification techniques that influence the patient's knowledge and health behavior (Chase et al., 1997, p. 227).

Pharynx: The throat (Stedman's Medical Dictionary, 1990, p. 1179).

Rehabilitation: Restoration following disease, illness, or injury of the ability to function in a normal or near normal manner (Stedman's Medical Dictionary, 1990, p. 1341).

Self-Directed Learning: A process in which adults take the initiative in diagnosing their own learning needs, formulating their own goals, identifying potential resources for learning, choosing and

implementing learning strategies, and evaluating their own learning (Knowles, 1975, p. 18).

Speech-Language Pathologist: A professional who provides assessment and treatment of speech, language, cognitive-linguistic, and swallowing disorders (Nicolosi, Harryman & Kresheck, 1983, p. 222).

Transformative Learning: The process of becoming critically aware of how and why our presuppositions have come to constrain the way we perceive, understand and feel about our world; of reformulating these assumptions to permit a more inclusive, discriminating, permeable and integrative perspective; and of making decisions or otherwise acting upon these new understandings (Mezirow, 1990, p. 14).

CHAPTER 2

REVIEW OF THE LITERATURE

Health Care

During the twentieth century, the major causes of death have shifted from acute or infectious conditions to chronic, more long-term illnesses (Kane, Ouslander & Abrass, 1999, p. 23; Ory, Abeles, & Lipman, 1992, p. 1). Due to an increase in medical treatments and advancements like antibiotics and vaccines, more people are living to older ages leading to a greater proportion of older people in the United States population. Health care thus has to focus more on issues of chronic, long-term diseases or disabilities, and how or even if to treat these conditions. Therapeutic interventions often concentrate more on maintaining independence and maximizing remaining abilities rather than significantly improving function (Abdellah, 1986, p. 48; Rakowski, 1992, p. 255).

Older adults are more likely than younger adults to become ill and to exhibit multiple chronic illnesses (Abdellah, 1986, p. 49; Kiyak & Borson, 1992, p. 155; Schlenker, 1993, p. 12). Eighty percent of older adults have at least one chronic condition although conditions vary by the individual and may not impair functioning significantly for activities of daily living (Abdellah,

1986, p. 48; Becker & Kaufman, 1988, p. 461; Boulton, Boulton, & Pacala, 1998, p. 499). Older people are more at risk for disease because of fewer physiological resources to use as defense and less overall resistance to illness (Granger, 1986, p. 27; Rakowski, 1992, p. 255). Patients with chronic disease of long-term nature must be more involved in decisions about the nature and direction of their care and often face complex decisions with unclear outcomes. These individuals must spend more of their valuable energy simply to stay alive and to be actively involved in their health care team (Kiyak & Borson, 1992, p. 141).

Effects of Chronic Illness

A person who lives with years of chronic illness and decreased functional abilities to perform everyday living tasks and self-care has an increased risk of living in an institution. Institutionalization is most often in a nursing home setting, is almost always permanent, and is linked to increased mortality and physical and mental health impairments. Research has shown that physical and psychological disabilities are present in many individuals who live in institutions (Baltes & Wahl, 1992, p. 84). Persons who are age 65 have a 25-50% chance of spending some part of their lives in a nursing home, and this likelihood increases greatly with age (Fulton & Katz, 1986,

p. 43). As many as 20% of individuals 85 years of age and older reside in nursing homes as opposed to 2% of the 65 year olds (Kane et al., 1999, p. 37).

The concept of health is broadly defined and is not limited to the physical symptoms of pain or discomfort. The World Health Organization (1946) defines health as "not only the absence of disease or infirmity but also a state of physical, mental, and social well-being" (as cited in Levi, 1992, p. 277). Since health is such a multifaceted concept, then health care must take a holistic approach in addressing the range of social and physical events that may impact an individual. Factors outside of the presence of a physical disease such as emotional support, environmental pressures, and economic status should all be considered in assessing a person's health (Granger, 1986, p. 31; Levi, 1992, p. 277). When an individual has complex medical needs and multiple chronic conditions, the physical, economic, and psychosocial issues to be considered become even more complicated and systemic.

Although mortality is commonly discussed in relation to health status, decreased mortality rates are not necessarily indicative of improved health. The level of disability of the individual and quality-of-life must also be considered. These factors must be weighed against the

trend and ability of medicine to extend the length of human lives at all costs (Estes & Rundall, 1992, p. 301).

Increased life expectancy may be misleading because often the number of years that are added to a person's life are years that are filled with disability rather than years that are healthy and disease-free (Kane et al., 1999, p. 25). This ratio of disabled to healthy years of a person's life may be as high as 3.5:1 (Estes & Rundall, p. 301).

Maintaining the lives of individuals while rendering them disabled and dependent increases the trend toward institutionalization. Families provide 80-90% of care for disabled relatives and generally try to avoid placing a family member in an institution at all costs (Brody, 1986a, p. 89). However, in contemporary American society, most adults, especially women who are most commonly the caregivers for family members, are in the workforce (Brody, 1986a, p. 94; Kane et al., 1999, p. 30). Additionally, families are more geographically isolated than in the past, and there is less emphasis on extended families remaining close to each other and being able to provide daily assistance (Estes & Rundall, 1999, p. 301). Therefore, even though many families prefer to avoid institutional care for a relative, the need to be employed and the distance between family members often leaves no other

option. Families are often faced with the choice of leaving a job to care for a disabled person, allowing the disabled individual to remain in the home with an unsafe level of supervision and care, or moving a family member to an institutional setting. Family members who do provide care for relatives generally report decreased income levels because of job loss or a reduction in work hours due to the demands of caregiving (Brody, 1986a, p. 94).

Health Care Funding

Public funding of medical care for the blind, elderly, and disabled is provided primarily through Medicare (Estes & Rundall, 1992, p. 308). This insurance plan covers 30 million people, 90% of whom are age 65 and older.

Individuals contribute to the Medicare system during their years of paid employment. Medicare Part A is available to almost all of the 65 and older population and pays for hospital costs. Individuals have the choice of paying additional premiums for Part B coverage which covers doctor's visits, diagnostic testing, and a few medications. Long-term care such as nursing homes are not covered by the Medicare system (Dunkle & Kart, 1990, p. 234).

Medicare and the U.S. health care system in general have traditionally focused on acute-care and not on chronic illnesses or disease prevention (Brody, 1986a, p. 70).

Medicare thus does not pay for long-term care; for extensive preventive care; or for essentials like glasses, hearing aids, or dentures (Becker & Kaufman, 1988, p. 462; Kane et al., 1999, p. 424). Ironically, this type of medical equipment and care is almost universally needed by older adults to increase their safety and basic comfort. Medicare also does not reimburse in-home, nonskilled care like homemaking or transportation (Kane et al., p. 309). This lack of coverage is unfortunate since these are all services that would increase the ability for people to remain in their homes and decrease their need for institutionalization.

Long-term care is sustained care designed to maintain impaired individuals at their maximal state. Settings for long-term care can be home, community, or institutional (Dunkle & Kart, 1990, p. 225). Rehabilitation and other services may be provided in long-term care settings, depending on the individual facility. According to a U.S. Special Senate Committee on Aging Report in 1982, goals of long-term care address three areas: delaying preventable disease, lengthening functional independence in patients with chronic disease, and improving quality in later life (as cited in Ferraro, 1990, p. 225).

The use of long-term care is increasing now for reasons in addition to the simple increase in the number of older adults and is possibly due to changes in health care coverage (Mackin & Forester, 1999, p. 15). Medicare changes in reimbursement and the trend of private insurance companies toward decreasing costs have led to faster hospital discharges. Since the implementation of the Prospective Payment System in 1984, hospitals are reimbursed a lump sum according to the patient's diagnosis regardless of how long the patient stays in the hospital (Becker & Kaufman, 1988, p. 462; Kane et al., 1999, p. 36; Petchers, Roy, & Brickner, 1987, p. 752). Thus, there is incentive for the hospital to move the patient to another setting as soon as this is medically possible in order to save resources and keep any extra allocated funds (Brody, 1986b, p. 71; Kane et al., 1999, p. 421).

The level of acuity of hospitalized Medicare patients has increased secondary to reimbursement policies based on diagnosis that allow only the patients needing the most intense treatment to be in the hospital. Thus, there is a greater proportion of severely-ill patients in the acute-care hospital setting now than in the past. Less-acute cases that were once seen in the hospital are now treated on an outpatient basis (Kane et al., 1999, p. 36; Petchers,

Roy, & Brickner, 1987, p. 752). This phenomenon has created increased demands on the skills of health care and rehabilitation professionals in inpatient and outpatient hospitals (Manton & Suzman, 1992, p. 348).

The trend toward shorter hospital stays releases patients either into the care of their family members or into an institution as an intermediate or final stop (Estes & Rundall, 1992, p. 310). In 1997, 15% of hospital patients were discharged to nursing home settings (Kane et al., 1999, p. 39). These discharges of sicker patients to their homes leave individuals at risk for extended or subsequent illness and place greater financial, emotional, and physical demands on their caregivers. Unfortunately, there is limited financial support for social and rehabilitative services in the home under Medicare especially after recent changes in reimbursement from the Balanced Budget Act of 1997 (Estes & Rundall, 1992, p. 315; Melvin, 1999, p. 945; Mackin & Forester, 1999, p. 13).

Sub-acute facilities, home health agencies, and skilled nursing facilities are now under a prospective payment system, which is similar to the acute-care reimbursement system, and which was mandated by the Balanced Budget Act of 1997. This act served to reduce Medicare payments to all types of health care providers

(Melvin, 1999, p. 945). These facilities receive a lump sum payment based upon the patient's diagnosis and are expected to pay for all of the patient's care as well as any rehabilitation out of this distribution (Rao, 1999, p. 858). Consequently, skilled nursing facilities are limiting the number of complex medical patients that they admit at any one time. This is an effort to avoid losing money since the reimbursement that skilled nursing facilities are allowed by Medicare may not even cover the costs that the patient incurs (p. 859).

Cost-cutting measures by insurance plans were a foreseeable action because of the escalating costs of health care. National health care spending in 1990 was greater than 661 billion dollars; this was a 10.4% increase over 1989 with costs growing an average of two to three times the inflation rate (Estes & Rundall, 1992, p. 311). This trend will only increase with the growth in the population of older adults because this age group typically accounts for one-third of total health expenditures (Estes & Rundall, p. 311; Kane et al., 1999, p. 22). Older persons use a disproportionate amount of health care resources considering that this group comprises only 12% of the current population (Kane et al., p. 22).

Rehabilitation and Chronic Illness

Decreasing costs in the acute-care arena may save money initially by moving patients to less intensive, less costly settings. However, this practice may cost more over time if patients do not receive rehabilitative care due to the brevity of their hospital stay. Rehabilitation helps patients to regain their physical and mental functioning and return to their prior level of independence so that they do not require institutional care. The financial burden of care for patients who are discharged from hospitals quickly and without adequate rehabilitation is simply shifted to Medicaid, the major public source of funding of long-term care for the poor (Becker & Kaufman, 1988, p. 466; Kane et al., 1999, p. 425).

Institutional care is exorbitantly expensive with premium and out-of-pocket costs disproportionate to the income of the poor. Adults who enter nursing homes are generally considered to be impoverished within 3 to 6 months (Estes & Rundall, 1992, p. 311-312). Individuals must spend all of their savings and sell their homes in order to qualify for financial assistance through Medicaid to pay their nursing home monthly costs (Kane et al., 1999, p. 419). Medicaid is a needs-based, federal-state, matching funds program that pays a pre-determined rate to

nursing homes for monthly costs and requires spenddown of all the individual's resources (Brody, 1986b, p. 71; Kane et al., 1999, p. 425). Nursing homes must balance the ratio of Medicaid patients to private-pay patients that they admit in order to continue to demonstrate a profit.

One of the risk factors for nursing home placement is the inability to safely care for oneself due to cognitive decline. As many as 5% to 10% of individuals age 64 to 74 and 20% of those age 75 and older living in the community may exhibit a degree of cognitive deficit. These rates are much higher in nursing home settings (Kane et al., 1999, p. 125). Fortunately, even patients with cognitive deficits can participate in rehabilitation programs and treatment planning with modifications and increased levels of support from health care professionals (Becker & Kaufman, 1988, p. 461). Thus, cognitive deficits should not exclude an individual from participating in a rehabilitation program.

The oldest-old, those individuals age 85 and older, are the largest proportion of the rapidly aging population. This is also the group that experiences the most illness and utilizes the most health care resources from acute to long-term care (Manton & Suzman, 1992, p. 327). The oldest-old group comprised 37% of nursing home residents in 1980 and is predicted to use 56% of nursing home beds by

2040 (p. 343). Not only will health care professionals need to be trained in issues related to adults but also in those issues specific to a very old and possibly fragile population.

Research has shown that chronic disability is age related but may not be age determined (Manton & Suzman, 1992, p. 327). Not only is rehabilitation effective but also much can be done in preventative care at earlier ages to prevent the later onset of disease and subsequent disability. Rehabilitation professionals can intervene early in the lifespan of individuals in a preventative function as well as an educational role. Age is not a limiting factor, and evidence suggests that rehabilitation intervention in advanced disease states can improve physical and mental functioning even for those individuals who are 85 and older (Becker & Kaufman, 1988, p. 460; Manton & Suzman, 1992, p. 329). Professional education programs in allied health, nursing, and medicine need to implement more emphasis on geriatrics and the care of the chronically ill in order to meet the needs of the population (Boult et al., 1998, p. 504).

Historically, rehabilitation has focused more upon younger people than upon older adults and was designed to assist individuals in their return to work (Becker &

Kaufman, 1988, p. 460). Thus, geriatric rehabilitation is a relatively new area of practice, requiring professionals to develop the attitude that elderly individuals can increase in their functional abilities (p. 459). Stedman's Medical Dictionary (1989) defines rehabilitation as "restoration following disease, illness, or injury, of the ability to function in a normal or near normal manner" (p. 1341). Rehabilitation involves treatment planning, goal setting, and retraining in areas such as physical, speech, or psychological functioning, using skilled professionals from the fields of speech-language pathology, physical therapy, occupational therapy, and counseling (Becker & Kaufman, 1988, p. 459).

Goals of Rehabilitation

Even though the outcomes of rehabilitation are individualized, the basic goal is to help patients return as near as possible to their prior independence level (Becker & Kaufman, 1988, p. 459). The family should be involved jointly with the rehabilitation professionals as early and as actively as possible in the patient's care (Becker & Kaufman, p. 463). Geriatric rehabilitation involves patients with more complex medical cases and the additional factors of increased age and decreased resiliency. Goals of geriatric rehabilitation exist on a

continuum and may include increasing overall physical fitness, restoring function to individuals who are chronically ill but not disabled, or improving the function of those individuals who are obviously disabled (Becker & Kaufman, 1988, p. 460).

As with all medical treatment requiring the expertise of professionals, rehabilitative care is expensive and is not reimbursed by Medicare or private insurance carriers for an extended period of time. However, rehabilitation that is focused on the functional daily skills needed for independence can make the difference in the level of care that patients require upon their discharge from the hospital. Early rehabilitative intervention is critical as is the continuity of care from the acute-care hospital into the discharge setting; this indicates a need for training and education of the patient and their families in ways to maintain and continue progress (Becker & Kaufman, 1988, p. 462). Patients who do not receive rehabilitation may be more dependent on others for their care leading to ultimately greater expense (p. 462).

Rehabilitation has been shown to be cost-effective in patients of all ages with both chronic and acute illnesses (Becker & Kaufman, 1988, p. 463). Patients who participate in a rehabilitation program typically are able to live more

independently and avoid institutional care. Even if patients live in a long-term care setting, they may be able to be more independent by increasing their functional abilities through rehabilitation (Becker & Kaufman, 1988, p. 463; Petchers et al., 1987, p. 753). Additionally, any reduction in disability level leads to decreased health care costs (Becker & Kaufman, 1988, p. 463).

Not only are well-trained rehabilitation professionals needed for the health care of America's older adults, but also sheer numbers of professionals are needed. If population projections are correct, by 2040, there will be a need for 197% more health care professionals in community agencies and for 270% more in institutional settings (Manton & Suzman, 1992, p. 341). The population of individuals with disabilities will number 7 million in 2000, 9 million in 2020, and 12.4 million in 2040 (p. 342). Nursing home capacity must increase by 2.2% per year in order to maintain pace with the demand that the increase in the population will provide (p. 324).

Patients in institutions are more acutely ill than those in previous years, and many institutions are chronically understaffed. There is a lack of qualified personnel in nursing homes especially nursing staff, and institutions habitually lack the recommended registered

nurse to patient ratio. This shortage occurs even while the medical complexity of patient admissions increases as patients are discharged from the hospital earlier (Manton & Suzman, 1992, p. 348). Typically, nursing homes are lacking in both adequate numbers and in the training level of staff.

Medical Decision-Making

An issue that arises in all medical settings when individuals are severely ill and unable to communicate their wants and needs is the patient's right of autonomy and decision-making. Patient autonomy is the "right to control one's own destiny, to exert one's will" (Kane et al., 1999, p. 485). Autonomy is closely linked to the patient's decision-making capacity. Even patients with some degree of dementia and memory loss can make informed decisions about their care if provided with the right information in the appropriate manner (p. 487).

In a busy hospital setting, patients may not be given adequate time for review of their health care options and for making health care decisions. Patients and their families may be pressured to decide quickly about placement of medical devices or medical treatments. These are stressful medical decisions under ideal conditions and are compounded by the presence of potentially critical illness.

Medical crises do not allow for thorough discussion and analysis of treatment options (Lo & Dornbrand, 1984, p. 402).

Health care personnel may not take extended time to review and explain treatment options and all of the associated ramifications. Additionally, key health care personnel may not be available during the hours that the patient's family is present in order to provide information and consultation that would aid in informed decision-making (Kane et al., 1999, p. 487). Health care professionals may present information in an ineffective manner, in a biased manner, or in a manner that does not allow for questioning by the patient and family (p. 488).

Physicians should present information objectively about alternatives, risks, and benefits associated with treatment options and then assess the patient's understanding. Decision-making should be a joint process between the patient and the physician if the patient is competent. The advance directive that delineates the patient's wishes for life-sustaining medical treatment should be followed if patients are not competent to speak for themselves (Lo & Dornbrand, 1984, p. 402). Since health care professionals have their own inherent biases, they may present the options that they feel are most

appropriate for the patient. The professional's personal values may influence the presentation of information (Kane et al., 1999, p. 493). Advance directive documents are designed to help avoid some of these dilemmas, and an informed team of health care professionals can assure that information is presented objectively, can be discussed openly, and multiple viewpoints can be considered.

Many patients, especially those currently 65 and older, place much authority and the ultimate decision-making upon their physician, refusing to take an autonomous position in their own health care (Kane et al., 1999, p. 493; Rao, 1999, p. 859). Older patients also tend to rely on their physicians over any other health care professional and do not question the options for treatment that are presented to them (Becker & Kaufman, 1988, p. 465). This stance leads to medical decisions based upon the physician's or other health care professional's values rather than on the patient's values, and it places the professional in a precarious legal and ethical position.

One of the greatest ethical dilemmas currently facing health care professionals is how aggressive to be in the nutritional management of patients who cannot eat or swallow. Technology can support patients who cannot eat but at great psychological and financial expense and at

sometimes questionable value. Medical ethics policy in health care now is to view alternative nutrition as medical treatment rather than basic care or as a right of the individual (Kane et al., 1999, p. 495). Cases for using alternative nutrition must be considered on an individual basis especially if the prognosis is uncertain or poor.

Decisions must be made about the benefits versus the risks of any intervention such as pain or discomfort (Lo & Dornbrand, 1984, p. 403). Technology has revolutionized health care but "life-sustaining treatment is not mandatory simply because it is possible" (p. 403). Using alternative nutrition may prolong a person's life, but the underlying disease process is left intact often leaving little change in the prognosis even with nutritional intervention. Difficult decisions about heroic versus ethical treatment will only increase as technology improves and the older adult population grows. These decisions must be addressed by health care professionals, patients, and families together in order to facilitate the most appropriate care for each individual (Sloane & Rizzolo, 1993, p. 927).

Speech-Language Pathology

Speech-language pathologists are rehabilitation professionals who provide services to adult patients with communication and swallowing disorders in medical settings

as part of an interdisciplinary health care team. An integral part of the speech-language pathologist's interventions especially with adult patients is the education of the patient and family about the nature of the condition, recommendations, prognosis, and course of the disease.

In order to effectively deliver rehabilitation services, the speech-language pathologist must function interactively with the patient and be more than just an "information-giver." The professional must be adept in methods of addressing individual learning styles and patient and family needs. Since the majority of patients in health care settings are adults, educational efforts need to be designed and implemented using adult learning principles and strategies (Casserly & Strock, 1988, p. 60; Goodwin-Johansson, 1988, p. 10).

To be an effective therapist and educator, the speech-language pathologist must have the most current content knowledge and training about medical innovations and advancements and of changing practice patterns in the field. Ongoing continuing education by the professional is needed to achieve this level of expertise and is also mandated by the American Speech-Language-Hearing Association in an effort to assure that professionals are

providing ethical and competent treatment to patients and families.

There has been an increase in the demand for speech-language pathologists in medical settings recently due to demographic shifts, improved knowledge of the benefits of speech-language pathology services, and increased coverage of these services by insurance providers (American Speech-Language-Hearing Association, 2000, p. 4). The speech-language pathologists needed in health care sites not only require specialized knowledge of issues and practices related to the setting but also require a knowledge base of the broader issues of health and rehabilitation that cross disciplines (Shadden, Toner, & McCarthy, 1997, p. 37). Speech-language pathologists need to be specialists and generalists simultaneously.

Speech-Language Pathology Training

The master's degree is the entry level credential for the speech-language pathologist, and some groups are even calling for a clinical doctorate to address the knowledge explosion that has occurred in the field in recent years and the subsequent difficulty in becoming fully prepared for all aspects of clinical practice in a master's level program (Shadden, Toner, & McCarthy, 1997, p. 38). In the Shadden et al. study, the majority of speech-language

pathologists surveyed felt there was a need for training beyond the master's degree in order to be proficient in adult medical settings (p. 56).

One of the areas in which practicing speech-language pathologists and medical program administrators alike express concerns about continued professional training is dysphagia or swallowing disorders. Professionals preferred continuing education courses as the method of gaining this additional training and knowledge (Shadden, Toner, & McCarthy, 1997, p. 43). Continuing education is critical for those who did not have specific coursework in their graduate training and to disseminate updated information on the normal physiology of swallowing and on evaluation and treatment options (Logemann, 1997, p. 125). Continuing education helps build upon current skills and expand the speech-language pathologist's knowledge base (p. 132).

Not only is it difficult to adequately and comprehensively address all of the specialized areas within speech-language pathology in graduate programs, but also not all programs offer a separate course in normal and disordered swallowing and the interaction of swallowing with overall health and functioning (Logemann, 1997, p. 123). Programs are required to address swallowing disorders in some manner, but the specifics are not

mandated by the American Speech-Language-Hearing Association.

Only about one-half of university training programs offer coursework in dysphagia, and what is offered may only be a part of another course (Logemann, 1997, p. 127). In 1994, only 18 of 103 accredited programs in speech-language pathology offered dysphagia coursework (Shadden, Toner, & McCarthy, 1997, p. 55) although this number has most likely increased since that time. Continuing education courses may be one of the most accessible opportunities for a speech-language pathologist to learn about swallowing disorders.

Training opportunities for speech-language pathologists in dysphagia are vital due to the critical impact that a swallowing disorder can have on a person's life. Patients may die without adequately trained professionals (Logemann, 1997, p. 123). Speech-language pathologists who are not adequately trained may succumb to pressures to provide treatment without adequate assessment, or they may defer to the wishes of the physician or other health care professional who is not trained in dysphagia management. This can lead to feeding a patient when it is not safe to do so or when there is not the appropriate information from a dysphagia evaluation (p. 125).

The knowledge base for dysphagia assessment and treatment is larger than for any other area in speech-language pathology (Logemann, 1997, p. 125). Professionals need knowledge as well as skills to provide the best treatment for patients with swallowing disorders. The speech-language pathologist must be able to integrate information from the bedside and instrumental evaluations and communicate the results to the patient and the medical team. The speech-language pathologist must also be knowledgeable of dietary and nutritional options for patients (p. 126). Other areas in which the speech-language pathologist should demonstrate competency because of the relevance to dysphagia are counseling techniques, ethical issues related to feeding, and advance directives. Continuing education is the vehicle that helps to continually build the professionals' foundation of dysphagia knowledge (Miller & Groher, 1993, p. 182).

Roles of Speech-Language Pathologists

Speech-language pathologists are the medical professionals who have the primary role in assessment, treatment, and research in dysphagia (Logemann, 1995, p. 159). Speech-language pathologists possess the knowledge and skills to assess and treat patients in the area of swallowing disorders due to their intimate knowledge of the

head and neck and their foundation in the anatomy and physiology of the oral, pharyngeal, and respiratory mechanisms (Miller & Groher, 1993, p. 180). Many of the muscles and nerves utilized in speech production are the same as those used for chewing and swallowing. Dysphagia assessment and treatment has also been recognized as within the scope of practice of speech-language pathologists by national groups such as the Joint Commission for the Accreditation of Health Care Organizations, the U.S. Department of Health and Human Services, and the Health Insurance Association of America (p. 180).

Often, patients who exhibit disordered swallowing will also have disturbances in speech motor control and strength. For these reasons, speech-language pathology has taken the forefront in rehabilitation for this relatively new area of practice. In fact, 30% to 90% of a speech-language pathologist's time in medical settings may be devoted to patients with swallowing disorders (Logemann, 1997, p. 127). Dysphagia treatment has only evolved as a subspecialty of speech-language pathology in the last two decades (Groher, 1997, p. ix). This occurred as the medical field realized that evaluation and intensive treatment can aid in the return of an individual to normal feeding and swallowing (p. ix). As many as 80% of the

individuals who have symptoms of dysphagia may be able to return to full oral intake depending on the underlying medical condition (Logemann, 1995, p. 159).

The frequency with which the speech-language pathologist in medical settings provides treatment for patients with swallowing disorders is demonstrated by recent practice patterns. In a 1997 caseload survey by the American Speech-Language-Hearing Association, 95% of speech-language pathologists in hospitals and 97% of speech-language pathologists in residential health facilities like nursing homes reported treating patients with swallowing disorders. Fifty-one percent of speech-language pathologists across employment settings reported regularly treating or assessing patients with swallowing disorders (ASHA, 1997, p. 8). Patients with dysphagia are typically older adults especially those in residential health care facilities between the ages of 65 and 84 (p. 4). These demographic factors indicate that speech-language pathologists need training in both swallowing disorders and specific health issues of aging patients including the ways in which adults learn.

Importance of Patient and Family Education

In working with adult patients and families in medical settings, an integral part of the speech-language

pathologist's job is educational to facilitate learning and increase the likelihood that new skills will extend beyond the immediate treatment setting. The skills and techniques that increase the safety and abilities of the patient should not be taught in isolation of the situation and the individual. It is crucial for the speech-language pathologist to know how to design interventions that work well for adult learners since a large part of a clinician's caseload will be comprised of adult patients.

Additionally, the information provided about swallowing disorders is related to a serious medical condition and therefore is of critical importance (Goodwin-Johansson, 1988, p. 10). The definition of patient education is broad and involves a "planned learning experience using a combination of methods such as teaching, counseling, and behavior modification techniques that influence the patient's knowledge and health behavior" (Chase, Elkins, Readinger, & Shepard, 1997, p. 227).

Health care is recognizing the importance of education for adults for preventative, compensatory, and adaptive purposes (Goodwin-Johansson, 1988, p. 10). "In contrast to simply presenting information, education enhances skills and contributes to psychological adaptation to illness or caregiving" (Boise, Heagerty, & Eskenazi, 1996, p. 80).

Patient education that is patient-centered promotes trust, enhances professional relationships, empowers patients, improves outcomes, and helps in informed decision-making (American Academy of Family Physicians, 1984, p. 1; Boise, Heagerty, & Eskenazi, 1996, p. 80; Weston & Brown, 1995, p. 27). "Patient and family education is a recognized, expected component of good rehabilitation practice" (McClennan, Anderson, & Pain, 1996, p. 191). Recently, there have been national demands for health promotion and disease prevention through patient education by accrediting bodies and federal agencies such as the Healthy People 2000 and 2010 programs mandated by the U.S. Public Health Service (Jensen, Lorish, & Shepard, 1997, p. 246).

Both the American Medical Association and the American Nurses Association endorse programs that teach patient and family education in their curriculum (Houts, et al., 1996, p. 72). Physical therapy programs require that graduates are able to apply techniques and learning theory for design, implementation, and assessment of techniques used in education of patients, colleagues, and the community (Chase et al., 1997, p. 226). Physical therapists report that patient education is a very important part of their jobs, and a part in which they actively engage (p. 239). Hospitals also encourage and

often mandate patient education program development (Giloith, 1990, p. 29).

Design of Patient and Family Education

The field of speech-language pathology has not heretofore placed a strong emphasis on medical service delivery methods perhaps due to a traditional emphasis on the public school sector where most speech-language pathologists have historically been employed. The need for speech-language pathology to develop practice geared toward adult patients is evident as modeled by the allied health fields of nursing and physical therapy. This emphasis should be integrated into all training programs as the presence of speech-language pathologists in medical settings is well-established and will continue to grow.

Determining the content and direction of patient and family education should not be clinician-directed but should involve an assessment of the individual's needs at the time to facilitate resolving or alleviating the problems that the individual is experiencing (Casserly & Strock, 1988, p. 60; Knowles, 1980; McClennan et al., 1996, p. 191; Weston & Brown, 1995, p. 27). Additionally, the speech-language pathologist needs to understand or at least consider the patient's belief system, motivation, and perspective on interventions and health (Jensen et al.,

1997, p. 244). The context of the patient's life will influence how the disease or condition is manifested, in its severity, and in the patient's reaction to the condition (Jensen et al., 1997, p. 251; Weston & Brown, 1995, p. 28).

Direction of Patient Education

Speech-language pathology educational efforts should be directed at helping patients and families adopt treatment recommendations into their personal lifestyles especially as patients and families are expected to perform more care at home (Gilothe, 1990, p. 35; Houts et al., 1996, p. 64). The patient's priorities need to be integrated into health planning. This gives the individual power and avoids imposing the medical professional's authority and control onto the patient (Goodwin-Johansson, 1988, p. 11).

Historically, medical professionals have been trained to view themselves as authorities, and professionals must actively work toward returning control to the patient. Also, situations involving medical trauma tend to trigger dependency to some degree in almost all individuals creating more reliance on others for decision-making (Goodwin-Johansson, 1988, p. 11; Serradura-Russell, 1992, p. 104). Patient educational programs were previously based on what the professional thought the individual

needed to know rather than on the patient's stated needs (McClennan et al., 1996, p. 192). Fortunately, rehabilitation professionals are beginning to realize that that a clinician-focus is ineffective and that education should be dictated by the learner's needs at the time (McClennan et al., 1996, p. 191; Weston & Brown, 1995, p. 28).

Since hospital stays have been shortened by insurance companies, it is more critical than ever to provide educational resources to avoid repeat hospitalizations, decrease medical complications, and decrease patient and family stress (McClennan et al., 1996, p. 198; van den Borne, 1998, p. 93). Health care cuts have led to fewer and shorter sessions available for speech-language and dysphagia therapy (Sonies & Frattali, 1997, p. 10). Thus, the speech-language pathologist must quickly initiate evaluation and treatment planning aimed at continuity of care and goals that will transfer and apply to the discharge setting. Clear communication of swallowing recommendations to the patient, family, and other professionals is critical (Logemann, 1998, p. 241).

Additionally, insurance companies are increasingly concerned with outcome-based measures that demonstrate that the therapeutic intervention caused an increase in the

patient's abilities; they want to know that the treatment provided by the therapist made an important difference (Sonies & Frattali, 1997, p. 23). Patient outcomes can be enhanced with programs designed in ways to maximize patient involvement and follow-through (Jensen et al., 1997, p. 246). The patient and family will be required to do more care at home and to be able to manage health issues themselves since patients are sent home sicker now (McClennan et al., 1996, p. 191). Rehabilitation professionals cannot assume that patients will be able to perform therapeutic activities independently without conscientious efforts toward education and application to home settings (Houts et al., 1996, p. 71).

Speech-language pathologists in health care must maximize treatment effectiveness, and individualizing treatment approaches and considering the uniqueness of the patient is necessary to achieve this goal. Families need information as well as practical applications to their lives to actually be able to implement what is taught (Houts et al., 1996, p. 71). Research has shown that caregivers in the home setting who were trained by speech-language pathologists in swallowing techniques and strategies were as effective in avoiding complications for

the patient as were professionals in this role in the home (Logemann, 1998, p. 245).

Patient Education and Adult Learning

The effective rehabilitation professional must be patient-centered and not therapist-centered; this is a general principle for facilitating adult learning in any context (Knowles, 1980). Being client-centered rather than provider-centered improves the quality of therapy (Jensen et al., 1997, p. 251). Determining the learning needs of the patient and family rather than prescribing a set doctrine or set of exercises is crucial (McClennan, Anderson, & Pain, 1996, p. 191; Weston & Brown, 1995, p. 28). Patients are more likely to adhere to plans in patient education programs that are based upon their personal beliefs of the problem and the solution, and plans that allowed them to become empowered (Holland, 1999, p. 51; Lipkin, 1996, p. 10; Weston & Brown, 1995, p. 27).

Additionally, the speech-language pathologist must avoid the temptation to provide the patient with all of the knowledge deemed important by the health care professional (Jensen et al., 1997, p. 246). The goal of patient education cannot be "unquestioning compliance with medical advice" (Goodwin-Johansson, 1988, p. 12). Instead, the goal should be open sharing of doubts, questions, and

concerns and presenting information so that the patient chooses to follow-through with therapy programs.

Paulo Freire's, a Brazilian educator and activist, compared modern education to a "banking" system that attempted to deposit the knowledge deemed important by the dominant culture into the passive student (Freire, 1970). Freire felt that this type of educational system was wrong and was oppressive to the students and served only the interests of those in power and control in society. Health education can fall into this same dictatorial approach without an effort to be patient-centered. Patient-centered education leads to empowerment and a sense of control which in turn leads to more positive health behaviors, attitude, and decreased incidence of depression (Boise, Heagerty, & Eskenazi, 1996, p. 80).

Communication in Patient Education

Speech-language pathologists are specialists in human communication and its disorders and as such have the ideal background to be leaders in providing patient and family education. Clear communication by all professionals on a rehabilitation team is critical for providing quality health care (Logemann, 1998, p. 241). Speech-language pathologists can implement and teach strategies to improve caregiver-patient interactions and to enhance communication

in a variety of scenarios (Clark, 1997, p. 252). Speech-language pathologists can also help other health care professionals communicate with older adult populations and avoid ageism or applying negative stereotypes because of age (Clark, 1997, p. 266). Knowledge about the nature of communication disorders and the possible behaviors that may occur with a communication disorder facilitates understanding and empathy with the patient by professionals and caregivers (p. 266).

Effective communication is reported as an area of need, frustration, and stress across medical diagnoses, and deficits in communication have even been shown to increase the risk of institutionalization for patients with Alzheimer's Disease (Clark, 1997, p. 253). Older adults value clear communication and report that it is more important to have a professional who can present material effectively and with concrete examples than to have the most knowledgeable therapist (Chase et al., 1997, p. 227). Also, the effectiveness of health care interventions with older patients has been directly related to the quality of the communication between the patient and medical professionals (Clark, 1997, p. 265).

During a patient and family educational intervention, communication should be viewed as a two-way street with

information being transmitted to the recipient and also being obtained from the patient by the speech-language pathologist (Clark, 1997, p. 265). Also, patient education programs should provide information in various modalities through pictures, videos, written information, and verbal stimuli (p. 258).

The effective clinician should be creative and consider the individual learning styles and preferences of the patient. Involving the family members during the onset of assessment and treatment facilitates their understanding of the problems and their involvement in treatment activities (Toner, 1997, p. 394). Additionally, all patient and family education should progress along a knowledge continuum from dependency in learning, to teaching strategies for independent learning, and to the ultimate goal of independent problem solving by the patient and family (Clark, 1997, p. 258).

Speech Pathologists and Dementia

Speech-language pathologists in medical settings today are involved in the assessment and treatment of an increasing number of patients with dementing illnesses. Alzheimer's Disease is the most frequent cause of dementia and is a progressive degenerative brain disease associated with characteristic nervous system changes and cell death

(Bucht, & Sandman, 1990, p. 832; Johnson, 1997, p. 80; Ripich, 1991, p. 255; Woodruff-Pak & Papka, 1999, p. 124). Dementia can also be caused by cerebrovascular disease, chronic alcoholism, and Parkinson's Disease (Johnson, 1997, p. 80; Logemann, 1995, p. 146; Ripich, 1991, p. 256).

Symptoms of dementia are loss of functioning in a variety of areas including short and long-term memory, reasoning, orientation, attention, judgment, personality, and language skills (Ripich, 1991, p. 256; Woodruff-Pak & Papka, 1999, p. 124). Dementia is also frequently accompanied by dysphagia (Logemann, 1995, p. 146). It is estimated that 5% to 10% of the population has some degree of dementia (Bucht & Sandman, 1990, p. 832).

Dementia from Alzheimer's disease currently affects four million people in the United States, is the fourth leading cause of death in the United States, and is expected to affect 14 million individuals by the year 2050. Ten percent of individuals over age 85 are suspected to have Alzheimer's Disease (Johnson, 1997, p. 80). Since individuals with dementia are more likely to exhibit deficits in communication, memory, and swallowing (Logemann, 1998, p. 330), speech-language pathologists will inevitably treat a significant number of patients with this diagnosis.

Dementia is the most common medical diagnosis in nursing homes, and the proportion of patients with dementia in long-term care is increasing (Peck, Cohen, & Mulvihill, 1990, p. 1195). Recently, there has been an impetus to provide much-needed comprehensive rehabilitation services, including speech-language pathology, to patients in long-term care facilities. These severely-ill patients generally exhibit multiple medical conditions requiring specialized care. This specialized care requires speech-language pathologists to provide direct intervention to the patient and family, consultation to the facility, and practical training to staff and caregivers.

Dementia and Swallowing

Many patients with cognitive deficits from dementia require assistance with feeding, refuse to eat, and have difficulty maintaining adequate nutritional status (Bucht & Sandman, 1990, p. 832; Horner, Alberts, Dawson, & Cook, 1994, p. 187; Siebens et al., 1986, p. 192; Volicer et al., 1990, p. 22). Feeding patients with cognitive deficits can be challenging and stressful to staff and caregivers (Volicer et al., 1989, p. 193; Volicer et al., 1990, p. 24). Patients with difficulty eating and swallowing need assessment by a speech-language pathologist to determine the appropriate dietary consistency, compensatory

strategies to assist with swallowing, cueing techniques, positioning, and problem solving skills for caregivers to implement when unexpected situations arise.

The nature of dementia with its progressive confusion and cognitive deficits often requires that the therapist used an approach with direct intervention for the caregiver and indirect intervention for the patient. The speech-language pathologist must be knowledgeable of the disease progression, symptoms, and management techniques for the various stages of the disease (Clark, 1991, p. 136). The focus of treatment is on education, compensatory strategies, and designing environmental modifications. Families of patients with dementia respond best to a speech-language pathologist who avoids lecture, stresses the positive attributes of the patient, allows family questioning, builds on patient and family prior knowledge, and facilitates problem-solving to identify the areas of greatest need and stress. As much intervention as possible should be based upon the identified needs of the patient and family. The professional should also help the family anticipate and prepare for future problems (pp. 136-137).

Consequences of difficulty with swallowing or eating for patients with dementia are malnutrition and weight loss. Malnutrition is common in long-term care facilities

and may occur in as many as 12% to 85% of elderly nursing home residents (Keller, 1993, p. 1212; Spiegel, Sataloff, & Selber, 1999, p. 370). Nutritional deficits and weight loss are common symptoms of Alzheimer's Disease and other dementias (Bucht & Sandman, 1990, p. 832). Malnutrition leads to increased hospitalization, infection, and mortality (A.S.P.E.N. Board of Directors, 1987, p. 436; Henderson et al., 1992, p. 309; Horner et al., 1994, p. 187; Keller, 1993, p. 1212). Other complications of malnutrition are increased healing time, skin breakdown, and decreased immunity (Curran, 1997, p. 289). Caring for patients with eating dependency is very expensive and may account for as much as 25% of total care costs in long-term care facilities. For patients with Alzheimer's related dementia alone, this may amount to as much as \$20 billion yearly (Horner et al., 1994, p. 187).

Malnutrition is highly associated with feeding impairments and swallowing difficulties (Curran, 1997, p. 289; Keller, 1993, p. 1215). The severity of dementia may be indicative of the degree of the swallowing impairment, and as many as 80% of patients with moderate to severe dementia may have impaired swallowing (Horner et al., 1994, p. 183). These deficits are probably due to a combination of cognitive, motor, and neurological factors (Keller,

1993, p. 1217). Nutritional status should be frequently evaluated as the patient's medical status changes since changes can cause skills to increase or decrease (Griggs, 1997, p. 217).

Nutritional Options

Many individuals with progressive terminal diseases like Alzheimer's Disease are non-ambulatory and non-verbal in the late stages of the disease. When a patient can no longer eat because of a severe illness, the manner in which to provide nutrition becomes a difficult decision (Campbell-Taylor & Fisher, 1987, p. 1100). Oral nutrition in patients with severe dementia may become nearly impossible due to the patient's confusion, to difficulty physically initiating swallowing, or to a decreased level of alertness (Volicer et al., 1989, p. 192). The speech-language pathologist is trained to assess and treat patients with swallowing disorders and to present options to the patient, family, and the physician about nutritional methods. Speech-language pathologists should counsel and inform patients and families of swallowing goals and the risks and benefits of all procedures including alternatives to oral feeding (Sitzmann & Mueller, 1988, p. 39). The patient and family are the ultimate decision makers on

whether alternative nutrition is utilized (Logemann, 1998, p. 320).

Previous medical belief was that patients who could not eat orally would benefit from a feeding tube inserted into the nose or the stomach, but current research is contradicting this belief especially in patients who are chronically-ill or who have dementia (Horner et al., 1994, p. 187). Tube feeding often does not meet the patient's nutritional needs and is not without risks or discomfort (Campbell-Taylor & Fisher, 1987, p. 1101; Sitzmann & Mueller, 1988, p. 40). Since research into this area is constantly being updated and re-evaluated, the speech-language pathologist must be proactive to be knowledgeable of all the options for nutrition, when to recommend which options, and for what populations these options are appropriate or inappropriate. A knowledgeable speech-language pathologist is a perfect advocate for the patient's and family's rights.

Many patients in nursing homes have progressive dementia in the late or terminal stage. The use of a feeding tube in these patients may prolong this final stage of their illness without adding to the quality of their lives (Peck, Cohen, & Mulvihill, 1990, p. 1195). The issue is whether prolonging a terminal condition is of benefit to

the individual which is generally contraindicated in palliative care where the goal is to relieve and alleviate suffering (Ahronheim, 1996, p. 387). Any intervention for a patient with dementia should balance medical concerns with quality-of-life for the individual. Reasonable long-term changes in condition or status should be the goal of a medical technology, and if this cannot be attained, then the use of the technology may be inappropriate (Toner, 1997, p. 392).

Speech-Language Pathologists and Decision-Making

Effective patient education programs reflecting the state of practice at the time are crucial for the patient and the family members making medical decisions and trying to improve the patient's health. Current information is critical for health and disease management, and "having information about the disease helps one to make sense of the situation, accept the illness, and ultimately, to manage it successfully" (Boise, Heagerty, & Eskenazi, 1996, p. 80). Therefore, the speech-language pathologist must first have the knowledge of advances in "research, technology, and educational approaches" in order to provide education for patients that they can in turn use to make informed decisions (p. 82).

Speech-language pathologists can help to facilitate patient and family empowerment and decrease any tendency for individuals to wait passively for the health care professional to make decisions for them (Houts et al., 1996, p. 71). The effective medical professional integrates education about decision-making into all interactions with the patient and family with open dialogue, using "teachable moments" (Giloith, 1990, p. 34). Patient education should not be an afterthought or occur only immediately prior to discharge from the medical facility but should be an ongoing dialogue.

A variety of methods can be used to encourage patient decision-making other than simple information-giving, and the ultimate goal should be to facilitate the use of problem-solving skills. Being able to solve problems that arise with medical conditions has been shown to decrease the emotional stress of coping with an illness (Houts et al., 1996, p. 65). The speech-language pathologist can facilitate problem solving in individuals by teaching the family to identify problems, generate alternatives, decide on the best alternative, and implement and evaluate an action (p. 66). This process is similar to Mezirow's transformational learning and perspective transformation,

which is a critical process of adult learning and development (Mezirow, 1991).

Since speech-language pathologists work with patients who have life-threatening and chronic illnesses, it is natural that decisions about treatment options will be challenging for the patient, family, and professional. Decisions to authorize or withhold a treatment are not made easily and require a thorough knowledge and understanding of the underlying issues and beliefs of all individuals concerned (A.S.P.E.N. Board of Directors, 1993, p. 50SA). Decisions about alternative nutrition occur during stressful periods, and the patient and family may have misconceptions about different types of nutritional methods. Individuals will need information presented in a manner that will enable them to make decisions about issues that they probably know very little about. Part of the speech-language pathologist's role is to help empower and enable the patient and family to be "active, responsible, and responsive" in participating in decision-making and treatment planning (Serradura-Russell, 1992, p. 102).

One challenge for the speech-language pathologist is to provide the patient and family with objective information about swallowing safety without advocating a certain method of intake (Logemann, 1998, p. 364). This

objectivity requires that professionals critically examine and recognize their own beliefs and values related to life-sustaining treatment and end-of-life decisions (Serradura-Russell, 1992, p. 102). The speech-language pathologist can also facilitate the patient's decision-making by communicating clearly to the patient, by assuring the comprehension of the patient of all the options relating to swallowing and nutrition, and by assuring that all the needs of the patient are made known especially if the individual has a communication impairment (Logemann, 1998, p. 364).

Advance Directives

Another complicating factor in medical decision-making concerning swallowing and nutrition is the fact that many instances involve patients who are not competent to make health care decisions for themselves (Lo & Dornbrand, 1992, p. 72). Individuals have the right to initiate an advance directive document that states their preferences for treatment if they are unable to make decisions themselves; in fact, facilities receiving funds from Medicare or Medicaid are required to inform patients of their rights to execute this document (Ouslander, Tymchuk & Krynski, 1993, p. 70; Pruchno et al., 1995, p. 623). In an advance directive, individuals are able to state their wishes

regarding life-sustaining medical treatment like the use of alternative nutrition and hydration (Workman, Pillsbury, & Hulka, 1997, p. 369). "Life-sustaining treatment is any medical treatment that serves to prolong life without reversing the underlying medical condition" (Council on Ethical and Judicial Affairs, 1992, p. 2229). Mechanical ventilation, antibiotics, chemotherapy, kidney dialysis, and artificial nutrition and hydration are all considered means of life-sustaining treatment depending on the situation.

Individuals can also name a representative or proxy in their advance directive to make health care decisions for them in the event that they become incapacitated and unable to make decisions for themselves (A.S.P.E.N. Board of Directors, 1993, p. 51SA; Zweibel & Cassel, 1989, p. 615). Proxy decision-makers with an intimate knowledge of the individual have been supported by the courts (Weir & Gostin, 1990, p. 1848). However, it is estimated that only 15% of Americans have advance directives or health care proxy declarations in existence (Landes, 1999, p. 116). Although most elderly patients state that they would not want artificial nutritional support if they had even a diagnosis of mild dementia (Gjerdingen, Neff, Wang, & Chaloner, 1999, p. 421), these wishes have not been

evidenced by a dramatic increase in the use of advance directives. Health care proxies may conflict with other family members of the patient and sometimes make decisions about treatment in direct contradiction of what the patient would have actually wanted (McNabney, Beers, Siebens, 1994, p. 161; Van Rosendall, Verhoef, & Kinsella, 1999, p. 3226; Zweibel & Cassel, 1989, p. 620), or an individual's advance directive may be ignored (Van Rosendaal, Verhoef, & Kinsella, 1999, p. 3227). One reason that the decisions of the health care proxy may differ from the decisions of the patient is because patients have not discussed their wishes for end-of-life care directly with their family (Landes, 1999, p. 112).

Legal and Ethical Concerns

Even when a patient or health care proxy does not want to utilize alternative nutrition, physicians may be hesitant to withdraw or withhold nutrition or hydration. This reluctance may be due to their ignorance of legal precedents or the pressure from legal counsel to be conservative in these issues to avoid litigation. Also, physicians may fear personal liability (Weir & Gostin, 1990, p. 1846). However, 48 of 50 states clearly support the legality of ceasing medical treatment if it is contrary to the patient's earlier stated wishes or is not in their

current best interests (Weir & Gostin, 1990, p. 1847; Landes, 1999, p. 115). At issue in the cases of patients with severe dementia is the fact that even though the disease is progressive and terminal, it is not imminently terminal. Death cannot be pinpointed as easily as it can be in diseases like cancer or AIDS, and patients may be unable to make their own decisions or even state their basic needs. Various state courts have ruled differently in these types of cases tending to be more conservative in withdrawing or withholding nutrition and hydration than in withholding or discontinuing respiratory life support (Weir & Gostin, p. 1850).

Overall, the physician has no legal responsibility to continue ineffective treatment, and patients have the right of refusal of any treatment whether they are competent or not (Weir & Gostin, 1990, p. 1850). The physician should not be held liable if nutrition and hydration are withheld or withdrawn because death is caused by the underlying medical condition and not from the lack of nutrition (A.S.P.E.N. Board of Directors, 1993, p. 50SA). Physicians should instead be concerned with the legal risks of treating a terminal patient in ways that the patient does not want to be treated (Weir & Gostin, 1990, p. 1852).

The reality of medical decision-making, especially that concerning such sensitive issues as providing nutrition and hydration, is that the information provided may not be totally objective and may be inadequate to facilitate an optimal decision (Ackerman, 1996, p. 1266; Kayser-Jones, 1990, p. 473; Logemann, 1998, p. 364). Most elderly individuals report that they would not want a feeding tube if they were in a demented state (McNabney, Beers, & Siebens, 1994, p. 161). However, Van Rosendaal, Verhoef, and Kinsella (1999) found that surrogate decision-makers reported extreme stress in making the choice whether or not to place a feeding tube in a demented patient indicating that communication between patients and families about end-of-life issues is not always clear (p. 3226). Surrogates also reported that the information they received about the process, complications, and implications of a feeding tube was inadequate about half of the time (p. 3226).

Speech-language pathologists are at the forefront in dealing with the technology that replaces oral feeding and sustains life (Serradura-Russell, 1992, p. 102). Therefore, speech-language pathologists should be instrumental in providing information and in openly discussing the treatment options available. This can help

assure that the best option for the patient with the optimal clinical and personal outcome considering the preferences of the individual is chosen (Council on Ethical and Judicial Affairs, 1992, p. 2230; Curran, 1997, p. 229). Since there are no definitive criteria for making decisions about the use of alternative nutrition due to dysphagia, the speech-language pathologist needs to be well-educated in the ethical and legal policies concerned to give the patient objective input (Goodhall, 1997).

It is not uncommon for patients and families not to be consulted about the placement of a feeding tube because some medical professionals and facilities may view it similarly to a urinary catheter in simplicity and impact (Lo & Dornbrand, 1992, p. 12; Van Rosendaal et al., 1999, p. 3226). However, it has been clearly stated by professional medical organizations that devices such as a feeding tube should be viewed as elective medical treatment and are not basic care that is a right of all human beings (A.S.P.E.N. Board of Directors, 1993, p. 50SA; Slomka, 1995, p. 1258; Lo & Dornbrand, 1992, p. 72). This premise is supported by groups such as the American Medical Association; the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research; and the Hastings Center, an independent,

interdisciplinary center for research in ethics and health (Slomka, 1995, p. 1258).

Each patient should be viewed as an individual, with the risks and benefits of alternative nutrition weighed into the decision-making process (Lo & Dornbrand, 1992, p. 72). The United States judicial system has clearly supported the right to withdraw alternative nutrition and hydration along with a ventilator or cardiopulmonary resuscitation and considers all of these as medical treatment (Slomka, 1995, p. 1258; Weir & Gostin, 1990, p. 1850). Alternative nutrition should not be used when the patient or legal guardian refuse the treatment or when the prognosis does not support aggressive nutritional support (A.S.P.E.N. Board of Directors, 1987, p. 439.)

Implications for Speech-Language Pathologists

Ultimately, speech-language pathologists are the professionals who treat patients with swallowing disorders. Inherent in this treatment approach is a need for an educational focus with an assessment of the patient's unique needs and perceptions. In order to be effective rehabilitation professionals, speech-language pathologists need to know how to provide patient education for adults. Speech-language pathologists also need to be well-trained, knowledgeable, and comfortable with all aspects of

swallowing disorders and nutritional options. The content knowledge about the latest research findings, medical technologies, and ethical issues related to swallowing and nutrition is critical. The speech-language pathologist must also be an expert or at least a student of the process of educating adult patients. The need for continuing education is a reality for professionals in health care disciplines because there is more knowledge being created, areas of practice are rapidly evolving, and new techniques are being continuously implemented.

Professionals and patients often have misconceptions or lack of knowledge about swallowing and nutritional options. This can lead to alternative nutrition being implemented in inappropriate situations or for the wrong reasons. Bypassing oral feeding with alternative nutrition is often a difficult decision that frequently involves patients who cannot speak for themselves. Also, withholding nutrition and hydration often creates a visceral reaction in families and may conflict with their religious and end-of-life beliefs. The speech-language pathologist is the medical expert who can provide education and information so that the best decisions are made for each individual with a swallowing disorder.

Dysphagia

Description of Dysphagia

Dysphagia refers to any difficulty that an individual experiences in swallowing and transporting food or liquid from the mouth to the stomach (Groher, 1997, p. 1; Logemann, 1998, p. 1). Swallowing disorders are generally the result of obvious or underlying neurological conditions like stroke, traumatic brain injury, Parkinson's Disease, or dementia and may be easily detected or asymptomatic (Cherney, 1994, p. 2; Groher, 1997, p. 1).

Swallowing disorders can occur at any age but are more prevalent in acute and chronically-ill older adult populations. The potential number of patients with dysphagia is increasing as the population of the world continues to age. Dysphagia affects at least six million Americans to some degree (Robbins, Carnes, & Gunter-Hunt, 1999). Swallowing disorders may occur in as many as 16% to 40% of adults over age 65 in hospitals and nursing homes most commonly from a stroke (Groher, 1997, p. 2; Cherney, 1994, p. 2). Up to one-half of patients who experience a stroke will exhibit dysphagia at least temporarily (Buchholz, 1997, p. 44). Incidence of dysphagia may be even higher but may not be identified due to silent or asymptomatic cases (Spiegel et al., 1999, p. 370).

Swallowing is a complex process that involves muscular strength and coordination, coordination with the respiratory system, and complicated innervation by numerous nerves of the head and neck. Patients who experience swallowing impairments may exhibit difficulty with chewing and shaping the food into a mass that can be propelled into the back of the throat or pharynx (Groher, 1997, p. 1). Individuals may also exhibit difficulty in initiating the actual swallowing reflex that propels the food from the mouth to the pharynx, or they may have difficulty with airway protection (Logemann, 1995, p. 146). Impairments at any stage of the swallow can be mild to severe, and complications of dysphagia can be malnutrition, pneumonia, or dehydration (p. 5).

The entry of food or liquid into the airway can occur before, during, or after the swallow because of a multitude of factors. Additionally, material that has already traveled through the mouth and pharynx and has entered the esophagus can travel back upward, or backflow, through the upper esophageal sphincter, which separates the esophagus and the pharynx. When material crosses back through the upper esophageal sphincter, it can easily be misdirected into the next available passageway, which is the airway,

and then on to the lungs.

Aspiration

The most dangerous consequence of a swallowing disorder is generally considered to be aspiration. Aspiration occurs when material enters the area below the level of the vocal folds either before, during, or after the swallow (Logemann, 1998, p. 5). Over 50% of patients with moderate to severe dysphagia aspirate (Sitzmann & Mueller, 1988, p. 39), and aspiration in stroke patients is present at least 50% of the time (Horner et al., 1988, p. 1359). Aspiration is dangerous because there is a significant risk that the material will travel to the lungs and cause choking or pneumonia. Aspiration can only be definitively detected through a radiographic evaluation like a modified barium swallow and is often asymptomatic (Logemann, 1986, p. 34). Silent aspiration occurs without reaction by the patient and increases with age as the reflexive protective closure of the larynx, the valve to the airway, becomes less sensitive (Falestiny & Yu, 1999, p. 383). Additionally, as many as 70% of patients with altered mental states aspirate due to their inability to protect their airway and to coordinate their respiration with swallowing (p. 383).

Patients who aspirate may not be able to maintain their weight and may develop malnutrition (Sievers, 1997, p. 43). Additionally, recurrent aspiration of material into the lungs leads to scarring and the possibility of repeated bouts of pneumonia. When pneumonia is caused by aspiration of bacteria into the lungs from oral, pharyngeal, or gastric sources it is referred to as aspiration pneumonia (Feinberg et al., 1990, p. 62; Finucane & Bynum, 1996, p. 1422).

Aspiration pneumonia is a major health concern especially in the older adult population and may account for 70% of the pneumonia that is acquired outside of the hospital (Falestiny & Yu, 1999, p. 383). Aspiration pneumonia is the sixth leading cause of death among individuals overall, and is the fourth leading cause of death in those age 65 and older (Curtis, 1994). The condition is a significant cause of hospitalization, debility, and death (Feinberg et al., 1990, p. 64; Pick et al., 1996, p. 765), and mortality rates with aspiration pneumonia are 50% to 60% in the elderly (Patel & Thomas, 1990, p. 390; Sitzmann & Mueller, 1988, p. 39). Aspiration pneumonia is the leading cause of death and hospitalization in nursing home residents (Spiegel et al., 1999, p. 370).

Although aspiration is a risk factor for pneumonia, some people who aspirate develop pneumonia and others who aspirate do not. Precise predictions of which patients will develop aspiration pneumonia cannot be made by medical professionals (Feinberg, Knebl, & Tully, 1996, p. 104; Feinberg et al, 1990, p. 64; Logemann, 1995, p. 147; Logemann, 1998, p. 6; Martin et al., 1994, p. 2). Therefore, speech-language pathologists and other medical professionals cannot equivocally state that a person who is aspirating will develop pneumonia and should not take anything by mouth, rather they can only discuss the risks and likelihood of developing pneumonia (Feinberg, Knebl, & Tully, 1996, p. 108). Developing aspiration pneumonia probably depends on a combination of factors like the patient's defense mechanisms, consciousness level, and mobility level (Groher, 1994a, p. 233).

Speech-language pathologists are faced with the dilemma of promoting the safety of an individual with a swallowing disorder versus using an artificial method of nutrition for a condition that probably but not necessarily will occur. There is little research data that provides absolute guidelines for the most appropriate and effective use of alternative nutrition because of aspiration (p. 233).

Dysphagia Diagnosis

Speech-language pathologists are the medical professionals who diagnose swallowing disorders and aspiration through bedside and radiographic swallowing evaluations. An alternative to oral feeding is usually recommended by the speech-language pathologist for patients with severe dysphagia or patients who are in a comatose state (Buchholz, 1997, p. 61).

Too often, there is an inordinate fear among speech-language pathologists and medical professionals about aspiration. Although aspiration is a serious consequence of a swallowing disorder, patients should not be forbidden to have oral intake if there is a consistency on which they exhibit safe swallowing or if their prognosis is terminal (Logemann, 1998). Medical professionals may be overly cautious by recommending non-oral feeding for patients who aspirate minimally or only intermittently. Thus, the speech-language pathologist who is overly conservative and recommends non-oral feeding based on a single examination performance may be needlessly depriving an individual of the pleasure of eating (Groher, 1994b, p. 148).

Speech-language pathologists need to be well-educated on the safety, risks, and benefits of alternative nutritional methods. The speech-language pathologist can

teach management strategies, safe postures while eating, and compensatory strategies to improve swallowing safety. In most cases, there is some consistency of food that the patient can safely consume orally even if they do require a feeding tube for nutritional support. The optimal swallowing program for the patient manages the dysphagia with dietary changes and compensatory strategies to allow for oral nutrition as much as possible (Logemann, 1996, p. 325).

Methods of Alternative Nutrition

When a method of feeding other than oral nutrition is recommended because of severe aspiration or the total inability to swallow efficiently (Langmore, 1991, p. 204), several forms may be used. These alternative nutritional methods may include an intravenous line, a nasogastric tube (through the nose), or a surgical or percutaneous endoscopic gastrostomy tube (PEG). A gastrostomy, or stomach feeding tube, is most commonly used as a long-term option when oral feeding is unsafe and when the alternative nutrition needs to be used for a month or longer (Griggs, 1997, p. 326; Logemann, 1998, p. 195). These type of feeding tubes can be removed from the patient at any time (Logemann, 1998, p. 350).

The use of PEG tubes has increased recently (Ergun & Miscovitz, 1992, p. 62) due to the simplicity of the procedure and to its relative safety (Woods & Peitzman, 1999, p. 321). In 1993, the American Society for Parenteral and Enteral Nutrition (ASPEN) estimated that more than 5 million individuals in the United States were receiving some form of alternative nutrition (p. 1SA).

Risks of Alternative Nutrition

Although it may appear ideal to give a patient who cannot eat or swallow a different point of entry for their nourishment and bypass the mouth, the support for feeding tubes is not clear. Many elderly patients have poor outcomes with feeding tubes (Woods & Peitzman, 1999, p. 325). Elderly patients with gastrostomy feeding tubes have been found to have high rates of pneumonia and death (Croghan et al., 1994, p. 141; Finucane, Christmas, & Travis, 1999, p. 1366). Feeding tubes are not without risk or complication even though the procedure is performed routinely (A.S.P.E.N. Board of Directors, 1993, p. 8SA; Rossi, 1993, p. 148; Sitzmann & Mueller, 1988, p. 40). Complication rates for the PEG tube procedure may be as high as 18% (Sitzmann & Mueller, 1988, p. 40).

Possible complications of a feeding tube include aspiration, infection, bleeding, constipation, diarrhea,

and tube dislodgment (Curran, 1997, p. 302; Finucane, Christmas, & Travis, 1999, p. 1367; Woods & Peitzman, 1999, p. 324; Young, 1993, p. 197). Additionally, many patients who are confused or who have dementia will require arm restraints in order to prevent them from removing the feeding tube (Ahronheim, 1996, p. 381; Groher, 1994a, p. 234; Lo & Dornbrand, 1992, p. 71). The presence of the feeding tube is often an agitation that decreases patient comfort and may even be a burdensome intervention (Council on Ethical and Judicial Affairs, 1992, p. 2230; Segel & Smith, 1995, p. 14).

Although a major reason for a speech-language pathologist to recommend a feeding tube is because an individual is aspirating food or liquid, tube feedings paradoxically predispose a patient to aspiration of the tube feeding (Feinberg, Knebl, & Tully, 1996, p. 107; Patel & Thomas, 1990, p. 391; Sievers, 1997, p. 50; Workman, Pillsbury, & Hulka, 1997, p. 348). There is certainly little evidence to support the premise that feeding tubes prevent aspiration pneumonia (Ahronheim, 1996, p. 382; Finucane & Bynum, 1996, p. 1421). Sitzmann and Mueller (1988) found aspiration occurred in 10% to 36% of patients who had PEG tubes (p. 40).

In several research studies, the presence of the feeding tube was a greater predictor of aspiration pneumonia than eating orally (Feinberg, et al., 1990, p. 69; Langmore et al., 1998, p. 78). Many studies have found that patients with gastrostomy feeding tubes have a greater incidence of pneumonia than patients without feeding tubes (Ahronheim, 1996, p. 382; Cogen & Weinryb, 1989; Pick et al., 1996, p. 767).

Speech-language pathologists need to be knowledgeable of all the possible sources of aspiration associated with feeding tubes and swallowing disorders. Many patients with feeding tubes, especially comatose patients or patients with severe dementia, are at risk for aspiration from gastroesophageal reflux because of their often recumbent position in bed, low levels of physical activity and alertness, and loss of oropharyngeal skills due to disuse (Feinberg et al., 1990, p. 62). The aspiration of refluxed stomach contents constitutes a life-threatening occurrence (Curran, 1997, p. 301; Feinberg et al., 1990, p. 64).

Additionally, another significant cause of aspiration pneumonia is the aspiration of bacteria-laden oral secretions (Feinberg et al., 1990, p. 64; Feinberg, Knebl, & Tully, 1996, p. 106; Gillick, 2000, p. 206; Langmore, et al., 1998, p. 70). This problem is especially prevalent in

patients with dementia who cannot perform their own oral care and as a result have poor dentition and frequent periodontal disease. Also, many elderly patients take medications that cause a dry mouth and decreased saliva production which increases the risk of tooth decay (Langmore et al., 1998; Martin & Martin, 1992, p. 75).

Thus, the elimination of aspiration is not as simple as avoiding food or liquid through the mouth; aspiration has multiple sources.

Current Uses of Feeding Tubes

Although the use of alternative nutrition is not without risks, there are many appropriate uses for feeding tubes about which the speech-language pathologist must be knowledgeable. Patients who are in a comatose state after an acute injury, who are unable to maintain their nutritional status and eat enough calories after a surgery, or who have a disease for which recovery appears possible are appropriate candidates for alternative nutrition. Many individuals lose the ability to swallow immediately after a stroke or other neurological condition and will need short-term nutritional support in order to recover (A.S.P.E.N. Board of Directors, 1987, p. 437). However, the short-term aspect of feeding tubes may be forgotten or overlooked after the patient moves to a different setting or if the

caregivers feel that the feeding tube is more convenient than oral feeding (Ackerman, 1996, p. 1266). The speech-language pathologist should be an advocate for the frequent re-evaluation of the necessity of non-oral feeding for patients with feeding tubes.

The use of feeding tubes becomes more muddled and controversial in patients with terminal diseases with no chance of recovery or improvement such as dementia. Dementia caused by Alzheimer's disease, Parkinson's disease, or cerebrovascular disease often results in feeding and swallowing disorders (Buchholz, 1997, p. 247). The prognosis and risk to benefit ratio of placing a feeding tube in a patient with chronic dementia must be weighed carefully. If the patient has no prognosis to participate in swallowing treatment strategies and if the patient and family do not choose non-oral feeding, then intervention by the speech-language pathologist should not continue after the initial evaluation, recommendations and patient and family education (Logemann, 1998, p. 244).

Although there are many legitimate reasons that medical professionals recommend the use of a feeding tube such as to improve the quality and length of life, the actual reasons that feeding tubes are used may be for family and facility needs, for increased convenience with a

patient who is confused and difficult to feed, for avoidance of liability for physicians and facilities, and for fear of withholding nutrition and hydration (Finucane, Christmas, & Travis, 1999, p. 1369; Kayser-Jones, 1990, p. 473; Sloane & Rizzolo, 1993, p. 927). The family and staff of care facilities need to be educated by the speech-language pathologist that feeding a patient by oral or non-oral means is not always comfortable or beneficial to the patient, can be dangerous, and requires specialized training (Logemann, 1998, p. 244; Steele, Greenwood, Ens, Robertson, & Seidman-Carlson, 1997, p. 43).

Facility staff and families frequently feel that they must feed a person in some manner in order to prevent weight loss, and there may be external pressure from administrators to avoid weight loss among their residents. However, dependence in feeding is a predisposing factor to aspiration so feeding difficult patients without appropriate evaluation by the speech-language pathologist can be very dangerous (Langmore, et al., 1998, p. 78). The speech-language pathologist can also facilitate dialogue between the professionals, family, and staff to discuss any frustrations with providing nutrition and to help those who are involved to realize that the feeding and nutritional deficits are caused by the patient's disease. This

realization can help to diffuse any feelings of blame or guilt (Volicer et al., 1989, p. 193).

Guidelines for Alternative Nutrition

Rabeneck, McCullough, and Wray (1997) have developed guidelines for recommending PEG feeding tubes to patients, based upon ethical and medical principles. These are summarized as follows:

1. Physicians should not offer the option of a PEG tube to patients with anorexic syndromes, who have the inability to utilize nutrition regardless of how it is provided.
2. Physicians should offer and recommend against the use of Peg tubes in patients who are in a persistent vegetative state or coma.
3. Physicians should offer and recommend the use of a PEG tube in patients who exhibit dysphagia without other complicating conditions.
4. Physicians should offer and discuss the trial use of a PEG tube in patients with dysphagia complicated by other medical conditions (p. 497).

Finucane and Bynum (1996) recommend that the use of feeding tubes be reserved for those patients with decreased consciousness levels, for those with persistent pneumonia despite careful oral feeding programs, and for those patients who cough severely and exhibit significant discomfort eating (p. 1423).

Outcomes with Feeding Tubes

Not only is there the consideration of risks and benefits and changes in quality-of-life, but also the

research supporting the success of feeding tube use in patients with dementia is not strong. In frail elderly patients, research has shown that feeding tubes do not extend lifespan (Grant, Rudberg, & Brody, 1998, p. 1973; Mitchell, Kiely, & Lipsitz, 1997, p. 332). Additionally, feeding tubes do not increase a patient's weight, and feeding tubes do not seem to make an improvement in a patient's comfort level and may only prolong the process of dying (Van Rosendaal, Verhoef, & Kinsella, 1999, p. 3227). The addition of nutrients through a feeding tube has not been shown to increase weight or functional abilities in patients with severe dementia, cancer, or AIDS (Finucane et al., 1999, p. 1365). Thus, in the final stages of dementia where treatment is often futile, feeding tubes may be a disproportionate level of care (Serradura-Russell, 1992, p. 105; Volicer et al., 1989, p. 193).

Mortality with feeding tubes in patients with mixed diagnoses was 50% one year after the placement of the feeding tube (Finucane et al., 1999, p. 1366). Research has found that there were no differences in survival rate between severely-demented patients who were fed by PEG tubes compared to patients who were fed orally (p. 1367). Rabeneck, McCullough, and Wray (1997) reviewed the medical records of 7,369 nursing home patients and found that death

from the feeding tube procedure was 23.5%, and the median survival rate of patients was 7.5 months (p. 496).

Rabeneck, Wray, and Petersen (1996) found mortality rates at one, two, and three years after PEG tube placement at 59%, 71%, and 77% respectively (p. 289). This data indicates that even with alternative nutrition, patients do not live significantly longer, and the quality-of-life is questionable. In this population, alternative nutrition may not be achieving its overall goals.

Financially, there are incentives for long-term care facilities to have patients with feeding tubes as residents (Leff, Chevront, & Russell, 1994, p. 133). Alternative nutrition eliminates the considerable manpower involved in feeding dependent patients, and the placement of a feeding tube is well-reimbursed for such a quick and relatively simple procedure (Ahronheim, 1996, p. 387). Additionally, enteral feeding formulas and equipment are reimbursable by Medicare when deemed medically necessary by a physician for long-term use because a patient is unable to physically or safely eat orally (Palmetto Government Benefits Association, 1999, p. 64.2). Physicians may be pressured by administrators at long-term care facilities to place feeding tubes in patients who refuse to eat, are losing

weight, or are difficult to feed (Van Rosendaal et al., 1999, p. 3226).

The number of feeding tube procedures is increasing every year, and 75,000 were placed in Medicare patients in 1991 (Finucane & Bynum, 1996, p. 1421). There were 121,000 feeding tubes placed in elderly patients in 1995 (Grant et al., 1998), and 30% of these patients had a diagnosis of dementia (Rabeneck et al., 1996). Sloane and Rizzolo (1993) found that 10% of patients in nursing homes had gastric (PEG) feeding tubes (p. 927). These numbers would undoubtedly be larger now with the increase in elderly patients since these studies were conducted.

End-of-Life Issues

There is a common misconception that the withholding of nutrition and hydration leads to a painful death. Research indicates the opposite, and instead finds that patients can remain comfortable with minimal or no intake of food or liquid (McCann, Hall, & Groth-Juncker, 1994, p. 1265). Patients with terminal conditions typically lose their appetites and the desire for food (McCann, et al., p. 1266). A patient who does not receive either nutrition or hydration typically experiences a sense of euphoria and an analgesic affect from the release of natural opiates or painkillers of the body. Patients need ice chips, good

oral care, or some form of moisture for their mouths in order to be comfortable (Finucane et al., 1999, p. 1368; McCann, et al., p. 1265).

Some religions do not believe in withholding a treatment like a feeding tube although major groups are beginning to view nutritional support as unnecessary treatment in certain conditions (Gillick, 2000, p. 206; McCann, et al., 1994, p. 1263). The official positions of the Roman Catholic and Orthodox Jewish churches are that the benefits of alternative nutrition must clearly outweigh the burdens in order to justify its use near the end of life (Gillick, 2000, p. 208). Often, the cultural and symbolic meanings associated with food and eating make withdrawing or withholding nutrition even more difficult than removing a person from ventilator support or kidney dialysis or not administering cardiopulmonary resuscitation (DeRenzo, 1997, p. 101; Ergun & Miskovitz, 1992, p. 63; Slomka, 1995, p. 1258).

The position of groups like the American Medical Association and American Dietetic Association is that a feeding tube is an invasive medical treatment that is a choice and not a basic right (Landes, 1999, p. 111). Having the ability to maintain a person's life does not mean that this intervention should occur in all situations.

Length of life does not necessarily indicate quality. The speech-language pathologist should encourage the health care team to explore all of the issues with each individual patient and not just use the available technology as a quick solution to a nutritional dilemma (DeRenzo, 1997, p. 105).

The case for withholding feeding tubes in certain patients is more clear if diseases like progressive dementias are viewed as terminal conditions similar to cancer or AIDS. In these conditions, the individual or the family is more readily allowed to refuse medical, life-sustaining treatment as it would only prolong a dying process. With severe dementia, the provision of nutrition will not usually be beneficial because of the progressive nature of the disease (Ergun & Miskovitz, 1992, p. 63).

American society has yet to accept that dementia is a terminal state and is one with little quality in the final stages in which the patient becomes nonverbal, nonambulatory, and incontinent (Gillick, 2000, p. 207). The swallowing impairments from advanced dementia are not remediable (Logemann, 1998, p. 361), and the speech-language pathologist must strive to find a balance between nutritional support and the patient's abilities in order to

provide the dysphagia treatment that does the least harm (DeRenzo, 1997, p. 106; Serradura-Russell, 1992, p. 105).

Transition to Oral Feeding

Even when feeding tubes are implemented for appropriate reasons and conditions, the short-term aspect of use may be forgotten as patients are discharged from the hospital or no longer have a speech-language pathologist following their case. Patients may receive a feeding tube during the acute stage of their illness, be transferred to another setting, and then lack follow-up care by a speech-language pathologist. This creates scenarios in which patients who could quite possibly return to oral feeding are forgotten by the health care system (Leff et al., 1994, p. 133; Spiegel et al., 1999, p. 370).

Patients with feeding tubes should receive periodic re-evaluations by speech-language pathologists in order to ascertain if they can be weaned from the feeding tube and transition back to at least some oral feeding. It is estimated that 40% to 50% of patients could avoid the placement of a feeding tube with aggressive dysphagia management and treatment by a speech-language pathologist (Klor & Milianti, 1999, p. 162).

Research has demonstrated that careful oral feeding by a well-trained caregiver can be safe and effective for some

patients with swallowing problems and dementia and can decrease the risk of aspiration (Feinberg et al., 1990, p. 68; Volicer et al., 1989, p. 193). Klor and Milianti (1999) found that 10 out of 16 patients in nursing homes with feeding tubes who received dysphagia therapy by a speech-language pathologist were weaned back to full oral feeding, and the majority of the others in the study attained some level of oral intake (p. 162).

Speech-language pathologists should make the assessments and recommendations for oral feeding programs for patients with dysphagia. Speech-language pathologists should also be the professionals who provide staff and caregiver training about swallowing precautions and methods of safe oral feeding. An oral diet with the risks delineated by the speech-language pathologist after a thorough evaluation is appropriate if the prognosis for the patient is terminal and if this is the patient's choice (Spiegel et al., 1999, p. 373).

Oral intake provides many benefits such as socialization, oral stimulation, sensory input, and the removal or dilution of bacteria from the mouth. Eating is often a very comforting process and is one that is associated with many memories of childhood and adulthood (Robbins et al., 1997, p. 41; Scofield, 1991, p. 1218;

Segel & Smith, 1995, p. 11). Patients who do not eat are often excluded from the gatherings that occur at mealtimes and lose the pleasure and social connection of eating (Buchholz, 1997, p. 38; Finucane et al., 1999, p. 1368; Klor & Milianti, 1999, p. 162). It may be too easy to quickly and impersonally feed an individual cans of formula through a tube in a few minutes without the interaction and contact that accompanies a meal (Ahronheim, 1996, p. 381; Volicer et al, 1989, p. 193).

Another reason that alternative nutrition may cause social withdrawal is because the person with a feeding tube has an artificial medical device and eats in a manner that is not socially typical. These factors often lead to isolation and depression due to the loss of socialization and human contact (Logemann, 1995, p. 146; Robbins et al., 1997, p. 41). Improvements in swallowing, conversely, have been linked to increased quality-of-life (Robbins et al., 1997, p. 41).

Implications for Speech-Language Pathologists

In conclusion, dysphagia is a major health concern that affects more elderly adults than younger adults. Therefore, the incidence of dysphagia is likely to increase as the older adult population increases and as life-extending technology improves. Patients with persistent,

severe dysphagia that renders them unable to maintain their nutritional status or to eat safely provide ethical and clinical challenges for the health care team.

The role of the speech-language pathologist is to serve as a primary team member to evaluate and treat patients with swallowing disorders and to advise other professionals of all the ramifications of the patient's swallowing disorder. Patient suffering is to be avoided at all costs, and the treatment that does the least harm is sometimes the optimal goal of the intervention. Patient and family autonomy and decision-making should always be facilitated and encouraged. The speech-language pathologist must be able to provide current and complete information about the nutritional options available and the risks and benefits of each option. If no health care professional takes the lead in these issues, then patients may receive nutritional treatment that they do not desire or do not benefit from (Van Rosendaal et al., 1999, p. 3227).

The most recent research evidence suggests that feeding tubes do not help a significant number of patients especially those with gastroesophageal reflux and moderate to severe dementia. The direct relationships and factors that cause an individual to aspirate and develop pneumonia

are unknown, and therefore, experts are unable to directly predict aspiration pneumonia. Families and other professionals need to be educated about the alternatives to feeding tubes, and to the fact that patients do not have to eat when there is no benefit to be obtained from nutrition. Non-oral feeding can often do more harm than good and can simply prolong the dying process of an individual. The patient's personal preferences and medical history, current legal precedents, and ethical guidelines should all be considered in the recommendations for nutritional intake.

Health care facilities need to develop guidelines to follow when ethical issues involving dysphagia and feeding tubes arise. Ethics committees and teams of professionals from law, speech-language pathology, social work, gastroenterology, nutrition, neurology, and other areas of medicine and rehabilitation should be used as consultants and experts in nutritional decisions. Additionally, patients, families, and medical professionals should discuss and document an individual's preferences for life-sustaining treatment through advance directives.

Speech-language pathologists should be advocates for individuals with feeding tubes so that patients are re-evaluated regularly to assess the possibility of returning to oral nutrition. Speech-language pathologists also

should serve as educators about the risks and benefits of non-oral feeding and about all of the possible aspiration risks. Finally, speech-language pathologists should be involved in further research to document the positive outcomes of those individuals who do aspirate but do not develop pneumonia when they are in supervised dysphagia feeding programs.

Adult Education

Historical Development

Prior to the 1920's, there was only one philosophy of teaching which was called pedagogy. This philosophy was applied to all learners whether they were children or adults. Pedagogy literally means "the art and science of teaching children" (Knowles, 1980, p. 40). Typically, teaching in a pedagogical system involved trying to transmit all the knowledge that was known at the time to the learner usually through lecture and test format. The learner's role in a pedagogical system is to passively absorb the content material and to store it for future application.

As increasingly large numbers of adults, who are persons fulfilling adult social roles such as spouse, employee, and parent (Knowles, 1980, p. 24), began participating in post-high school education, it became

apparent that a system other than pedagogy was needed in order to satisfy the needs of these new learners. Due to the technological revolution, more knowledge was being generated, and it was impossible to simply transmit the body of all known knowledge to the learner. The focus of education needed to be more on enabling individuals to be self-directed in their learning and to seek knowledge as a lifelong process (p. 41).

In the 1950's, researchers such as Houle began investigating adult learning and publishing about contemporary teachers of adults who were reporting success with their educational endeavors. Social scientists were exploring issues related to adult learning as well as forming theories of adult development. The term andragogy became commonly used during this time in history.

Overview of Andragogy

Knowles (1980) defines andragogy as "the art and science of helping adults learn" (p. 43). He views pedagogy and andragogy as being on a continuum with each approach being appropriate for different learners at different times in their learning process according to the area being studied. Depending on the knowledge level and comfort level of the learner, teaching methods that use a different degree of control will be most beneficial, and

adults will range from being relatively dependent on an instructor to being nearly independent learners.

Facilitating the development of independence in the learner is the responsibility of the adult educator.

Andragogy is based upon four core assumptions that Knowles (1980) stated should serve as guides for instructional design. These can be contrasted with the pedagogical assumptions in the same areas.

1. Concept of the Learner: In andragogy, the learner progresses from being dependent to being self-directing and more autonomous. Individuals will differ in the rate and timing of their progression toward self-directed learning. The teacher serves to facilitate the individual's move toward autonomy and self-direction. Adults may still be dependent in some situations but have an actual psychological need to be self-directing, similar to Maslow's hierarchy that states that adults strive toward self-actualization. In contrast, in pedagogy the learner is passive and dependent, and the teacher makes the decisions in all aspects of learning from content to method.
2. Role of the Learner's Experience: In andragogy, value and emphasis are placed upon the rich expanse of the learner's life experiences. Personal experience helps the learner make meaning from a learning encounter and can also serve to teach others. Content is tied to experiential activities in order to increase the meaning and practicality of the subject matter presented. Humans of all ages learn from and remember what they do, and this commonality is recognized. In pedagogy, the experiences of the teacher and the content material are most important. This experience is transmitted to the passive, dependent learner.

3. Readiness to Learn: Andragogical principles state that individuals are ready to learn when a topic becomes relevant and applicable to an event in their everyday lives. Teachers serve to help learners identify what they need to know at the current time and how to apply this knowledge to their unique situations. In pedagogical practice, society decides when the learner is ready to learn and assumes that individuals of similar ages should be learning the same material at the same time. The emphasis of pedagogy is more developmental and uniform rather than individualized.
4. Orientation to Learning: Andragogy states that learners want to become more competent in their fields or areas of interest. Learners seek to be able to immediately apply the knowledge they learn to their daily lives. Knowledge should not be so abstract and decontextualized as to be without practical application and personal relevancy. Problem solving and performance is stressed, and the learner seeks education in order to solve problems. In pedagogy, the learner is expected to acquire knowledge in "subjects" and store it for future application. Learning of content areas is stressed over performance or competency. (Knowles, 1980, pp. 43-44).

Knowles added to his original assumptions of adult learning in his later writings. In 1984, he wrote that adults are motivated to learn by internal rather than external factors (p. 12). In 1990, Knowles added a sixth assumption stating that it is important for adults to know why they are being required to learn content information (p. 57). Adults are less likely to passively accept the necessity of learning information simply to complete a

requirement if they cannot ascertain the value or relevance of the knowledge or skills.

Program Planning in Andragogy

From these assumptions of andragogy, Knowles (1980) gives specific recommendations and applications to planning educational programs and learning opportunities for adults. First, there should be a climate established by the facilitator that is conducive to learning in both physical and psychological aspects. Physically, the environment should be controlled as much as possible in seating arrangements, temperature, and lighting. Efforts as simple as arranging the chairs to facilitate group and personal interaction and maintaining appropriate group size should be made.

The psychological environment should be maximized for adult learning from the moment the learners enter the setting. The facilitator should create a climate of mutual respect, demonstrate through an open attitude that the learner's experiences are valuable, and actively listen to all individuals. The environment created should be safe, supportive, friendly, and collaborative; mutual trust and responsibility from all participants should be promoted. Lastly, the learning environment should be learner-centered instead of teacher-centered (Knowles, 1980, p. 223).

The second step in program planning in andragogy is to allow mutual design of learning activities by the learners and the facilitator. Learners have been found to be more committed to and invested in goals and activities that they help to plan. Methods to implement mutual planning include allowing small groups to plan class activities with coordination by the instructor, using subcommittees and elected representatives, and having issues reviewed by the entire class for final decisions (Knowles, 1980, p. 226)

Kidd (1973) notes that there are wide ranges of dependency levels on a teacher by learners especially in choosing learning objectives and curriculum (p. 271). Learners may need guidance in developing their own goals at least initially. Having educational control may be a novel and possibly intimidating experience for the adult who is accustomed to content-centered or teacher-centered approaches. However, taking an active role in designing learning objectives can be a positive experience because it places some responsibility for the direction of the learning activity onto the learner (Kidd, 1973, p. 280)

Another program planning step when teaching adults is for the learners to participate in diagnosing their learning needs. Kidd (1973) defined a learning need as "a need in the sense that the learner lacks some information

or skill that it is assumed he should have, or that is enjoyed by most members in society" (p. 271). Learning needs for an individual may be related to family, health, community, recreation, consumerism, job, or religion (p. 272). Adults are aware of their own strengths and weaknesses to some degree and need to be involved in planning learning projects to address their weaknesses and build upon their strengths.

Knowles (1980) states that when adults diagnose their own learning needs, their motivation to learn is maximized (p. 227). To facilitate self-diagnosis of learning needs, one must first determine the required competencies for the task. This can be achieved through surveying the research literature, by using the judgment of experts in the field, by conducting a task analysis, or by allowing the group to develop their own model of the skills needed to be competent in a designated area (pp. 227-228). Beginning the learning experience with a competency model helps the learners to see from the initiation of the course what skills they will develop during the learning activity (p. 229). Students who are already working in a professional field can help to develop the necessary competencies needed to be an expert.

After the desired competencies are ascertained, then the learners need to determine their current skill level which helps them to become sensitive to their own strengths and weaknesses and to decide the focus of their efforts toward growth (Knowles, 1980, p. 230). Thirdly, the learners must determine the gap between their current skills and the desired competency level and then take the initiative to choose their own path and formulate their goals (p. 232).

The next stage in program planning is to formulate the direction for the learning activities. Learners are encouraged to state objectives in ways that have personal meaning for them and that will help them to direct their own learning (Knowles, 1980, p. 234). These objectives may need frequent revisions as goals often become clearer as the learning progresses. Some learners are more comfortable with behavioristic style goals with a terminal endpoint while others may prefer to state a broad objective to be accomplished.

Developing the design and operation of the learning activities are the next two stages of program planning. Some authors recommend organizing the curriculum with sequence, continuity, and integration of elements (Knowles, 1980, p. 235). Knowles prefers to sequence learning

activities based upon the natural sequence of the task (p. 236). Possible techniques for the facilitator to use in presenting the material are whole group meetings, small group meetings, individual sessions, designated time for reading, social interaction periods, and preparatory activities outside of the classroom (pp. 236-237).

Knowles also recommends tailoring the teaching technique to the desired outcome. For example, when knowledge is the outcome, then the most effective teaching techniques are usually lecture, reading, and panel discussions. For learning new skills, role playing and physically practicing the activity may be the most effective modes of delivery (Knowles, 1980, p. 240). No single teaching technique is disallowed in adult education; the key is that the presentation style should fit the learners' needs and also fit the goal of the learning activity.

The final phase of program planning in andragogy is to evaluate and re-diagnose the learner's needs. This simply involves measuring changes from the initial performance data, deciding how the learning is progressing, and determining if a new or different direction should be chosen (Knowles, 1980, p. 247). Kidd (1973) recommends regular, ongoing evaluation of learning in order to

determine changes that have occurred and what these changes mean. This evaluation process helps determine the next step in the learning experience. Possible concrete methods of self-evaluation suggested by Kidd are for the learners to review videos of themselves, for the class to write their own examinations, and to hold critical discussions of the major propositions as determined by each learner in the content area being covered (p. 286).

Self-Directed Learning

Knowles (1975) defines self-directed learning as "a process in which individuals take the initiative, with or without the help of others in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (p. 18). Adults become more self-directing and less dependent as they mature and assume the social role and responsibilities of an adult (p. 15). This concept actually makes the role of the adult educator easier because adult learners are active and motivated to learn for their own purposes and may not need the motivation of the facilitator. Self-directedness is critical to andragogy; all of the other principles revolve around this tenet.

Individuals in self-directed learning settings are valued for their experiences, and their experience is what brought them to the learning setting at this point in time. Adults want to learn skills or content relevant to their current lives and want to be able to apply this information immediately and to solve a life problem or issue. Since every individual occupies a different role and unique place in the world, learners will differ on when they seek knowledge and what this knowledge will be (Knowles, 1975, p. 20). Adult learners are motivated by factors outside of grades; these factors can be health, self-esteem, curiosity, career advancement, or the need for a challenge (p. 21).

The number of adults participating in adult education activities has increased greatly since the 1960's. In a participation study by the United Nations Educational, Scientific, and Cultural Organization (UNESCO), Valentine (1997) reported that 41% of the adults sampled, or 79 million individuals, reported participating in some educational activity (as cited in Merriam & Caffarella, 1999, pp. 48 & 51). Studies on participation completed since the 1960's have shown that the major reason for individuals to pursue adult education is related to employment. Education is needed oriented toward the

employment setting either for career advancement or to maintain skills and keep pace with technology (Merriam & Caffarella, 1999, p. 52; Tough, 1979, p. 35).

Many people have a preconceived notion of adult education being limited to formal, college courses. Many activities are formal educational activities, but adult education also occurs in nonformal settings such as in small groups, in churches, in hospitals, and in libraries (Darkenwald & Merriam, 1982, p. 152). Adults learn from diverse activities such as reading, taking courses, listening to speakers, talking with subject matter experts, and taking lessons (Tough, 1979, p. 3).

The content of adult education is not just academic but also includes such topics as gardening, parenting, cake decorating, welding, retirement planning, or diabetes management. The learner may be seeking information for a long-term goal or for immediate, short-term application although the purpose is almost always to solve a problem occurring in their daily life (Tough, 1979, pp. 36 & 40). Self-direction is crucial and is obviously being used by adults as they determine areas of interest or need and then seek an educational resource which may be with an expert, a textbook, or a course.

Tough (1979) found that many adults did not always recognize the instances in which they were engaged in a learning activity unless the experience was in a structured classroom setting (p. 15). Adults tended to overlook and even discount the projects they engaged in to improve their health or to pursue an interest outside of work as an educational episode. These adults needed encouragement to include non-formal educational projects under the auspices of learning perhaps because these projects were so personally rewarding.

Tough (1979) and his colleagues were most interested in the planning and the efforts to learn that adults demonstrated. Their project involved interviewing 60-70 people from various demographic backgrounds and eliciting detailed accounts of their adult learning projects. Results indicated that the average number of hours spent per year on self-planned learning was 700-800, and less than 1% of adults indicated that these projects were undertaken for some type of credit (pp. 18-19). The trend of adults to engage in self-planned learning has most likely increased since participation in adult education overall has increased since the 1970's (Merriam & Cafferella, 1999, p. 48).

Tough (1979) drew some profound conclusions from his research into self-planned learning. He emphasized the criticality of adults being lifelong learners in order to continue a society where technological advancements are made, social problems are solved, and occupations become more sophisticated and refined. Without research, health care would still use leeches, and computers would fill an entire room. Research, however, does not occur without an individual first having an idea and an intent to purposely investigate this idea. Tough was particularly interested in the factors that motivated adults with the intent to learn and to seek educational opportunities in a variety of settings.

Brookfield (1986) reiterates Knowles and Tough in their definitions of self-directed learning as "externally observable learning activities or behaviors" (p. 40). A general assumption has been that learners who were strong in field independence, analytical, inner-directed, and individualistic, were more likely to be self-directed learners (p. 41). Individuals strong in field dependence tended to rely more on outside resources, be mindful of the affects of their actions on others and the environment, and respond well to outside reinforcement (p. 41).

Brookfield (1986) and other researchers have found that self-directed learners are not so isolated and autonomous as a strictly field-independent learning or cognitive style would imply, but instead learners tend to use a network of resources, support, and other learners in their educational endeavors (p. 43). Brookfield cautions against classifying a learner as a specific type such as field-independent or field-dependent and then correlating that type of learner to being strong or weak in self-direction. One must be cautious in assuming that since adults are self-directed learners, then they are completely autonomous, know their own needs well, are able to access any and all needed resources, and need no contact with peers (p. 48). Self-directed learning should not be used by educators as an excuse to not provide any direct instruction.

Many adults cite the reasons for their journey into a learning project as the contact with others and the cognitive and social stimulation provided (Tough, 1979, p. 46). Brookfield and Tough both caution the educator that adults will often need assistance in planning and goal-setting in their learning projects after they have made the initial effort to learn about an area. Adults may lack even the most rudimentary knowledge of an area in which

they are interested and may need assistance in order to plan the learning experience (Tough, 1979, p. 47).

Brookfield (1986) offers some cautionary advice to those who would whole-heartedly embrace the concept of self-directed learning. First, the research conclusions from various studies may have been too limited in their sample diversity for socioeconomic status, culture, employment level, and ethnicity (p. 51). Therefore, the extent to which an adult is self-directed may vary based upon many sociocultural factors. Secondly, self-directed learning efforts are individualistic; thus, they are difficult to quantify, measure, and describe. Additionally, even though individuals may initiate and plan their own learning, the effort may not be exceptionally effective or beneficial (p. 54). Finally, self-directed learning without critical reflection on the alternatives and perspectives of others and oneself and without the awareness that all knowledge is socially constructed is hazardous (p. 58). The most complete form of self-directed learning integrates process and critical reflection.

Need for Continuing Education

Adults must continue to learn and seek educational opportunities throughout their lives if for the sole reason of remaining employable (Tough, 1979). Education beyond

high school is mostly non-compulsory, so adults must often identify and pursue their learning needs independently. This pursuit requires identification of one's needs and the skills of self-direction, and initiative.

In dynamic fields like health care where the information quickly evolves and changes, professionals must be active in their own search for additional knowledge and skills. Speech-language pathologists who work in medical settings form a very diverse group with varying levels of support for continuing education within their work and peer groups. Many speech-language pathologists work in isolated areas or between several facilities. In the area of alternative nutrition, which is a part of the field of dysphagia, coursework in graduate school is limited, and professionals are responsible for their own continuing education.

Current and appropriate clinical knowledge is critical for working with patients with dysphagia because this is a life-threatening condition that greatly influences the patient's quality-of-life. Luckily, there are resources for speech-language pathologists who identify a knowledge discrepancy in their actual and desired competency level. There are professional journals related to swallowing disorders and related issues. Additionally, other

professionals can be used as resources within the medical setting although caution should be used that the person is truly an expert in the area. Internet resources are also accessible that provide current information for professionals regarding dysphagia and nutritional options. Continuing education courses are available throughout the United States addressing dysphagia and related issues. Unfortunately, there are not yet many sources with information specifically for speech-language pathologists and alternative nutrition. At this time, the professional must be able to access and synthesize research and information from various disciplines to learn extensively about nutritional options and the ramifications of each.

Although many professionals will exhibit initiation and self-direction, there will often be a need to first raise awareness of the current issues and concerns and of the research into these areas that is rapidly changing long-held beliefs. Educators must heed Brookfield's and Tough's cautionary statements and not simply assume that since speech-language pathologists are adults, they are therefore self-directed learners and will teach themselves. Professionals need facilitators to bring issues to a level of awareness in order to be able to initiate their learning activities. Adults have the potential to be self-directing

but need the right environment in order for this to occur (Rogers, 1994). Speech-language pathologists in medical settings may only need to be pointed in the right direction in order to pursue continued training and education related to nutritional options for patients with swallowing disorders.

Sensitivity to issues with alternative nutrition can be elevated through research efforts, through presentations at national and local meetings, through publications in national and local speech-language pathology journals, and through the development and promotion of organized continuing education courses. With these resources available, the likelihood of speech-language pathologists using self-direction to increase their knowledge and skills is enhanced. This phenomenon should snowball as professionals use each other as resources and network to learn about issues, concepts, and educational opportunities related to patients with alternative nutrition.

Perspective Transformation

Continued professional training should have as a goal perspective transformation for speech-language pathologists. Mezirow (1990) defines perspective transformation in adult learning as:

The process of becoming critically aware of how and why our presuppositions have come to constrain the way we perceive, understand and feel about our world; of reformulating these assumptions to permit a more inclusive, discriminating, permeable and integrative perspective; and of making decisions or otherwise acting upon these new understandings. (p. 14).

Transformational learning is composed of three components - critically reflecting on one's assumptions, experiencing insight into the reason for these assumptions, and then taking some type of action upon these insights (Mezirow, 1990, p. 354). Before any type of social change can occur, the individual has to experience a perspective transformation (p. 363). Transformational learning is different from everyday learning because it produces far-reaching changes in individuals and actually shapes them, their future behaviors, and their attitudes (p. 2).

There is a body of considerable literature regarding critical thinking, critical reflection, rationality, and other terms that are precursors to and part of transformational learning. These are all skills that are critical to the adult learner for personal as well as societal development. Brookfield (1987) identifies two stages to critical thinking: identifying and challenging assumptions and generating alternatives to these assumptions (p. 15).

Dewey (1933) described reflective thinking as critical and questioning such as when encountering an event or issue that creates a state of doubt (p. 12). Reflective thinking is a deeper level of thought and not just a transient sensation or impression. Reflective thoughts are thoughts that are linked and refer to their predecessors; reflective thought has purpose and consequence. Dewey further defines reflective thinking as "active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends" (p. 9). Dewey's definition of reflective thinking is similar to Mezirow's work on perspective transformation in that it stresses the importance of examining one's belief systems and the presuppositions that affect attitudes and actions. Not all learners are able to engage in such critical examination. Dewey (1933) stated that individuals need to have the personal and mental attitudes of open-mindedness, responsibility, and whole-heartedness in order to engage in reflective thought.

Applying Transformative Learning

Adults who think critically realize that all knowledge and beliefs are generated and created within a social and cultural setting and are therefore inherently biased either

positively or negatively. There are no absolutes in society, and challenging the status quo is often necessary even if it is difficult. Critical thinkers possess a healthy skepticism about societal values, political edicts, and economic predictions (Brookfield, 1987, p. 9). Often, revelations come to people when they realize the difference between the ideal of society and the actual outcomes that are attainable.

Transformational learning occurs when critical reflection is followed by insight into the reason behind one's values, and the individual determines whether to reject or at least modify these beliefs. Mature adult learners are able to achieve this level of learning, and this is absolutely vital in order for society to change and develop. According to Mezirow (1990), individuals have unique meaning systems consisting of beliefs, values, and assumptions. These meaning systems serve to filter and interpret new experiences so individuals can relate to them and understand them. However, one's personal meaning systems can also distort perceptions according to preconceived expectations (p. 2).

Critical reflection skills are applicable to interpersonal relationships, workplace issues, ethical issues, politics, and racial and cultural relations.

Adults need to be able to actively think about why they make certain assumptions and judgements, and adult education helps learners assume responsibility for decision-making (Mezirow, 1990). Adult education through critical reflection enables the learner to ask "Why do I think the way that I do? What are the presuppositions that I bring to this experience?" (Mezirow, 1990).

Adults are able to use critical reflection and transformative learning to different degrees, depending on their developmental level. Individuals are not born as skeptics, questioning the world and the way society is structured. Critical reflection is the ability to identify a problem and make critical judgments about the nature of the problem as well as generate solutions (Kitchener and King, 1990, p. 160). Learners gain these skills through a developmental sequence that can be taught after the learner's current stage is first identified. In the initial stages of transformative learning, the individual believes that knowledge is concrete and an absolute truth exists. Next, the learner begins to see the influence of context and culture on knowledge. The individual with the most advanced reasoning skills sees that knowledge and perspectives can be interpreted in more than one way and

that some perspectives are superior to others (pp. 163-166).

Adult educators must realize that learners are at different developmental levels in their critical reflection and evaluative skills (Mezirow, 1990). The educator needs to recognize and group learners appropriately according to their developmental level in order to begin where the learner is currently functioning. Specific ways that the adult educator can facilitate a progression into more advanced stages of critical reflection and transformative learning abilities are by providing a supportive environment, by providing a good role model, by conducting critical reading of texts for hidden bias or motivation, by recognizing affects of social norms, and by dialoguing with others with similar problems or needs (p. 359).

Critical thinking and transformational learning are invaluable skills in a workplace that is open to new ideas and innovations. Workplace examples of uses for these skills are in research and development, entrepreneurship, strategic planning, interpersonal relations, and creative problem solving (Brookfield, 1987, p. 138). Those who utilize critical thinking and reflection in their work are able to identify difficult areas or problems in their practice, question the reason for these problems, generate

alternatives to current practices and possible solutions to the problems, and then act upon these new insights.

Critical reflection skills are crucial in decisions involving difficult clinical cases where ethical and legal conflicts may be involved.

Transformative thinking occurs when a speech-language pathologist repeatedly questions when to recommend a patient for a feeding tube, questions why patients with feeding tubes continue to get aspiration pneumonia, and is frustrated when unable to answer family questions related to alternative nutrition and the patient's prognosis. This professional has identified challenging issues and possible needs for additional training and will seek and take advantage of continuing education opportunities related to alternative nutrition once these opportunities are available. However, not all speech-language pathologists are at this stage of transformational learning. Some professionals will need to take an intermediate step of first identifying their current knowledge levels and needs related to the area of dysphagia and nutrition. In the field of speech-language pathology, there is a need to broaden the information on these topics and to raise awareness of the issues involved among professionals.

Mezirow (1991) states that critical reflection and the move toward transformative learning occur through "increased ability and experience" and that education may increase and improve this development (p. 161). Speech-language pathologists may differ in their use of critical reflection about their practice and their knowledge base depending on the type, length, or diversity of their experience. Undoubtedly, there are some professionals who have not identified any areas of training need in their clinical skills but who could benefit from any information or contact that served to facilitate this critical questioning and self-assessment. Speech-language pathology training programs would be well-served to initiate critical reflection and decision-making into their curriculum. Unquestionably, it is vital that all professionals in medical practice be constantly assessing, questioning, and modifying their skills and beliefs about accepted practices in order to provide the best possible care and maintain pace with technological and methodological changes.

Empowerment

Empowerment is a concept with strong social ramifications that is characterized by an individual's ability to accurately perceive societal inequalities that serve to oppress or limit their humanity. Empowerment is

democratic. To be empowered means that individuals have the power to change, reorganize, and overcome any societal restriction placed upon them because of race, gender, socioeconomic status, sexual orientation, or ethnicity. Education is the tool that allows oppressed groups to become aware, to devise alternatives, and to act to make changes (Fellenz & Conti, 1989, p. 21).

Myles Horton was a visionary in adult education with a humanist philosophy of education. He established the Highlander Folk School in the 1930's with the purpose of educating adults so they would have the skills to solve their own problems (Adams, 1975, p. 46). The original purpose of Highlander was education for a "revolution that would basically alter economic and political power relationships to the advantage of the poor and powerless" (p. 205).

The entire premise of the Highlander school was based upon empowering individuals and using education to correct "unfair privilege and unfair deprivation" (Adams, 1975, p. 13). Horton was inspired to this goal after living among the poor of rural Tennessee and discovering that the people were not ignorant, that they knew the answers to their own problems, and that they only needed help to get organized and "do things for themselves" (p. 65). Highlander was

the realization that people had the potential to solve their own problems and was also the process of gaining the skills and organization necessary to solve these problems (Conti, 1977, p. 39). Myles Horton had faith in the abilities of the people to be initiated, to be organized, and to act in their own behalf.

The social problems of the time of the Highlander school were multiple and were addressed by Highlander students and activists, and significant historical gains were made. Highlander staff and students were involved in almost every social change since the 1930's, including labor union formation, initiating race relations, fighting to end segregation, establishing civil rights for women and African Americans, and fighting the abject poverty of the Appalachians. Horton felt that "broad social movements were needed to change governments fundamentally" (Adams, 1975, p. 53), and this was the level of change needed to rectify societal injustices.

The specific method advocated by Highlander for adults to create social change was through education geared toward the needs of the people and not toward a standard curriculum or an edict of the dominant culture. One immutable principle of Highlander was to "learn from the people and start their education where they are" (Adams,

1975, p. 206). Poor adults could only improve their situations when given the opportunity to learn and the personal motivation to take social action (p. 18).

Paulo Freire was a Brazilian educator and activist whose concept of empowerment was similar to Horton's concept in that it was active. Freire's concept of empowerment involved the process of recognizing the oppression by the persons being oppressed, reflecting on what was learned, and then acting upon the situation (Freire, 1970, p. 32). The oppressed individuals such as the poor or the illiterate first needed to realize that their condition or circumstances could be changed and then needed to act to accomplish or work toward that change (p. 34). Freire's work was conducted with persons who were poor, uneducated, and consequently illiterate in South America. He felt that systematic education that was designed by the oppressed people themselves was the only way to end unjust social conditions.

The idea of change through education was also shared by Myles Horton as he promoted education designed to meet the immediate needs of the people. Both Horton and Freire saw education as a process and a "tool for making sense of the world and for preparing people to take action" (Conti, 1977, p. 42). Specifically, Freire fought to change

educational practice from a "banking" system where the learners passively sat and had the knowledge of the dominant culture poured into them to an active, communicative, problem-solving arena. Freire knew that knowledge was not absolute but was instead a process and an active re-creation by the learner and was constantly changing (Freire, 1970, p. 58). Students and teachers were partners in educational endeavors and each learned from the other. Freire helped people to become empowered through the processes of critical reflection, dialogue with peers, and action. No representative or spokesperson could liberate a group; it had to be the members of the involved group themselves taking action.

The concept of empowerment has currently become popular in the media and in self-help efforts. Empowerment as espoused by Freire and Horton is an invaluable trait for a professional like a speech-language pathologist. Empowered professionals will not accept the face value of a conflict, a questionable practice, or an ethical dilemma. This professional will identify the conflict and recognize that meaning and reality are situational, ever-changing, and unique to the individual. The speech-language pathologist will then problem-solve, talk to other professionals, generate alternative solutions, and act upon

these ideas. Empowered professionals will provide the highest level of care and be an advocate for the patient; they will identify and seek to change inadequacies in their own knowledge base; they will not accept unfair or inequitable treatment of a patient.

With specific regard to alternative nutrition, researchers are discovering new information about the safety, outcomes, and ethics of these devices, and professionals need a sense of empowerment to recognize that this is an area of clinical practice that is changing. Professionals need to recognize that each individual patient will view the use of a feeding tube differently and from a unique perspective. The speech-language pathologist must be proactive to keep abreast of changing practices, to continuously reflect upon these changes before implementing desirable ones, and to educate others. This is in sharp contrast to just silently accepting outdated or incorrect treatment.

CHAPTER 3

PROCEDURES

Research Design

This study utilized a descriptive research design. Descriptive studies have far-reaching influence on events in society and are useful for investigating educational problems and needs (Gay & Airasian, 2000, p. 275). A descriptive study "determines and describes the way things are" (p. 275). Typical tools used in descriptive research are surveys, questionnaires, observations, and interviews (p. 275). This study sought to describe the knowledge levels, roles, perceptions, and education and training backgrounds of speech-language pathologists and alternative nutrition.

The data in this study were both quantitative and qualitative. A mail questionnaire survey was designed and used to gather quantitative data because of its ease of administration, cost-effectiveness, and ability to reach a geographically-diverse sample (Gay & Airasian, 2000, p. 281). Additional quantitative data were obtained through telephone interviews using selected portions of the survey instrument. Qualitative data were gathered using telephone interviews to expand upon trends evident from the quantitative data analysis. Interviews obtain in-depth,

detailed data and can use questions that require lengthy responses. Interviews are also flexible, can be adapted to each individual participant, and allow for follow-up on incomplete answers to questions (p. 291). Using a combination of data collection methods provided a wealth of descriptive data about speech-language pathologists in medical settings and their knowledge, roles, and training needs related to alternative nutrition.

Sample

The population for this study consisted of speech-language pathologists practicing in medical settings in the United States who were certified by the American Speech-Language-Hearing Association (ASHA). A population is the group that is of interest to the researcher and the group to which the results of the study will be generalized (Gay & Airasian, 2000, p. 122). Medical settings in the study were limited to general medical hospitals, rehabilitation facilities, and nursing homes. These are the work sites where a speech-language pathologist would be most likely to assess and treat dysphagia and be involved in the recommendation of alternative nutrition.

A sample is a subset of the larger population that is considered to be representative of the population (Gay & Airasian, 2000, p. 123). In a simple random sample, every

member of the population has an equal opportunity to be included in the group (Pannbacker & Middleton, 1994, p. 137). In random sampling, selection of subjects is independent, and subjects are in no way related to or dependent upon each other (Shavelson, 1996, p. 9).

The list of speech-language pathologists in this study was purchased from the American Speech-Language-Hearing Association membership database. The association was able to provide a randomized mailing list of a specified number of speech-language pathologists sorted by medical work settings across the United States. The database that the names were drawn from was advertised as having daily updates of changes in names, addresses, and demographic information. Being listed in the American Speech-Language-Hearing Association membership database established that the professional was currently certified as a speech-language pathologist.

The sample from this study was selected from this randomized list. The sample was stratified and weighted by the proportion of professionals employed in each medical setting in order to represent the population more appropriately. Therefore, 44% of the sample was chosen from nursing homes; 32% was chosen from general medical hospitals, and 24% was chosen from rehabilitation hospitals

since these distributions mirrored the employment patterns of the population. Information concerning the distribution of the sample in these employment areas was also obtained from the American Speech-Language-Hearing Association.

Instrument

An instrument was designed to obtain information about speech-language pathologists' training, roles, experience, and knowledge levels regarding alternative nutrition as related to dysphagia (swallowing disorders) or nutritional compromise. The instrument was divided into five sections. Section 1, Demographic Information, elicited information about the respondent's educational background, work setting, and clinical experience. Section 2, Prevalence Information, contained questions specific to patients with feeding tubes, including the frequency with which the speech-language pathologist recommended feeding tubes, the perceived confidence level of the speech-language pathologist with alternative nutrition, the frequency and total number of swallowing assessments typically performed, and the professional's perceptions of educational preparation from undergraduate and graduate programs. Section 3, Role of the Speech-Language Pathologist, addressed the professionals' role in their work setting related to patient care and interaction with other health

care professionals. Section 4, Continuing Education, obtained data about continuing education background and perceived future continuing education needs. Section 5, Alternative Nutritional Methods, was the Knowledge Assessment portion which contained 26 multiple-choice questions related to risks, indications, mechanics, and benefits of feeding tubes.

The instrument was developed and modeled similarly to an instrument used in a research study by Manley, Frank, and Melvin (1999) which was conducted with speech-language pathologists in medical settings working with patients with tracheostomy tubes. The Manley et al. survey was the first to assess speech-language pathologists' knowledge and skills with patients with tracheostomies. This patient population is similar in medical complexity to those with severe dysphagia and feeding tubes. In fact, patients who require a tracheostomy tube often also need an alternative nutritional method at least on a short-term basis.

For the current study, portions of the Manley et al. (1999) instrument were used with permission of the authors (see Appendix A). Questions that were the same or similar were in the areas of demographics, continuing education, educational experience, and role of the speech-language pathologist. The portions of the Manley et al. instrument

that were used were altered and customized to address the specific issues of patients with feeding tubes rather than patients with tracheostomy tubes. The response format in the instrument was a mixture of dichotomous choice, scale items, multiple choice, and open-ended questions.

Items that were of particular interest in the current study and which expanded upon the scope of the Manley et al. (1999) study were the speech-language pathologist's current role, desired role, and actual knowledge related to alternative nutritional methods. This information was elicited in order to determine the current knowledge levels of speech-language pathologists, perceptions of those currently working in the field of the critical components that should be included in education and training for speech-language pathologists, and the range of responsibilities of professionals with patients with alternative nutrition. At the time of this study, there were no data available in the literature to document the knowledge levels of speech-language pathologists or the proficiency at which these knowledge levels were needed.

Knowledge Assessment

The Knowledge Assessment used in this study was designed by a review of the literature for concepts and issues related to alternative nutrition that speech-

language pathologists would most likely encounter in medical settings. Due to the relationship of these concepts and issues to dysphagia which can easily comprise at least one-half of a medical speech-language pathologist's caseload (Logemann, 1997, p. 127), these were judged to be areas in which professionals should demonstrate competency. Knowledge of these broad areas is required by the professional in order to perform effective assessment, treatment, and patient and family education.

Validity of the Instrument

Content validity is an integral part of any assessment instrument. Content validity is concerned with how well the substance of an instrument or measure represents the attribute being assessed (Pannbacker & Middleton, 1994, p. 49). Content validity is also concerned with being comprehensive enough to adequately address all of the behaviors or areas of interest (Pannbacker & Middleton, 1994; Weisberg, Krosnick & Bowen, 1996, p. 95). A high degree of content validity assures that the test covers the specific information that is being assessed and is often "established using content experts to make judgments" (Mertens, 1998, p. 294).

Content validity for the Knowledge Assessment portion of the research instrument was first addressed by

performing a comprehensive review of the literature in the fields of speech-language pathology, gastroenterology, nutrition, enteral feeding, swallowing disorders, and nursing related to alternative nutrition. By encompassing such a range of medical disciplines, concepts that were crucial and important for the speech-language pathologist's daily interactions and treatment of patients with feeding tubes from a diverse and broad perspective were included.

Content validity was also established by review of the instrument by subject matter experts. These subject matter experts were four speech-language pathologists with at least three to five years of experience in a medical setting working with patients with swallowing disorders. Additionally, the Knowledge Assessment was reviewed by a registered nurse, two gastroenterologists, and a registered dietician. A representative from nursing was chosen because feeding tubes are a basic competency in the nursing curriculum, and nurses provide the daily care and maintenance of the device for the patient in health care settings. A gastroenterologist, a physician specializing in disorders of the gut and stomach, was chosen because this professional authorizes and performs the placement of the feeding tube and is knowledgeable of all aspects of alternative nutritional methods. Registered dietitians

work closely with patients with feeding tubes in order to analyze their metabolic rate and caloric needs and to establish and monitor patients' diet and intake. These medical professionals, who served as expert reviewers, were all working with patients in hospital settings at the time of the review and interacted with patients using alternative nutrition frequently. Any recommendations or changes that the expert reviewers suggested were further researched and implemented into modifications in the instrument.

Construct validity is concerned with what an instrument is actually measuring (Gay & Airasian, 2000, p. 167). Construct validity is broad and involves traits or behaviors that impact performance on an assessment or instrument (p. 167). This type of validity is also the "degree to which a test measures a theoretical construct or trait" (Moore, 1983, p. 211). Important theoretical concepts used in the literature review and in the development of the descriptive instrument were dysphagia, speech-language pathology, enteral feeding, gastrostomy tubes, nutritional disorders, malnutrition, life support, artificial nutrition and hydration, and aspiration pneumonia. These were all underlying concepts and fields of study related to swallowing disorders and nutrition that

speech-language pathologists should be knowledgeable of in order to provide appropriate evaluation and treatment to patients with alternative nutritional methods.

The underlying theory base formed by these fields supported the 26 individual items that were included on the Knowledge Assessment. Stronger knowledge of these underlying principles should result in higher scores on the Knowledge Assessment section of the instrument. The subject matter experts who reviewed the instrument for content validity also made recommendations about any conceptual areas or individual items that should be deleted or added in order to include a comprehensive and representative theory base. To further establish construct and content validity after the initial reviews of the subject matter experts, the descriptive instrument was pilot tested with a group of five speech-language pathologists with a least three years of medical experience. The speech-language pathologists who participated in the pilot-testing were individuals who were not included in the actual research pool. Participants in the pilot-test actually completed the survey as if they had received it in the mail. Participants then made suggestions to the researcher either verbally or in writing about any unclear questions, errors in questions or

answers, or items that seemed inappropriate or out of place. These suggestions were then implemented into modifications to the instrument.

Data Collection Procedure

The survey was mailed in January, 2000, to 500 speech-language pathologists in medical work settings along with a cover letter explaining the purpose of the study (see Appendix B and Appendix C). Respondents were assured of confidentiality and were not requested to supply their name or other identifier in order to increase the number of responses and to avoid securing individual consent forms required by the Oklahoma State University Institutional Review Board. A self-addressed, postage-paid envelope was included with the survey instrument. The cover letter listed the telephone number of the researcher in the event that the respondent had any questions or concerns about the survey. Stationary from the Department of Communication Sciences and Disorders at Oklahoma State University was used for the cover letter in order to increase the appearance of legitimacy of the study. In a further effort to increase the overall response rate, follow-up postcards were mailed to all 500 subjects three weeks after the initial mailing requesting their assistance in completion of the survey and offering to provide an additional copy of

the survey if needed. The telephone number and e-mail address for the researcher were listed on the postcard as a contact point for those subjects who had questions or concerns or needed further information.

In order to compare the characteristics of respondents to non-respondents and investigate if these two groups were similar, follow-up telephone interviews were conducted with a random sample of individuals who did not return the initial survey. One method of increasing the representativeness of the results in survey research is to demonstrate that non-respondents are similar to those individuals who did respond but failed to participate for reasons such as incorrect addresses, forgetfulness, apathy, or losing the instrument (Gay & Airasian, 2000, p. 290; Kalton, 1983, p. 65).

The sample of individuals who did not return the survey were contacted by telephone and requested to complete the demographic sections of the instrument as well as eight of the Knowledge Assessment questions verbally. The eight questions from the Knowledge Assessment were determined by choosing two questions from each of the four factors that were found in the survey. The items with the highest loadings on the factors were used. This set of questions included Knowledge Assessment items 1, 2, 5, 6,

8, 11, 23, and 25. Data was obtained from 21 non-respondents. The sample of non-respondents to contact for telephone interviews was stratified according to the distribution of the initial mailing with 44% in nursing home settings, 32% in general medical hospitals, and 24% in rehabilitation hospitals. After the interviews were completed, t-tests were conducted with the data to compare the mean scores of the respondents to non-respondents and to determine if differences existed between the groups.

Data Analysis

Quantitative Measures

This descriptive study used three types of statistical analyses. First, frequency distributions were used to describe the sample. Five areas were included in this data. Basic Demographics included location of educational training and year of graduate and undergraduate degrees, years and type of experience as a speech-language pathologist, and current work setting. The Prevalence section gathered information specifically related to work experience in swallowing disorders, prior coursework and training in dysphagia, current job duties in assessing and treating patients with swallowing disorders, and perceptions of training related to swallowing and alternative nutrition. The third section of the survey,

Role of the Speech-Language Pathologist, obtained information from respondents about their role on the health care team and with patients specific to alternative nutrition. The fourth demographic section was entitled Continuing Education and included questions about types of continuing education that the professional had used in the past; effectiveness of continuing education; and the need for research, training, and coursework in the area of speech-language pathology and alternative nutrition.

The final section of the research instrument was the Knowledge Assessment which contained 26 multiple choice questions related to swallowing disorders and types of alternative nutrition. A total knowledge score for each respondent was computed, and frequency data was also used to indicate the percent correct and incorrect on each individual item and to compare the respondents on their overall knowledge scores. Measures of central tendency including means, medians, and standard deviations were computed for individual items and for respondents' total knowledge scores.

The second type of statistical analysis that was conducted was factor analysis. Factor analysis is a multivariate statistical process that reduces a set of data to a smaller number of hypothetical variables for data

interpretation (Kim & Mueller, 1978a, p. 9; Lorr, 1983, p. 14). Factor analysis was conducted to aid in the data interpretation and also to re-examine the constructs in the Knowledge Assessment portion of the instrument to determine whether the constructs in the instrument were congruent with the important constructs in the field. Factor analysis is commonly used to verify the underlying concepts in a data set and therefore can serve as a measure of construct validity (Conti & Fellenz, 1986, p. 73; Huck, 2000, p. 106; Norusis, 1988, p. B-41).

The third type of statistical analysis that was conducted with the Knowledge Assessment data was discriminant analysis. "Discriminant analysis is a statistical technique which allows the researcher to study the differences between two or more groups...with respect to several variables simultaneously" (Klecka, 1980, p. 7). Discriminant analysis is a multivariate type of analysis that is more useful than a single or univariate analysis of variance when dealing with people and complex, real-life scenarios or behaviors (Conti, 1993). Discriminant analysis was used with the knowledge data to determine the specific differences between predetermined groups of respondents. Groups were differentiated by those scoring

80% and above and below the 80% correct level on the Knowledge Assessment.

The final statistical analysis that was conducted was cluster analysis. Cluster analysis is a multivariate statistical technique that classifies cases and creates homogeneous groups among a set of data (Aldenderfer & Blashfield, 1984, p. 7; Lorr, 1983, p. 1; Norusis, 1988, p. B-71). Once a cluster solution was chosen to represent the data, analysis of variance was conducted to determine if differences existed between the group means. Post-hoc testing was also used to determine where the significant differences between groups were found. The results from the analysis of variance and post-hoc testing were used to describe and differentiate the clusters. Discriminant analysis of the clusters was also performed to assist with naming and describing the process that separated the groups and contributed to their uniqueness (Conti, 1996, p. 70).

Qualitative Measures

Follow-up telephone interviews were conducted with a sample of respondents in order to gather further descriptive data about members of the clusters and to supplement the quantitative data. Using multiple data sources to validate research findings is referred to as triangulation and serves to add credibility to a study

(Lincoln & Guba, 1985, p. 283, 307). At least three respondents from each cluster were contacted representing a high, middle, and low score on the Knowledge Assessment. As is typical with qualitative research methods, the overall interview process was terminated when the data was found to be occurring with redundancy between different respondents. The purpose of the interviews was to expand upon the data gathered from the research instrument regarding current and ideal roles of the speech-language pathologist with patients with feeding tubes, ethical issues related to alternative nutrition, criteria for recommending non-oral feeding, and effective methods of continuing education. An additional purpose of the telephone interviews was to explore areas of perceived need for further training for speech-language pathologists related to alternative nutrition.

The questions for the telephone interviews were uniform for each interview and were open-ended in format (see Appendix D). Respondents were allowed to answer questions with as little or as much detail as they desired. Probes were given by the interviewer to expand on topics occasionally if responses were limited or if the respondent required clarification. The data from the interviews were analyzed for trends, and the frequency of common responses

between individuals was reported. Data were examined for relationships both within and between the five cluster groups.

CHAPTER 4

RESULTS

Introduction

The data for this study were gathered from speech-language pathologists working in medical settings across the United States. Names and addresses were obtained from a mailing list generated by the American Speech-Language-Hearing Association. Participants were all certified speech-language pathologists at the time of the research as indicated by active membership in the American Speech-Language-Hearing Association. Five-hundred speech-language pathologists were randomly selected to participate in the research project. The overall return rate for the mail survey was 28% (138/500).

Using a mailing list from the American Speech-Language-Hearing Association was judged to be the most effective and accurate method of reaching speech-language pathologists with a mail survey. Since the Association required that this mailing list be purchased and advertised that their listings were updated daily, it was assumed that the information was the most current available. However, follow-up telephone calls to non-respondents and to those that were selected for interviews revealed that many of the telephone numbers of respondents and non-respondents that

were listed on the American Speech-Language-Hearing Association computer database were not working numbers. This suggests that the addresses to which the survey was sent may have also been incorrect resulting in the instrument never reaching the intended subject. The employment data was often not accurate as demonstrated by anecdotal statements by non-respondents that they were not working in medical settings currently or that they were not involved with patients with dysphagia. Therefore, a significant number of those selected for the sample may not have responded to the mail survey because they felt that the survey did not apply to them which may have decreased the overall return rate. Many of the surveys may actually have been sent to individuals who should not have been a part of the population under study. However, it was clear that those who returned the survey were correctly identified as members of the target population by their indication on the instrument of a current work setting in a medical facility.

A descriptive survey instrument designed by the researcher was used to gather the data in the areas of demographics, prevalence of swallowing disorders, roles of the speech-language pathologist, continuing education, and knowledge levels. Data from the first four sections of the

instrument were used to describe the sample and were also used in multivariate analyses with the knowledge level scores. Statistical analyses included descriptive statistics, factor analysis, discriminative analysis, and cluster analysis.

Description of Respondents

Speech-language pathologists working in the medical settings of general medical hospitals, rehabilitation hospitals, and nursing homes comprised the population sampled for this study. Demographic variables related to work experience, responsibilities, and setting were analyzed using frequency distributions (See Table 1). As the data shows, it was not uncommon for respondents to be employed in several settings simultaneously.

Table 1.

Description of Respondents by Demographic Variables

Work Related Variables

<u>Variable</u>	<u>Mean</u>	<u>Variable</u>	<u>Mean</u>
Yrs Experience	13.4	Recommend Feeding Tube:	
Yrs Medical Exper	11.3	> 3 times/week	8.00%
Total SLP's in Facility	2.6	1x/week	21.00%
Capacity of Facility	248.8	1x/month	21.70%
Dysphagia Exper	9.8 years	<1x/month	39.10%
MBS Experience	6.6 years	Never	5.10%
Perform MBS Daily	21.70%	Recommendation	
Perform MBS Weekly	31.20%	Used by Physician:	
Perform MBS Monthly	6.50%	Always	22.50%
Perform MBS < Monthly	10.10%	Frequently	68.10%
		Rarely	5.10%

Perform MBS Never	27.50%	Not Allowed to Recommend	2.20%
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Years Work Experience by Setting

Acute Care Hosp	5.7	Skilled Nursing Facility	2.2
Nursing Home	3.8	Rehabilitation Hospital	1.9
Rehab Unit in Hospital	3.3	Other Setting	0.9
Home Health Agency	2.3		

Current Work Hours by Setting

Acute Care Hosp	9.8	Nursing Home	3.1
Other Setting	8.4	Rehabilitation Hospital	2
Rehab Unit in Hospital	3.7		

The respondents' average year of graduation for the master's degree was 1986 with a range from 1966 to 1998. Respondents reported on specifics of their education and training backgrounds related to swallowing disorders and alternative nutrition as follows:

Dysphagia Coursework	None	Optional	Required
	56%	21%	19.6%

Only 24.6% of respondents reported that they had taken coursework specific to alternative nutrition in their undergraduate or graduate training programs, and practicum experience with patients with feeding tubes was reported by 44.2% of the respondents. Even with the absence of

training in their graduate programs, 71% of speech-language pathologists reported feeling well-prepared to address issues related to alternative nutrition in their clinical settings. The recent incidence of feeding tube use appears to have remained fairly consistent since only thirty-percent of the respondents stated that there had been an increase within the last year.

Another area from which data was gathered about this sample of speech-language pathologists was their current role within their medical facility and with other health care professionals. Nearly three-fourths (71%) of the respondents reported being frequently involved in the counseling and education of patients and families after alternative nutrition had been recommended. The professionals who were reported to provide the most information to patients and families about alternative nutrition were as follows:

Professional	Frequency
Physicians	25.4%
Speech-language pathologists	13.0%
Nurses	12.3%
Registered dieticians	9.4%

Speech-language pathologists expressed that they felt confident in answering patient and family questions about

alternative nutrition 74.6% of the time. When professionals were asked about their current knowledge levels related to alternative nutrition, 55.8% reported that they were satisfied and 42% reported that they were not satisfied with their current knowledge levels.

Specific questions were used on the survey to elicit information about methods of continuing education that professionals had used and the effectiveness of these continuing education efforts. Types of training that had been provided through the employment setting were reported as the following:

Training Provider	Frequency
Speech-language pathologist	60.1%
Nursing staff	54.3%
Facility inservice	44.9%
Registered dietician	43.5%
Physician	20.3%
Other job-related training	15.2%
No job-related training	10.1%

Respondents reported that they would be most likely to seek out further information about alternative nutrition from the following professionals:

Professional	Frequency
Gastroenterologist	42%
Registered Dietician	29%

Nurse	10.1%
Speech-language pathologist	9.4%

Respondents had attended an average of two continuing education courses with a component on alternative nutrition over the last five years. Resources that were utilized for continuing education were as follows:

Resource	Frequency
Observations	67.4%
Conference attendance	58.7%
Books	58%
Professional journals	52.9%
Other resources	40.6%
None	5.8%

Respondents overwhelmingly reported learning the most about alternative nutrition through work experience (68.8%), followed by self-study (10.1%), continuing education (8.7%), and employer-sponsored training (2.9%). Regarding the direction of future continuing education, respondents ranked questions in importance on a four-point scale from unimportant to very important. Sixty-seven percent of respondents reported that it was very important that additional information be published in the areas of speech-language pathology and alternative nutrition. Seventy-eight percent stated that it was very important for

university training programs to add coursework in the area of alternative nutrition. Finally, 71% of respondents indicated that it was very important that additional continuing education opportunities be made available for speech-language pathologists to learn more about alternative nutrition. On all three of these questions, at least 92% of respondents answered that it was very important or somewhat important to have more information available in graduate education programs, to have more research published, and to add continuing education programs that are related to speech-language pathology and alternative nutrition.

The final section of the survey instrument consisted of 26 multiple-choice questions related to alternative nutrition and swallowing disorders. Frequency data was tabulated for each individual item and for the total scores of the respondents (see Table 2). Total scores ranged from a low of 5 to a high score of 26 with a standard deviation of 3.11. Each item was scored as either correct or incorrect. Correct items were added together to obtain a total score for each respondent. The average score of respondents was 19.60; for this 26-item survey, this corresponded with a 76% accuracy level.

Table 2.

Respondent's Scores on Knowledge Assessment Items

<u>Item Number</u>	<u>Percent Correct</u>	<u>Percent Incorrect</u>
1	49.6	50.4
2	92.8	7.2
3	84.8	15.2
4	44.2	55.8
5	89.9	10.1
6	87.7	12.3
7	84.8	15.2
8	85.5	14.5
9	76.6	23.4
10	93.5	6.5
11	68.1	31.9
12	31.2	68.8
13	78.3	21.7
14	58	42
15	87.7	12.3
16	34.3	65.7
17	99.3	0.7
18	94.2	5.8
19	97.8	2.2
20	100	0
21	76.8	23.2
22	62	38
23	63.8	26.2
24	96.4	3.6
25	34.8	65.2
26	89.9	10.1

Interviews with Non-Respondents

Telephone interviews with non-respondents were conducted since the overall response rate was 28% in order to compare non-respondents to respondents to determine if the two groups were similar. It was important to show that

non-respondents did not comprise a different group than the respondents but simply failed to return the survey; demonstrating that the two groups were similar would aid in generalization of the results to the population at large and would lend credibility to the study (Kalton, 1983, p. 63). With lower overall return rates, researchers need to determine whether individuals did not respond because they were different from the individuals who did respond or due to some other factors. Common factors leading to non-responsiveness in survey research are forgetfulness, apathy, changes in address or other mailing problems, refusal, or losing the instrument (p. 65). Response rates to mail surveys vary greatly from 10-90% (p. 66). Response rates of 50% are often considered adequate; 60% return rates are considered good, and rates of 70% are considered very good (Babbie, 1990, p. 182). Mail survey return rates for clinical research such as with health professionals may be lower than for general surveys, and realistic return rates from health professionals may only be from 30% to 60% (Portney & Watkins, 1993, p. 252).

Thirty non-respondents who were sent an initial survey and follow-up postcard were chosen for follow-up from the initial list of 500 participants using a table of random numbers. They were replaced with the same randomized

method if their telephone number was unavailable or had been disconnected. Originally, the list of individuals to interview was stratified proportionally according to the overall population of speech-language pathologists employed in each of the three settings. This resulted in a target group consisting of 7 (24%) professionals from rehabilitation hospitals, 10 (32%) from general medical hospitals, and 13 (44%) professionals from nursing homes. However, due to the difficulty contacting speech-language pathologists and eliciting participation, the final pool consisted of 21 speech-language pathologists with the following distribution: 5 respondents from rehabilitation hospital setting (24%), 6 respondents from general medical hospital setting (29%), and 10 respondents from nursing home setting (48%). This final stratification distribution was very similar to the initial target with a slightly smaller total sample than was ideal.

Professionals were contacted via telephone and asked to provide the information from the demographic sections of the survey instrument as well as selected questions from the Knowledge Assessment. Two questions from each of the four factors were used in the interviews as representative of the Knowledge Assessment. These questions were chosen because they had the highest factor loadings in each of

their respective factors from the analysis. The list of questions from the Knowledge Assessment was reduced to eight items because of the complicated and lengthy nature of the items. It was felt that it would be difficult to elicit responses from speech-language pathologists on 26 multiple-choice items over the telephone.

The telephone numbers for professionals were obtained from the electronic membership database available to American Speech-Language-Hearing Association members through their website. Members list their telephone numbers and any information they choose about themselves on a voluntary basis, and they may also choose not to be listed. Many of the telephone numbers that were listed on the database were not working numbers. Other problems in gathering information through telephone interviews were refusals due to lack of time or interest, refusals due to the individual no longer working in the field of dysphagia, and individuals who were not at home at the time of the contact attempt. The following is the distribution of unsuccessful contact attempts by setting:

Rehabilitation hospital-- No telephone number (49%), not working number (8%), not working in dysphagia (1.6%), unavailable (33%), total attempted (51%).

General medical hospital--no telephone number (37%), not working number (13%), unavailable (28%), not working in dysphagia (11%), refused (2%), total attempted (39%).

Nursing home--no telephone number (29%), not working number (17%), not working in dysphagia (10%), unavailable (36%), refused (1%), total attempted (60%).

A t-test was conducted with the data to compare the demographic variables and the scores on the selected items on the Knowledge Assessment to determine if there were significant differences between respondents and non-respondents. No significant differences were found between respondents and non-respondents on demographic variables. Significant differences were found on six of the eight individual Knowledge Assessment items and on the overall score between the two groups on the eight items. Non-respondents had lower mean scores than respondents on the individual items that showed differences and on the overall mini-total score (see Table 3).

Table 3.

t-test Results of Non-respondent's and Respondent's Scores on Modified Knowledge Assessment

<u>Item</u>	<u>t-score</u>	<u>df</u>	<u>Sig:2-tail</u>	<u>Mean Diff.</u>
1	2.201	157	0.029	0.25
2	2.449	157	0.015	0.17
5	2.987	157	0.003	0.23
6	1.985	157	0.049	0.16
8	2.16	157	0.032	0.19
11	3.614	157	0.001	0.4
23	0.164	157	0.87	1.86E-02
25	-0.715	157	0.475	-8.07E-02

Although telephone interviews are a standard technique for data collection, the process was not without methodological hazards. Using telephone interviews to elicit responses to 30 demographic questions and eight knowledge questions with at least four multiple-choice options for each may have created some of the differences between the two groups. The multiple-choice questions were lengthy and technical in nature. Participants frequently requested repetitions of questions and answer options and sometimes were unable to answer items on the assessment.

The use of only auditory input without the benefit of being able to read and re-read the questions and answers may have decreased the participant's ability to respond according to their true capability. Anecdotal comments

from participants indicated that the process of completing the survey over the telephone was difficult. It was not possible to control background noise and activity, and these may have interfered with the respondent's concentration and processing skills. The interviews were also difficult for the interviewer, requiring an extremely quiet environment and intense concentration in order to administer the questions effectively.

Overall, it was judged that the main reason for the mail survey response rate was the inaccurate mailing list that resulted in many subjects not receiving the survey. Additionally, many of the professionals who received the survey may have been inappropriate since they were no longer working in medical settings. Another reason for the inaccuracies in addresses, telephone numbers, and work settings may be that many speech-language pathologists have changed jobs due to job losses and funding cuts since the Balanced Budget Act of 1997 (Melvin, 1999). This act cut reimbursement for rehabilitation in skilled nursing facilities such as nursing homes where 44% of speech-language pathologists in medical practice were employed.

The differing scores between the two groups and the lower scores on two-thirds of the Knowledge Assessment items by non-respondents could have either been caused by

actual differences in the sample or by the two methods of data collection that were used. Overall, these differences indicate that caution should be used in the interpretation of the data because lower-scoring professionals may have been underrepresented in the surveys that were returned. However, this situation validates the need for training for all speech-language pathologists in the area of alternative nutrition since even those professionals who may have higher knowledge levels demonstrate training needs.

Knowledge Assessment Factors

Factor analysis was used in this study to examine the Knowledge Assessment items for relationships and underlying conceptual ties. Factor analysis is a combination of statistical analyses that have a common objective of representing "a set of variables in terms of a smaller number of hypothetical variables" (Kim & Mueller, 1978a, p. 9). Factor analysis examines the interaction and interrelationships between variables and allows the analysis of the effects of multiple rather than single variables (Norusis, 1988, p. B-41). Factor analysis can be used as an exploratory tool to determine underlying dimensions of the data and to aid in data reduction (Kim & Mueller, 1978a, p. 9; Lorr, 1983, p. 14). Additionally, factor analysis can be used in a confirmatory function to

test hypothesized relationships among the data (Kim & Mueller, 1978a, p. 9; Lorr, 1983, p. 14).

Factor analysis can also be used to identify and verify the underlying constructs within a set of data (Norusis, 1988, p. B-41). Determining the underlying concepts in an instrument can serve as a verification of construct validity (Conti & Fellenz, 1986, p. 73; Huck, 2000, p. 106). The underlying concepts that are revealed during factor analysis "can be used to explain complex phenomenon" (Norusis, 1988, p. B-42). The two goals with factor analysis are parsimony and meaningfulness (p. B-43). The analysis should represent the relationships among variables with as much parsimony or simplicity as possible (Lorr, 1983, p. 14). Parsimonious solutions group variables with high correlations and reduce the data to a more meaningful and understandable form. This is accomplished by creating a solution with the smallest number of factors possible that simplifies the data and simultaneously preserves the meaning. In this manner, new insights about complex human behavior can be made.

In this study, factor analysis was used to determine the number and nature of underlying concepts in the Knowledge Assessment portion of the research instrument. In the analysis, 24 of the 26 items were used; 2 items were

not included because all of the respondents answered these correctly. Initially, in the selection of factors, eigenvalues were used to determine the number of meaningful factors to be included in the analysis of the Knowledge Assessment. An eigenvalue is a value used to determine the appropriate number of factors to extract and is also used as a measurement of variance (Kim & Mueller, 1978a, p. 76). The eigenvalue represents the total variance explained by each variable (Norusis, 1988, p. B-46). Generally, factors must have eigenvalues of 1.0 or greater in order to be included in the model (Kim & Mueller, 1978a, p. 49; Norusis, 1988, p. B-47).

In the next step in factor selection, a scree plot of the values was examined. A scree plot is a visual representation of the point at which the eigenvalues begin to trail off from the steep slope of the other factors similar to the appearance of rubble at the foot of a mountain (Norusis, 1988, p. B-47). Examining the scree plot assists in determining where to logically stop the factor extraction process.

During factor analysis, a rotation of the data is typically conducted in order to simplify the data and make it more interpretable (Kim & Mueller, 1978a, p. 50; Norusis, 1988, p. B-53). Orthogonal rotation using the

varimax method was the method of rotation used in this analysis. The varimax method is the most commonly used method, and it "attempts to minimize the number of variables that have high loadings on a factor" (Norusis, 1988, p. B-54).

A four-factor solution was judged as the most appropriate for this data. In the original analysis, four factors were extracted with the requisite eigenvalues of 1.0 or greater. However, factor solutions with two to seven factors were examined to judge which solution provided the most parsimonious and representative results. Examining the scree plot aided in the determination of the point at which the factor values began to lose meaning and the proportion of representativeness (Norusis, 1988, p. B-46). In the four factor solution, each factor accounted for the following amount of the total variance in the analysis: Factor 1--12.2%, Factor 2--7.7%, Factor 3--7.5%, and Factor 4--6.2%. In factor analysis, the first factor is always the combination that accounts for the most variance in the sample followed in strength by the next consecutively numbered factors. None of the factors are correlated with each other (p. B-46).

One caveat that must be acknowledged in the interpretation of these results is that the sample of

respondents available in the data set was smaller than the number typically recommended in multivariate analysis. Generally, the minimum number of cases available in the data set should be 10 times the number of items (26 x 10 = 260) or the number of independent variables (Shavelson, 1996, p. 536). This 10:1 ratio helps assure that the variance is stable. The data set for this study contained 138 sets of responses; therefore, the results should be interpreted with this qualifier in mind.

In this study, four orthogonal factors were identified (see Table 4). All of the items from the Knowledge Assessment were used in analyzing the factors in order to name them. Each item was included in the factor with its highest loading. Each variable in the analysis is expressed in a coefficient that standardizes the

Table 4.

Factor Loadings of Knowledge Assessment Items

<u>Item No.</u>	<u>Factor 1</u>	<u>Factor 2</u>	<u>Factor 3</u>	<u>Factor 4</u>
11	0.63	0.19	0.10	-0.12
6	0.58	-0.04	0.17	-0.12
22	0.52	-0.01	-0.20	0.11
4	0.46	0.29	0.04	0.15
7	0.33	0.27	0.19	-0.20
12	0.28	0.02	-0.01	0.09
21	0.26	-0.10	0.25	0.20
1	0.13	0.73	-0.17	0.05
25	-0.09	0.62	0.16	-0.05

<u>Item No.</u>	<u>Factor 1</u>	<u>Factor 2</u>	<u>Factor 3</u>	<u>Factor 4</u>
14	0.25	0.56	0.06	0.09
3	0.01	0.49	0.32	-0.09
9	0.01	0.40	-0.12	0.21
10	0.20	0.21	-0.01	-0.09
5	-0.10	0.01	0.82	0.09
2	-0.35	0.28	0.62	-0.02
15	0.26	0.05	0.51	0.02
16	0.16	-0.18	0.40	0.13
18	0.35	0.22	0.36	0.12
8	-0.05	0.02	0.03	0.70
23	0.08	0.01	0.02	0.68
26	0.02	0.01	0.25	0.46
19	0.35	0.02	0.12	0.38
13	-0.05	0.21	-0.09	0.30
24	0.27	-0.10	0.08	0.29

variable in terms of the factor. These coefficients are referred to as factor loadings, and they indicate the weight that is assigned to each factor (Norusis, 1988, p. B-48). All of the factors in the analysis had slightly different loadings. Coefficients of .3 are commonly considered large enough to use as criteria for conducting the analysis (Kim & Mueller, 1978b, p. 70). Out of 26 items on the Knowledge Assessment, 22 (85%) loaded above the .3 level. All 26 variables were retained in the analysis, although the 22 variables above the .3 criterion level were given more weight in the description and the naming of the factors. Overall, the four factors had an

almost equal number of items distributed among them: Factor 1--7, Factor 2--6, Factor 3--5, and Factor 4--6.

Description of the Knowledge Assessment Factors

The Knowledge Assessment factors were described for their components and content and were also analyzed for level of cognitive complexity. One way of considering cognitive processing that is frequently used by educators from a wide variety of disciplines is Bloom's Taxonomy of Educational Objectives (Bloom, 1956). The taxonomy is simply a model for classifying educational objectives and cognitive tasks into the various levels of cognitive processing required by the task (p. 1). The goal of educators is generally to facilitate the development and use of higher levels of mental processing and independence in learning. This taxonomy aids educators in determining the level at which they are teaching and the reasoning skills they are requiring of the learner (p. 2).

Bloom (1956) discriminates between six different levels of cognitive processing from least to most complex which build upon each other (p. 15). These levels organized from simple to complex are Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation (p. 18). Tasks at the Knowledge level only require the individual to recall or recognize facts or

information (p. 201). Comprehension requires the individual to understand and be able to generalize or restate previously learned information (p. 204). Application requires the individual to use basic problem solving and apply or translate information previously learned to a novel or real-life situation (p. 205). Analysis level tasks require the individual to use critical thinking skills, to compare and contrast, and to categorize information (p. 205). Synthesis requires the individual to integrate varied or diverse pieces of information in order to form a hypothesis or create a plan (p. 206). Evaluation requires the individual to assess a situation and make value judgments and recommendations (p. 207).

Factor 1 contains seven items from the Knowledge Assessment and was named Foundations. All of the items have some relationship to basic mechanics, purpose, or indications for a specific type of feeding tube. The concepts included in Foundations are critical for daily, routine treatment and assessment of patients with feeding tubes. Areas that are included are the procedures involved in the operation of a feeding tube, the actual material that could be passed through the tube, the level of personnel required to place a feeding tube, and instances where various feeding tubes would be implemented. Items

are general in nature to feeding tubes and not just isolated to swallowing or tasks of the speech-language pathologist. Professionals can easily obtain this information through a swallowing disorders course, written material, inservice, or hands-on training. Information included in Foundations is considered to be at the comprehension level on Bloom's Taxonomy and requires recall and application but not any higher level use of cognitive skills or evaluative judgment.

Factor 2 contains seven items from the Knowledge Assessment and was named Complications. All of the items that loaded on this factor are related to adverse effects, risks, and safety issues with various types of alternative nutrition. These items are at the application level on Bloom's Taxonomy and require the professional to use prior knowledge to address specific patient situations. All items are critical to patient safety and professional liability. Complications contains many concepts that the speech-language pathologist needs to know in order to perform patient, family, and staff education. Rather than being related to everyday use and mechanics as Foundations is, Complications is related to more life-threatening situations with long-term ramifications. The professional is required to have a broad understanding of the basic

knowledge areas of dysphagia and alternative nutrition upon which to build in order to use the knowledge included within the Complications factor. The Complications factor requires that the professional have Foundations knowledge plus clinical experience.

Factor 3 contains five items and was named Use. These items are all related to anatomical concepts, daily use, and appropriate use of feeding tubes. The majority of these items are at the application level on Bloom's Taxonomy and can be learned through many methods such as continuing education courses, inservices, texts, or journal articles. Some of the items in this factor necessitate application of factual knowledge gathered from real-life, highly-variable situations indicating a higher level of technical skill needed than the previous factors. Professionals strong in this factor would be actively weighing risks and benefits and making recommendations for the patient based upon their conclusions and comparisons.

Factor 4 contains six items and was named Therapeutic Intervention. All of the items that loaded on this factor deal with events that could occur routinely in direct interactions with the patient. These scenarios would necessitate an evaluation of the situation and judgment by the professional of the appropriate action to assure

patient safety and comfort. The items in Therapeutic Intervention require a higher level of knowledge application and synthesis by the professional than any of the previous factors. Therapeutic Intervention also requires the formation of a hypothesis about the patient's symptoms. These scenarios take an if-then format and require the professional to decide the appropriate action or recommendation in light of a threatening situation. These cognitive requirements indicate that Therapeutic Intervention requires a professional to be using Synthesis skills of Bloom's Taxonomy. Professionals need knowledge of all the conceptual areas identified by the other factors in order to function well and make recommendations at this level.

Factor analysis was also used in this study to address the area of construct validity. Since factor analysis serves to identify the concepts that form the basis for the individual items of an instrument, it can be used for comparison to the original concepts that formed the basis of the instrument (Conti & Fellenz, 1986, p. 73; Huck, 2000, p. 106). The four factors that were identified in this analysis were re-examined to determine if they were commensurate with the concepts that the Knowledge Assessment was originally based upon. The four factors

that were identified were Foundations, Complications, Use, and Therapeutic Intervention. All of the factors included items that addressed dysphagia, feeding tubes, nutrition, aspiration, the gastrointestinal tract, and oral feeding. Rather than separating these concepts into distinct groups within a factor, the analysis produced factors that were interwoven with each original construct. The factors each involved the original constructs and were defined by the level of cognitive processing, clinical decision-making, and evaluative judgment that was required by the professional. The factors ranged from simple knowledge of facts, to evaluation and synthesis of information, and to specific patient judgments and interventions (Bloom, 1956). Therefore, the four factors that were identified confirm the construct validity of the Knowledge Assessment since all of them were related to the knowledge areas and medical disciplines that were used in the development of the individual items. Additionally, these constructs were not only the major knowledge content areas needed by speech-language pathologists but also contain the major processes needed to be effective in the field.

Differences Between Experts and Moderates

Discriminant analysis was used in this study to identify any differences between groups of respondents

based upon their Knowledge Assessment scores. Discriminant analysis "is a statistical technique which allows the researcher to study the differences between two or more groups of objects with respect to several variables simultaneously" (Klecka, 1980, p. 7). This statistical technique is multivariate in nature, allowing the researcher to examine the interrelationships and simultaneous interaction of variables rather than examining variables singly and in isolation (Conti, 1993, p. 91). The assumption in discriminant analysis is that two or more groups exist, and these groups differ on some combination of variables. Discriminant analysis can be used to determine the differences between groups and also to classify cases or respondents into a group (Klecka, 1980, p. 8).

In this study, discriminant analysis was used to describe the combination of variables that could be used to distinguish respondents on the Knowledge Assessment portion of the survey according to their total score. A cut-off score of 80% correct on the Knowledge Assessment was used to form the two groups for the analysis. It was judged that 80% was the lowest score acceptable to be considered skilled on the Knowledge Assessment. Out of 138 total respondents, 82 were placed into the lower performing group

(Moderates), and 56 were placed into the higher performing group (Experts).

Two criteria were used for evaluating the hypothesis that it was possible to differentiate between Experts and Moderates on knowledge levels using variables related to experience, training, demographics, perceptions, and current work setting. The first criterion was that the discriminant function produced by the analysis had to be describable using the structure coefficients with the variables having a value of .3 or greater. The second criterion was that the discriminant function needed to correctly classify a target of at least 70% of cases in the analysis.

The first criterion was necessary because the nature of discriminant analysis is such that the procedure will produce a discriminant function regardless of whether the function is meaningful. The structure matrix contains the coefficients that show the similarity between each individual variable and the overall discriminant function. If several of the variables do not have a coefficient of at least .3, then it is impossible to discern the meaning of the function. In analyses which use a large number of variables, it is possible to obtain functions which have high predictive ability but which correlate with so many of

the variables that it is impossible to decipher the meaning of the function. Therefore, this criterion places a logical restriction on the interpretation of the statistical output and requires that it have clarity in order to be used.

The second criteria demands that the discriminant function account for a significant amount of variance before it can be used. Since this analysis contained two groups, the percent of correct classifications into a group based on random assignment would be 50%. Requiring a criterion level of 70% increases the likelihood by 20% that assignments were made on factors other than chance. Thus, in order for the discriminant function to be acceptable, it had to account for nearly one-half of the variance over random chance for assignment of individuals into a group.

Used together, these two criteria require that the results of the discriminant analysis be meaningful before the results are judged as useful. Analyses that use a large number of variables can produce functions which have high classification percentages but which offer little descriptive power. Alternatively, some analyses produce functions which can be clearly described but which have low classification power. Therefore, the combination of these

two criteria requires that the function be both clearly descriptive and highly accurate.

For purposes of this descriptive analysis, the respondents were divided into Experts and Moderates, based on the 80% correct cut-off score on the Knowledge Assessment. The set of 15 discriminating variables used to predict placement into these two groups was as follows: Year receiving graduate degree; Years of experience as a speech-language pathologist; Years of medical experience as a speech-language pathologist; Hours per week currently working in the medical settings of acute-care hospital, rehabilitation hospital, rehabilitation unit within a hospital, skilled nursing unit within a hospital, nursing home, home health agency, or other setting; Coursework in dysphagia during graduate or undergraduate training; Perceived preparation level to address issues of alternative nutrition; Years of dysphagia experience; Perceived preparation level to answer questions about alternative nutrition; and Satisfaction with knowledge level about alternative nutrition.

The pooled-within-groups correlations are the correlations for the variables with respondents placed in their groups of either Experts or Moderates. The pooled-within-groups correlation matrix of discriminating

variables was examined because the interdependencies among variables are important in most multivariate analyses. In order for multiple variables to be included in an analysis, variables should not be sharing much of the same variance; a high correlation would indicate that variables are accounting for the same variance. The within-groups matrix reveals how the discriminant function is related to the variables within each group in the analysis. Of the 105 correlation coefficients, six were above the .5 level. These included Medical experience with total years of experience (.80), Years of dysphagia experience with Medical experience (.77), Experience with Year of graduate degree (.67), Years of dysphagia experience with Years total experience (.63), Medical experience with Year of graduate degree (.55), and Perceived preparation level to address issues related to alternative nutrition with Perceived preparation level to answer patient/family questions related to alternative nutrition (.51). Only five correlation coefficients were between the .3 and .5 levels. These were Years of dysphagia experience with Year of graduate degree (.45), Coursework in dysphagia during educational program with Years of experience (.40), Coursework in dysphagia during educational program with Year of graduate degree (.33), Coursework in dysphagia

during educational program with Years of medical experience (.32), and Hours per week working in other settings with Hours per week working in acute-care hospital (.30). The remaining variables were below the .3 level, and thus were judged to be unrelated to each other. Since the shared variances were distributed throughout the correlation matrix and since no variable was consistently correlated with another variable, all of the variables were considered to be at a sufficiently independent level to be retained in the analysis.

Stepwise selection was used to determine which variables contributed most to the discrimination of Expert and Intermediate performers on the Knowledge Assessment. Stepwise procedures produce an optimal set of discriminating variables and help to eliminate weak or redundant variables (Klecka, 1980, p. 53). Although there are various methods of selecting variables for inclusion in the discriminant analysis, Wilks' lambda was chosen for this analysis because it considers both the differences between the groups and the cohesiveness within the groups (p. 54). Because of its approach to variable selection, Wilks' lambda is commonly used in discriminant analysis studies in the social sciences and in education. As a result of this stepwise procedure, eight variables were

included in the discriminant function. The following discriminating variables and their Wilks' lambda values were selected: Hours per week working in acute-care hospital (.91); Hours per week working in skilled nursing unit of hospital (.76); Hours per week working in rehabilitation hospital (.75); Hours per week working in rehabilitation unit of hospital (.75); Hours per week working in other settings (.75); Years of experience with dysphagia (.75); Satisfaction with knowledge level related to alternative nutrition (.75); and Perceived preparation level for working with patients with alternative nutrition (.74). The other seven variables used in the analysis did not account for enough variance to be included in the discriminant function.

Standardized discriminant function coefficients are used to determine which variables contribute most to the discrimination between the groups. By examining the standardized coefficients, the relative importance of each variable to the overall discriminant function can be determined. The standardized coefficients for this function which discriminated the Experts from Moderates were as follows: Hours per week working in acute-care hospital (.99); Hours per week working in skilled nursing unit within a hospital (.40); Hours per week working in

rehabilitation unit within hospital (.34); Satisfaction with knowledge level related to alternative nutrition (.31); Hours per week working in other setting (.30); Years of experience with dysphagia (.30); Hours per week working in rehabilitation hospital (.27); and Perceived preparation level for working with patients with alternative nutrition (-.21). In summary, Hours per week working in acute-care hospital contributed two to three times the discriminating power as the other variables and is almost a direct substitute for the discriminant function. The next most powerful discriminators were Hours per week working in skilled nursing unit and Hours per week working in a rehabilitation unit of a hospital.

The percentage of cases correctly classified shows how accurate the discriminant function is in grouping the respondents. This discriminant function was 73.91% accurate in classifying cases. It correctly placed 64 (78%) in the Moderate group, and 38 (67.9%) in the Expert group. Thus, the discriminant function is a 23.91% improvement over chance in predicting group placement and accounts for nearly one-half of the remaining variance above chance. Therefore, this demonstrates that Expert and Moderate speech-language pathologists on the Knowledge Assessment of dysphagia and alternative nutrition can be

distinguished on the basis of selected demographic variables.

The discriminant function is indicated by upper case D and is formed by adding or subtracting the variables depending on whether their value is positive or negative. The final value that is either added or subtracted from the equation is a constant that is determined through the same process as the coefficients that are used in the equation. The discriminant function which was used to classify the cases and which can serve as a guide for predicting future placement of respondents into these groups was as follows:

$$D = .077 \text{ (Hours per week working in acute care hospital)} + .032 \text{ (Hours per week working in rehabilitation hospital)} + .038 \text{ (Hours per week working in rehabilitation unit of hospital)} + .038 \text{ (Hours per week working in skilled nursing unit of hospital)} + .020 \text{ (Hours per week working in other setting)} - .45 \text{ (Perceived preparation level for working with patients with alternative nutrition)} + .063 \text{ (Years of experience in dysphagia)} + .58 \text{ (Satisfaction with knowledge level related to alternative nutrition)} - 2.15 \text{ (constant)}.$$

The group centroid for the Moderate Group was $-.49$ and was $.72$ for the Expert Group. The canonical correlation is a measure of the degree of association between the discriminant scores and the groups. A value of zero indicates no relationship, and 1.0 is the maximum value and strength (Klecka, 1980, p. 36). The canonical correlation

was .51 for this study. When this correlation is squared, it indicates that the groups explain 26.46% of the variation in the discriminant function.

The structure matrix contains the coefficients that show the similarity between each individual variable and the total discriminant function. The variables with the highest coefficients have the strongest relationships to the discriminant function. These coefficients are used to name the discriminant function since they show how closely the variables and the overall discriminant function are related. In a study such as this in which the discriminant analysis is used for descriptive purposes, this is the most important information in the analysis. This critical importance arises from the fact that interpreting the structure matrix results in naming the process that makes the groups different from each other (Klecka, 1980, pp. 31-34). Since the overall purpose of discriminant analysis is to describe the phenomenon that distinguishes the groups from one another, this logical process of giving meaning to the discriminant function by interpreting the structure matrix is central and critical to the entire process. In this interpretation, variables with coefficients of approximately .3 and above are generally included.

Three variables had sufficiently large coefficients to be included in the interpretation of the meaning of the discriminant function. These were as follows: Hours per week working in acute-care hospital (.78), Years of dysphagia experience (.35), and Years of medical experience (.31). Hours per week working in acute-care carried more than twice the weight as the other two variables in naming the discriminant function.

Based on the strength of these three variables, this discriminant function was named Specific Medical Experience. Working in the specific hospital setting of acute-care was over twice as strong a variable as the other two variables, indicating that this was this most critical element of the function. Length of experience working with swallowing disorders was also a critical variable followed closely by length of experience in medical settings. Respondents in the Moderate group worked an average of 4.8 hours per week in an acute-care hospital while members of the Expert group worked an average of 17.02 hours per week in acute-care. Members of the Moderate group had an average of 8.94 years of experience with swallowing disorders, and Experts had worked with swallowing disorders for an average of 10.98 years. Moderate group members' average medical experience was 9.99 years, and Expert group

members reported working in medical settings for 12.68 years. This interaction of variables indicates that the specific type of medical setting and the length of experience in a medically-based facility working specifically with patients with swallowing disorders were critical to form a discriminating statistical function that could classify respondents into Moderate and Expert performing groups on the Knowledge Assessment.

Thus, a discriminant analysis was calculated to determine if it was possible to use a variety of variables related to education, experience, perceptions, and work setting to discriminate between Moderate and Expert performers on a Knowledge Assessment measure related to swallowing disorders and alternative nutrition. Because a recognizable discriminant function was accurate in classifying respondents into the correct group and was able to explain a substantial amount of variance, it was judged to be meaningful and useful for discriminating between Moderate and Expert-level speech-language pathologists.

Identifying Clusters of Speech-Language Pathologists

Cluster analysis was performed using the 138 participants to determine if groups of speech-language pathologists could be identified by their scores on the items of the Knowledge Assessment portion of the research

instrument. Cluster analysis is a multivariate statistical procedure that reorganizes or classifies information about a sample of respondents into homogeneous groups (Aldenderfer & Blashfield, p, 7; Lorr, 1983, p. 1; Norusis, 1988, p. B-71). Cluster analysis differs from discriminant analysis in that it is an inductive rather than deductive process that allows for relationships inherent in the data to become obvious (Conti, 1996, p. 67).

Cluster analysis allows for a holistic view of the data rather than oversimplifying complex human phenomenon by examining variables in isolation (Conti, 1996, p. 67). An additional benefit of cluster analysis is that it enhances and enriches quantitative research (Fellenz & Conti, 1989). In cluster analysis, the number of groups and the specific makeup of the groups are initially unknown, and thus the data does not have the bias of the researcher imposed upon it (Norusis, 1988, p. B-71). Cluster analysis can be followed by other quantitative and qualitative analyses to add more descriptive power to the data in a triangulation process (Conti, 1996). The triangulation process in this study involved analysis of variance and discriminant analysis to determine the variables that were related to the clusters and the nature of these relationships. Interviews were also used as a

means to more accurately describe the clusters of speech-language pathologists.

Hierarchical agglomerative methods were used to establish the clusters. In this method, "clusters are formed by grouping cases into bigger and bigger clusters until all cases are members of a single cluster" (Norusis, 1988, p. B-73). The agglomerative method is the most commonly used method to form clusters, especially in the social sciences (Aldenderfer & Blashfield, 1984, p. 35; Lorr, 1983, p. 84). An agglomeration schedule displays the number of cases combined at each stage of the analysis, and coefficients provide the researcher with information about the similarity or dissimilarity of combined clusters (Norusis, 1988, p. B-77). Large coefficients indicate that more unlike clusters are being combined, and small coefficients indicate that very similar clusters are being merged (p. B-77). These coefficients allow the researcher to decide at what point to stop combining clusters and to decide what the ideal number of clusters is to represent the unique data (p. B-78). Generally, agglomeration should be ceased as soon as the distance between steps becomes large (p. B-78).

Cluster solutions from two to seven in number were considered for this study to best represent the data. A

five cluster solution was determined to be optimal for the data set based on the relatively equal distribution of respondents in each group and the defining characteristics of each group. Table 5 details the cluster names, number of respondents in each, and percentage of respondents that each cluster represents.

Table 5.

Distribution of Clusters of Speech-Language Pathologists

<u>Cluster</u>	<u>Name</u>	<u># Members</u>	<u>% Members</u>
1	Novices	34	24.6
2	Intermediates	23	16.7
3	Technicians	28	20.3
4	Generalists	26	18.8
5	Specialists	27	19.6

Elements of the Clusters

The first step in identifying and naming the clusters was to conduct a series of one-way analysis of variance (ANOVA) between the five clusters and the items on the Knowledge Assessment. Analysis of variance is a statistical procedure to determine if there are significant differences between the means of two or more groups using a predetermined criterion level (Gay & Airasian, 2000, p. 491). The probability level used in this study was .05.

Clusters were described based on the differences in mean scores on each individual variable (Lorr, 1983, p. 14). This analysis of means helps to find "attribute patterns" (p. 4). Both high and low mean scores between each cluster for each variable were examined. Analysis of variance demonstrates that significant differences exist but not where the differences lie. Therefore, post-hoc tests were necessary to determine exactly which group means were significantly different from each other for those items on which differences existed.

A one-way analysis of variance was conducted with the data to determine which of the 24 Knowledge Assessment variables were related to the clusters and the specific ways in which these variables were associated with the five cluster groups (cf. Conti, 1996, p. 70; Hays, 1995; Strakal, 1995; Yabui, 1993). This additional analysis provided information needed to name and describe the clusters after they were identified. The analysis of variance was conducted on 24 of the 26 variables in the Knowledge Assessment inventory. Two questions were excluded because all of the respondents answered correctly on these items, and thus there was no variance on the items. Items were coded so that each respondent received one point if the item was answered correctly and zero

points if it was answered incorrectly. Thus, the mean score for each item also reflects the percentage of the group that answered the item correctly. Significant differences were found on 17 of the 24 variables at the .05 level, and thus, these variables were used in naming the clusters (see Table 6). The variables that did not demonstrate significant differences between the clusters were not retained as they were not useful for naming and describing the clusters. A Tukey post hoc analysis was completed following the one-way analysis of variance in order to identify and demonstrate the differences between the five clusters.

Table 6.

Cluster Group Means and Group Differences on Knowledge Assessment

Item	Group 1	Group 2	Group3	Group 4	Group 5	Diffs.
1	0.21	0.85	0.89	0	0.54	4,1/5/2,3
2	0.94	1	1	0.96	0.75	5/1,2,3,4
3	0.74	1	0.96	0.74	0.82	1/2/3,4,5
4	0.06	0.12	0.93	0.48	0.71	1,2/3,5/4
5	0.88	0.92	1	1	0.71	1,2/3,4/5
6	0.68	0.85	0.96	1	0.96	1/2/3,4,5
7	0.71	0.85	0.96	0.83	0.93	1/2,4,5/3
8	0.85	0.73	0.81	0.96	0.93	None
9	0.74	0.88	0.85	0.57	0.75	None
10	0.79	1	0.93	1	1	1/3/2,4,5
11	0.32	0.73	0.96	0.57	0.89	1/2,3,5/4

<u>Item</u>	<u>Group 1</u>	<u>Group 2</u>	<u>Group3</u>	<u>Group 4</u>	<u>Group 5</u>	<u>Diffs.</u>
12	0.15	0.38	0.07	0.3	0.68	1,3,4/2/5
13	0.68	0.77	0.85	1	0.68	1,5/2,3/4
14	0.27	0.65	0.85	0.35	0.82	1/2,3,5/4
15	0.88	0.85	1	0.74	0.89	None
16	0.29	0	0.48	0.43	0.5	1/2/3,4,5
17	Not used					
18	0.85	1	1	0.96	0.93	None
19	0.91	1	1	1	1	None
20	Not used					
21	0.56	0.88	0.81	0.78	0.86	1/2,5/3,4
22	0.26	0.88	0.48	0.65	0.89	1/2,4,5/3
23	0.41	0.62	0.67	1	0.6	1,2,3,5/4
24	0.94	1	0.96	0.96	0.96	None
25	0.26	0.42	0.85	0.17	0.04	1,2,4/3/5
26	0.91	0.85	0.93	0.83	0.96	None

An analysis of variance of the demographic, educational, work experience, continuing education, and current role variables of the cluster members was also performed among the groups to determine if the mean scores were significantly different (see Table 7).

Table 7.

ANOVA of Clusters by Demographic, Educational, Work, and Continuing Education Variables

<u>Variable</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
<u>Education/Training</u>					
Graduation year					
Between	153.0	4	38.3	0.35	0.84
Within	14612.1	133	109.9		
Dysphagia Course					
Between	1.0	4	0.2	0.33	0.86

	Within	97.0	133	0.7		
Feeding Tube Course	Between	0.3	4	0.1	0.34	0.85
	Within	25.4	133	0.2		
Feeding Tube Training: Coursework	Between	0.9	4	0.2	1.54	0.19
	Within	18.3	133	0.1		
Feeding Tube Training: Reference Material	Between	0.1	4	0.0	0.14	0.97
	Within	11.7	133	0.1		
Feeding Tube Training: Symposium	Between	0.2	4	0.0	0.49	0.74
	Within	10.0	133	0.1		
Feeding Tube Training: Independent Study	Between	0.1	4	0.0	0.91	0.46
	Within	4.7	133	0.0		
Feeding Tube Training: Practicum	Between	0.1	4	0.0	0.17	0.95
	Within	15.6	133	0.1		
Feeding Tube Training: Other	Between	0.0	4	0.0	0.76	0.55
	Within	1.0	133	0.0		
Practicum Experience with Feeding Tubes	Between	0.7	4	0.2	0.63	0.64
	Within	35.6	133	0.3		
Perceived Preparation to Address Feeding Tube Issues	Between	1.5	4	0.4	1.74	0.14
	Within	29.1	133	0.2		

Work Experience

Years Work Experience	Between	28.7	4	7.2	0.13	0.97
	Within	7496.7	133	56.4		
Years Medical Experience	Between	132.6	4	33.1	0.76	0.55
	Within	5767.6	133	43.4		
Acute-Care Years Experience	Between	717.3	4	179.3	1.94	0.11
	Within	12272.7	133	92.3		

Rehabilitation Hospital Years Experience						
Between	55.9	4	14.0	0.71	0.59	
Within	2617.2	133	19.7			
Rehabilitation Unit in Hospital Years Experience						
Between	99.8	4	25.0	0.82	0.51	
Within	4031.2	133	30.3			
Skilled Nursing Facility Years Experience						
Between	93.0	4	23.2	1.47	0.22	
Within	2106.0	133	15.8			
Nursing Home Years Experience						
Between	211.7	4	52.9	2.23	0.07	
Within	3160.8	133	23.8			
Home Health Agency Years Experience						
Between	35.5	4	8.9	0.54	0.71	
Within	2204.9	133	16.6			
Other Years Experience						
Between	12.3	4	3.1	0.41	0.8	
Within	996.3	133	7.5			
Dysphagia Years Experience						
Between	64.2	4	16.1	0.66	0.62	
Within	3212.4	133	24.2			
Modified Barium Swallow Years Experience						
Between	107.6	4	26.9	0.95	0.44	
Within	3781.8	133	28.4			

Current Role

Acute-Care Hours/Week						
Between	4450.2	4	1112.6	6.4	0	
Within	23120.9	133	173.8			
Rehabilitation Hospital Hours/Week						
Between	228.5	4	57.1	0.8	0.52	
Within	9447.2	133	71.0			
Rehabilitation Unit in Hospital Hours/Week						
Between	62.1	4	15.5	0.19	0.94	
Within	10980.5	133	82.6			
Skilled Nursing Facility Hours/Week						
Between	221.4	4	55.3	0.51	0.73	
Within	14471.0	133	108.8			
Nursing Home Hours/Week						

	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Between	106.1	4	26.5	0.34	0.85
Within	10290.8	133	77.4		
Home Health Agency Hours/Week					
Between	34.8	4	8.7	0.31	0.87
Within	3784.3	133	28.5		
Other Hours/Week					
Between	1590.3	4	397.6	1.75	0.14
Within	30292.1	133	227.8		
Number of Beds in Medical Facility					
Between	376706.4	4	94177	2.38	0.06
Within	5273350	133	39649		
Number of Full-time SLP Staff in Facility					
Between	12.6	4	3.1	0.56	0.69
Within	741.0	133	5.6		
Frequency of Performing Modified Barium Swallows					
Between	20.6	4	5.2	2.02	0.1
Within	339.8	133	2.6		
Frequency of Recommending Feeding Tubes					
Between	9.3	4	2.3	1.49	0.21
Within	208.6	133	1.6		
Increase in Feeding Tube Use in Last Year					
Between	2.7	4	0.7	1.62	0.17
Within	55.7	133	0.4		
Perceived Preparation Level for Patient Education					
Between	0.5	4	0.1	0.58	0.68
Within	30.1	133	0.2		
Primary Information Provider re: Feeding Tubes					
Between	21.4	4	5.3	1.72	0.15
Within	413.6	133	3.1		
Perceived Preparation Level for Patient Questions					
Between	0.5	4	0.1	0.57	0.68
Within	26.7	133	0.2		
Frequency Feeding Tube Recommendation Implemented by Physician					
Between	1.3	4	0.3	0.76	0.55
Within	56.5	133	0.4		
Satisfaction with Knowledge Level					

	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Between	1.6	4	0.4	1.42	0.23
Within	37.5	133	0.3		
<u>Continuing Education</u>					
On the Job Training by Nurse					
Between	2.0	4	0.5	2.08	0.09
Within	32.2	133	0.2		
On the Job Training by Physician					
Between	1.1	4	0.3	1.71	0.15
Within	21.2	133	0.2		
On the Job Training by Registered Dietician					
Between	0.3	4	0.1	0.31	0.87
Within	33.6	133	0.3		
On the Job Training by SLP					
Between	1.2	4	0.3	1.29	0.28
Within	31.8	133	0.2		
Facility Inservice					
Between	1.9	4	0.5	1.98	0.1
Within	32.2	133	0.2		
Other on the Job Training					
Between	0.5	4	0.1	0.87	0.49
Within	17.4	133	0.1		
No on the Job Training					
Between	0.3	4	0.1	0.74	0.56
Within	12.3	133	0.1		
Professional Most Likely to use as Resource					
Between	0.7	4	0.2	0.1	0.98
Within	252.9	133	1.9		
Number of Alternative Nutrition Cont. Education Courses Last Five Years					
Between	25.8	4	6.5	1.8	0.13
Within	477.9	133	3.6		
Books as Continuing Education Resource					
Between	0.3	4	0.1	0.26	0.9
Within	33.2	133	0.3		
Conferences as Continuing Education Resource					
Between	2.0	4	0.5	2.07	0.09
Within	31.5	133	0.2		

Journal Articles as Continuing Education Resource						
	Between	3.1	4	0.8	3.26	0.01
	Within	31.3	133	0.2		
Other Cont. Educ. Resources						
	Between	0.5	4	0.1	0.54	0.71
	Within	32.8	133	0.3		
Observation as Continuing Education Resource						
	Between	0.7	4	0.2	0.46	0.77
	Within	47.8	133	0.4		
No Continuing Education Resources						
	Between	0.2	4	0.0	0.75	0.56
	Within	7.4	133	0.1		
Best Continuing Education Resource						
	Between	0.1	4	0.0	0.02	1
	Within	193.4	133	1.5		
Need for More Publications re: Alternative Nutrition						
	Between	0.1	4	0.0	0.05	1
	Within	65.8	133	0.5		
Need for More Coursework re: Alternative Nutrition						
	Between	2.6	4	0.7	2.05	0.09
	Within	42.5	133	0.3		
Need for More Continuing Education re: Alternative Nutrition						
	Between	1.4	4	0.4	1.05	0.39
	Within	45.6	133	0.3		

A total of 55 analyses were conducted. Significant differences were found on two of the individual variables; these were related to the current number of hours worked in acute-care and using journal articles for continuing education. Current hours per week worked in an acute-care setting was also found to be related to higher knowledge levels on the previous discriminant analysis. However, it was judged that the variable of using journal articles for

continuing education did not provide insight into the composition of the groups. For the description of the clusters, it was determined that the most critical and useful information that separated and defined the groups was the items on the Knowledge Assessment. Although the demographic variables were not used in the process of defining and describing the groups, this information may be helpful for developing an overall profile of the respondents (see Table 8). For instance, a trend can be noted in more years of medical experience corresponding with membership in groups with stronger knowledge levels.

Table 8.

Demographic Characteristics of Clusters

<u>Variable</u>	<u>Novice</u>	<u>Intermediate</u>	<u>Technician</u>	<u>Generalist</u>	<u>Specialist</u>
	<u>Work-Related Variables</u>				
Yrs Experience	13.15	12.6	13.8	12.5	14.0
Yrs Medical Experience	9.8	10.4	10.5	11.2	12.6
Total SLP's in Facility	2.1	2.2	2.8	2.2	2.3
Dysphagia Experience	8.9 years	10.7 years	9.9 years	9.3 years	10.4 years
Perform MBS at Least Monthly	48%	57%	79%	50%	67%
MBS Experience	5.9 years	7.0 years	7.9 years	5.7 years	6.4 years
Recommend Feeding Tube >/= monthly	47%	43%	64%	42%	56%
Recommendation Used by Physician Frequently	74%	73%	74%	64%	63%

Years Work Experience by Setting

Acute Hosp	2.7	5.4	6.8	5.0	6.3
Rehab Hospital	1.4	1.5	1.7	3.2	2.4
Rehab Unit in Hospital	1.9	4.4	3.5	2.7	3.3
Skilled Nursing Facility	1.9	3.9	2.0	1.2	2.3
Nursing Home	3.4	2.6	1.4	3.0	2.6
Home Health	2.2	2.6	1.4	3.0	2.3
Other Setting	1.2	1.0	1.1	.78	.37

Current Work Hours Per Week By Setting

Acute Hosp	4.0	5.0	19.5	8.8	10.5
Rehab Hospital	2.9	0	.71	1.5	3.1
Rehab Unit in Hospital	3.3	3.8	2.9	3.3	2.0
Skilled Nursing Facility	3.4	3.9	4.1	3.2	6.8
Nursing Home	3.3	4.7	2.1	3.2	2.3
Home Health	1.8	1.5	1.7	2.3	.7
Other Setting	4.6	7.2	2.6	11.6	8.1

Educational Variables

No Dysphagia					
Grad Course	56%	61%	61%	58%	44%
Practicum Experience					
Feeding Tubes	41%	52%	46%	35%	48%

Differences Among Clusters

The second step in describing the clusters involved the use of discriminant analysis. A discriminant analysis was performed on the five groups defined by the cluster analysis. The purpose of this discriminant analysis was to name and describe the process that separated the clusters from each other (Conti, 1996, p. 70). There were three discriminant functions which were found to separate and describe the five cluster groups. Two criteria were used

to evaluate the appropriateness of the discriminant function. The first criterion was that the structure coefficients produced by the analysis had to be describable using the variables with coefficients of .3 or greater. The second criterion was that the discriminant function needed to correctly classify a target of at least 70% of the cases in the analysis. The use of these two criteria in combination assured that the results of the discriminant analysis were meaningful for descriptive purposes.

The pooled within-groups correlations were examined to be certain that the variables were not sharing an inordinate amount of the variance. The examination of the 276 coefficients in this analysis revealed that all were at a sufficiently weak level to be retained in the analysis. Only one coefficient was at the .3 level, and the remaining 275 coefficients were below this level.

Stepwise selection was used to determine which variables contributed most to the discrimination of the process involved in forming the five clusters. As a result of this procedure and the resulting Wilks' lambda values, 23 variables were included in the three discriminant functions. The following items from the Knowledge Assessment were included: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 21, 22, 23, 24, 25, 26. Only

one variable in the analysis, Item 19, did not account for enough variance to be included in the discriminant function.

The standardized discriminant function coefficients were examined to determine the relative importance of each variable to the overall discriminant functions. The standardized discriminant coefficients for these functions which were used to differentiate the clusters were as follows for Function 1: Item 4 (.64), Item 14 (.47), Item 1 (.42), Item 21 (.42), Item 11 (.35), and Item 16 (.34). Item 4, a question requiring knowledge of the procedure for placing a gastrostomy feeding tube, accounted for more variance than any of the other variables. The remaining items were generally equally proportional in weight.

The standardized discriminant coefficients for Function 2 were as follows: Item 1 (.67), Item 25 (.56), Item 4 (.46), Item 8 (.40), Item 9 (.33), and Item 12 (.32). The variables in Function 2 were fairly equally distributed in their contribution to the explanation of variance. Item 1 accounted for twice the amount of variance as two of the other variables followed in weight by Item 25. Item 1 was related to the frequency of aspiration with gastrostomy feeding tubes. Item 25

discussed the risk of complications during and after the placement of a gastrostomy feeding tube.

The standardized discriminant function coefficients for Function 3 were as follows: Item 4 (.57), Item 25 (.53), Item 12 (.51), Item 22 (.45), and Item 3 (.31). The items in Function 3 were all distributed about the .5 level for their contribution to the explanation of variance with the exception of Item 3 which only accounted for .3 of the variance.

The percent of cases correctly classified shows how accurate the discriminant functions were in grouping the respondents. These discriminant functions were 96.4% accurate overall in grouping cases into the five clusters. Thus, the discriminant functions were a 46.4% improvement over random chance in predicting group placement. This high level is to be expected because the groups were preset through the cluster analysis. Discriminant analysis in this instance was not used to validate the structure of the clusters (Aldenderfer & Blashfield, 1984, pp. 64-65), but was used to identify and describe the process that separates the clusters (Conti, 1996, p. 71).

There were three discriminant functions which accounted for enough of the variance to be useful in describing the process that differentiated the groups from

one another. These functions serve as a guide for describing these groups and were as follows:

$$D_1 = 1.12 (\text{Item 1}) - .85 (\text{Item 2}) - .22 (\text{Item 3}) + 1.74 (\text{Item 4}) + .064 (\text{Item 5}) .70 (\text{Item 6}) + .51 (\text{Item 7}) - .72 (\text{Item 8}) - .15 (\text{Item 9}) + 1.12 (\text{Item 10}) + .86 (\text{Item 11}) + .36 (\text{Item 12}) + .36 (\text{Item 13}) + 1.07 (\text{Item 14}) - .33 (\text{Item 15}) + .77 (\text{Item 16}) - .61 (\text{Item 18}) + 1.02 (\text{Item 21}) + .64 (\text{Item 22}) + .34 (\text{Item 23}) - .38 (\text{Item 24}) + .33 (\text{Item 25}) - .28 (\text{Item 26}) - 3.66 (\text{constant}).$$

$$D_2 = 1.78 (\text{Item 1}) + 1.02 (\text{Item 2}) + .47 (\text{Item 3}) - 1.25 (\text{Item 4}) + .68 (\text{Item 5}) - .78 (\text{Item 6}) - .52 (\text{Item 7}) - 1.15 (\text{Item 8}) + .78 (\text{Item 9}) + .04 (\text{Item 10}) + .38 (\text{Item 11}) - .76 (\text{Item 12}) - .59 (\text{Item 13}) - .60 (\text{Item 14}) + .50 (\text{Item 15}) - .63 (\text{Item 16}) + .57 (\text{Item 18}) + .35 (\text{Item 21}) + .14 (\text{Item 22}) + .14 (\text{Item 23}) + 1.41 (\text{Item 24}) + 1.43 (\text{Item 25}) - .43 (\text{Item 26}) - 2.66 (\text{constant}).$$

$$D_3 = .69 (\text{Item 1}) - .54 (\text{Item 2}) + .88 (\text{Item 3}) - 1.55 (\text{Item 4}) - .91 (\text{Item 5}) - .29 (\text{Item 6}) - .15 (\text{Item 7}) - .25 (\text{Item 8}) + .19 (\text{Item 9}) + 1.07 (\text{Item 10}) + .30 (\text{Item 11}) + 1.23 (\text{Item 12}) - .57 (\text{Item 13}) - .09 (\text{Item 14}) - .34 (\text{Item 15}) - .63 (\text{Item 16}) + 1.13 (\text{Item 18}) + .35 (\text{Item 21}) + 1.06 (\text{Item 22}) - 1.05 (\text{Item 23}) + .57 (\text{Item 24}) - 1.35 (\text{Item 25}) + .63 (\text{Item 26}) - 1.77 (\text{constant}).$$

The group centroids for the three discriminant

functions were as follows:

Function	Groups				
	1	2	3	4	5
1	-2.60	.02	1.97	-.42	1.59
2	.04	1.88	1.09	-1.54	-1.58
3	-.38	1.56	-1.66	-.58	1.08

The canonical correlation is a measure of the degree of association between the discriminant functions and the groups. When this number is squared, the resulting figure explains the percent of variation in the discriminant function. The canonical correlations for the three discriminant functions were as follows: $D_1 = .87$, $D_2 = .81$, and $D_3 = .76$. Thus, each of the functions explained the following amount of variance among the groups: $D_1 = 76\%$, $D_2 = 65\%$, and $D_3 = 58\%$.

Eigenvalues were examined in order to make the determination of how many functions explained enough of the variance between the groups to be useful in the analysis. Eigenvalues describe the amount of variance explained by each function (Norusis, 1988, p. B-46), and values of 1.0 or greater are generally considered large enough to be useful in further analysis (Kim & Mueller, 1978a, p. 49; Norusis, 1988, p. B-47). Only discriminant functions with eigenvalues of 1.0 or greater were retained in the analysis which resulted in the use of three discriminant functions to describe the process that separated the five clusters. Overall, these three discriminant functions accounted for 86.9% of the variance between the variables and the groups. The eigenvalues of each function and the amount of variance explained by each were as follows:

Function	Eigenvalue	Variance
1	3.08	42.4%
2	1.87	25.6%
3	1.38	18.9%

The structure matrix contains the coefficients which show the similarity between each individual variable and the total discriminant function. The variables with the highest coefficients have the strongest relationship to the discriminant function. This is the most important element of the discriminant analysis because this information is used for describing and naming the process that separates the groups. Coefficients of .3 or above were included in the interpretation.

Based on the strength of these findings, each discriminant function was named and used to describe a process that separated and defined the five clusters of respondents. Function 1 was named Initiation of Tube Feeding and included four items with the following coefficients: Item 4 (.47), Item 1 (.35), Item 11 (.34), and Item 14 (.31). Item 4 pertained to the process of placing a percutaneous endoscopic gastrostomy (PEG) tube. Item 1 required knowledge of the risks of aspiration with gastrostomy feeding tubes. Item 11 required knowledge of

the differences between a PEG tube and surgical gastrostomy tube. The final question in Initiation of Tube Feeding was Item 14 which involved knowledge of the type of tube generally recommended for patients with a history of aspiration.

The second discriminant function contained two items to contribute to describing the group differences and was named Determination of Risks. The items that were included and their coefficients were Item 1 (.47) and Item 25 (.39). Item 1 required knowledge of the occurrence of aspiration in patients with gastrostomy feeding tubes. Item 25 related to possible complications during and after a feeding tube placement.

The third discriminant function was formed by four individual knowledge questions with the following coefficients: Item 22 (.38), Item 25 (.35), Item 12 (.35), and Item 4 (.33). This function was named Education of Patient and Family. Item 22 required the respondent to know when the recommendation of non-oral feeding should be made which is a decision critical for patient safety and quality-of-life. Item 25 required knowledge of the occurrence of complications during and after feeding tube placement. Item 12 addressed the specific materials that a patient could be fed through a gastrostomy feeding tube.

Item 4 discussed procedural placement of a PEG tube. Overall, the five clusters of speech-language pathologists were separated by three processes that were comprised by items from the Knowledge Assessment. These three distinct processes differed in complexity and in their relationship to the speech-language pathologist's role with patients with alternative nutrition.

Clusters of Speech-Language Pathologists

The multivariate statistical technique of cluster analysis revealed that five clusters of speech-language pathologists existed based upon the results of the Knowledge Assessment of alternative nutrition. The processes that separated these groups were Initiation of Tube Feeding, Determination of Risks, and Education of the Patient and Family. The five groups were named Novices, Intermediates, Technicians, Generalists, and Specialists. Novices exhibited the lowest scores on the areas of alternative nutrition that were assessed. Intermediates scored slightly higher than Novices but also had training needs on all aspects of alternative nutrition. Technicians had strong scores in many areas but may tend to follow standard guidelines and may be unable to individualize recommendations for patients. Generalists were strong in most areas of alternative nutrition especially related to

the risks of aspiration with feeding tubes. Specialists were strong on all areas of alternative nutrition and were able to individualize their recommendations according to the unique needs of the patient.

Novices

This group was comprised of 34 speech-language pathologists accounting for 24.6% of the total population. Novices had the most training needs and the lowest mean scores on the Knowledge Assessment of all the groups. Although another group, Intermediates, were similar to Novices, the Novices always scored at the lowest levels. These mean scores indicate that professionals in this group would have difficulty in assessing need, determining risks to benefits, or explaining to others most aspects of alternative nutrition. The highest mean score that Novices obtained was .32 on an item that required the speech-language pathologist to delineate the differences between a percutaneous and surgical gastrostomy tube, and this is an educational item rather than an item with serious health-related ramifications. Thus, the cluster was named Novices because it contained individuals who may be inexperienced or who may not have an extensive background in dysphagia and alternative nutrition.

Intermediates

This group was composed of 23 speech-language pathologists accounting for 16.7% of the population of respondents. Overall, Intermediates were most similar to Novices with mean scores falling mostly at the lower end on all the items in the Knowledge Assessment. On Initiation of Tube Feeding, Intermediates demonstrated a need for training in the risks of aspiration with feeding tubes. Intermediates scored around the .5 level on items related to the surgical process of placing a tube and the mechanics of the feeding tube. These results indicate a low knowledge level of current research implications and the risks of feeding tubes particularly related to aspiration.

On Determination of Risks, Intermediates scored similarly to Novices with very low scores below .2 on all items. These results indicate that Intermediates need training in order to be able to adequately educate others about the risks of feeding tubes. These professionals could be making recommendations for alternative nutrition based upon inadequate knowledge levels.

On Education of Patient and Family, Intermediates scored similarly to Novices and Generalists with scores of below .4 on knowledge of the material that a patient can receive through a gastrostomy tube. Intermediates scored

at their highest level (.65) on when to recommend non-oral nutrition based on swallowing status. Again, Intermediates scored very low on items dealing with complications of feeding tubes and were similar to Novices. These results suggest that Intermediates know the typical guidelines for recommending non-oral feeding based upon swallowing status (Logemann, 1998) but have a need for training about the alternatives that they are advocating and the implications of these alternatives.

Technicians

This group was comprised of 28 speech-language pathologists accounting for 20.3% of the total population. Technicians demonstrated mid to high scores on Initiation of Tube Feeding. Technicians formed a separate group with moderate knowledge on the risks of aspiration with a gastrostomy feeding tube. Their scores were .7 or greater for the process of placing a PEG tube, differences between gastrostomy tubes, and the type of tube recommended for patients with a history of aspiration. Technicians scored similarly to Specialists on 75% of the items in this area. These results indicate that Technicians have a good knowledge base of the general mechanics of feeding tubes and a fair knowledge base of aspiration risks with feeding tubes.

On Determination of Risks, Technicians scored as a separate group in the mid-range on aspiration risks. Unlike any other group, this group scored very low (.04) on complications of feeding tube placement and use. These results indicate that Technicians have knowledge of how feeding tubes work but not of the dangers associated with their use.

On Education of the Patient and Family, scores for Technicians were scattered ranging from being the highest group to being the lowest group. Technicians scored in the mid-range for placement knowledge of feeding tubes and as the highest group for knowledge of the material that a patient can receive through a feeding tube. The strongest mean scores for Technicians were on the criteria to use for recommending non-oral feeding. The group scored lowest on knowledge of complications with feeding tubes. These results make this group similar to Intermediates in that Technicians may use a standard guideline for recommending non-oral feeding based on swallowing status but have inadequate knowledge of the risks of the alternatives that they are proposing. Increased knowledge of the risks of alternative methods of nutrition would allow Novices, Intermediates, and Technicians to evaluate the individual strengths and weaknesses of the patient and to weigh the

risk to benefit ratio of nutritional methods. Further training on the risks and benefits of alternative nutrition would facilitate these speech-language pathologists to broaden and strengthen their scope of practice and to better consider the entire clinical profile of their patients.

Generalists

This group was comprised of 26 speech-language pathologists accounting for 18.8% of the population. On Initiation of Tube Feeding, Generalists scored high overall. Generalists are notable for their strengths in knowledge of aspiration risks with gastrostomy tubes, the differences between types of gastrostomy tubes, and the type of tube that is recommended in patients with documented aspiration risks. Curiously, Generalists scored very low (.12) on knowledge of the process of placing a PEG tube and were similar to Novices on this item. This would indicate that the group is more knowledgeable of the effects of the feeding tubes rather than the actual placement process. However, knowledge of the ramifications of the feeding tube is more critical to the safety of the patient than is knowledge of the actual surgical procedure. These scores might be expected since speech-language pathologists deal directly with the effects of the feeding

tube but will not have direct involvement with the actual placement of the feeding tube since this is performed by a physician.

On Determination of Risks, Generalists were strong and scored similarly to the highest group, the Specialists, on items dealing with the risks of aspiration with gastrostomy tubes. Generalists' knowledge of overall complications with gastrostomy tubes was moderately-strong and is an area for training. These results indicate that Generalists have a strong knowledge base of the risks specific to swallowing and aspiration. Generalists demonstrated training needs regarding the other risks and complications of feeding tubes such as from infection or accidental dislodgment. The reason that Generalists' knowledge of risks is stronger related to aspiration may be because that is the most common danger associated with disordered swallowing which is the speech-language pathologist's primary area of training.

On Education of Patient and Family, Generalists scored low on the items involved. Scores were similar to Novices on the method for placing a PEG tube. Generalists were similar to Novices and Intermediates on knowledge of the materials a patient could receive through a gastrostomy tube. Generalists scored high, similar to Technicians, on

when to recommend non-oral feeding based upon swallowing skills. Generalists demonstrated mid-low mean scores (.42) on knowledge of general complications with feeding tubes. This distribution of mean scores indicates that Generalists need additional training in some technical and risk-related aspects of alternative nutrition in order to educate others on areas of feeding tubes related to swallowing and general use. Generalists demonstrate high scores on the criteria for recommending non-oral feeding and could be stronger clinicians with increased technical knowledge of feeding tubes and associated risks. This increased knowledge and skill base would increase their ability to individualize their recommendations for each patient.

Specialists

The Specialist group was comprised of 27 speech-language pathologists accounting for 19.6% of the population. This group was notable because they were the highest scoring group on the Knowledge Assessment. Their scores were the strongest on every item in Initiation of Tube Feeding. Likewise, on Determination of Risks, Specialists scored the highest of all the groups on knowledge of aspiration and general complications with feeding tubes. These scores indicate strong knowledge of the risks of aspiration with feeding tubes, the mechanics of placing a feeding tube, and

the differences between types of gastrostomy tubes. Specialists would be excellent in initial decision-making, in the assessment of risks and benefits of feeding tubes, and in educating others on a wide range of topics related to swallowing and alternative nutrition.

On Education of Patient and Family, Specialists scored the highest of any group on two items discussing placement procedure and complications with feeding tubes. Notably, Specialists scored the lowest of any group (.07) on the types of material that a patient could receive through a gastrostomy tube. This item is important but is an area in which a speech-language pathologist would have only indirect involvement. Specialists scored mid-range but below .5 on when to recommend non-oral feeding based on swallowing status. Given the high score of this group on all the other areas, these lower scores on the criteria for recommending non-oral feeding may be due more to the use by Specialists of individualized criteria for each patient. Since Specialists have such a strong knowledge base, they are able to integrate information about each patient with their factual knowledge of dysphagia and translate this information into unique recommendations. These skills allow this group to use independent judgment based on the profile of the individual patient rather than to need to

follow a rigid protocol. Specialists are able to consider the specific context of the patient, the patient's strengths, and the patient's needs when making evaluations and recommendations.

Cluster Interviews

In order to gain additional information to describe the participants and to supplement the quantitative data in this analysis, follow-up telephone interviews were conducted to gather qualitative data from members of each of the five clusters. Interviews are often used to verify and extend data gathered from other sources (Lincoln & Guba, 1985, p. 268). A combination of research methods which use both qualitative and quantitative data can provide a more representative, meaningful, and holistic picture of a complex group such as health care professionals (Conti, 1996, p. 71). Using multiple sources of data is referred to as triangulation, and it serves to validate information from one source against information acquired from another source. Using triangulation also prevents the researcher from drawing conclusions from one single item of information (Lincoln & Guba, 1985, p. 283). Triangulation often uses information from multiple sources like combining interviews and questionnaires (Lincoln &

Guba, 1985, p. 306), and the use of triangulation in research helps give more credibility to findings (p. 307).

The questions for the interviews with respondents were formed to further explore trends that were revealed by the mail survey and to answer research questions that were not addressed by the survey. All of the respondents were asked the same open-ended questions and were allowed unlimited time to expand upon any area. Interviews lasted from 12 to 25 minutes each. The interviews were semi-structured in nature since the questions were pre-set, but respondents were encouraged to state their opinions on any area of swallowing disorders or alternative nutrition, and the interviewer responded interactively to their questions or comments. The interview phase of data collection was terminated when the information being obtained was found to be redundant over subsequent contacts with different individuals as is typical in qualitative research (Lincoln & Guba, 1985, p. 202).

Interview questions addressed perceived training needs of the individual and of the field of speech-language pathology, preferred methods of continuing education in both availability and format, current roles of professionals with patients with feeding tubes, perceived appropriate roles for speech-language pathologists with

patients with feeding tubes, criteria for recommending non-oral feeding, and recent ethical challenges with alternative nutrition (see Appendix D).

A purposive sample of at least three members from each of the five clusters was chosen for the interviews. A minimum of one individual with a high, middle, and low knowledge score was interviewed for a total of at least three interviews per cluster. Interviews were attempted with 117 professionals, and a total of 21 follow-up interviews were completed (18%). The distribution of interviews for each cluster was as follows: Novices--3, Intermediates--4, Technicians--5, Generalists--5, and Specialists--4. Contacting respondents was difficult due to the lack of phone listings or non-working telephone numbers for 38% of the total attempted. Additionally, many professionals were not available at their contact telephone number when the interviews were attempted (44%).

The purpose of these interviews was to maximize the information that was obtained related to issues and trends in alternative nutrition and speech-language pathology clinical roles that emerged from the survey instrument and from the Knowledge Assessment. It was also a goal to determine further differences and descriptions of the

members of the clusters and areas of need for training and continuing education.

The qualitative data was examined to determine if there were differences between the clusters. Respondents were found to report similar needs, roles, and ethical dilemmas across cluster distributions. Therefore, the data was analyzed in the aggregate and was not separated by cluster grouping. One reason that there were no differences found within or between clusters even among respondents with very different Knowledge Assessment scores was because of the nature of the interview questions. The interview questions were open-ended and designed to elicit information about current job roles, perceptions of training needs and preferences for training delivery, and ethical situations arising in the medical setting. These questions were the same for all interviews, were subjective in nature, and had no correct or incorrect response. This uniformity could be viewed as one weakness in the research design, and future research should explore specific training needs between groups of speech-language pathologists.

All of the respondents to the cluster interviews reported a need for more training on dysphagia and alternative nutrition in speech-language pathology graduate

programs. It was the consensus that more training or at least some training in dysphagia was absolutely necessary along with training in specific areas of dysphagia like alternative nutrition. Forty-eight percent of respondents volunteered the information that they did not have training in dysphagia in their graduate programs. Respondents who reported some training in dysphagia stated that the training had usually been a very small part of their entire educational program and was often provided in the context of another course. The number of speech-language pathologists who did not have coursework in dysphagia in graduate school may have actually been higher than 48% if this question had been directly asked of each respondent.

Training Needs

The respondents identified several important areas of training for speech-language pathologists. Seventy-one percent of speech-language pathologists reported that they needed additional knowledge of types of feeding tubes; 43% wanted to know more about risks and complications of feeding tubes. Other specific training needs were as follows: ethical issues (14%), weaning patients from alternative nutrition to oral feeding (10%), placement of feeding tubes (10%), benefits of tube feeding (10%),

patient's rights (5%), nutrition (5%), and physicians' training (5%).

Overall, speech-language pathologists practicing in medical settings reported that graduate programs should require at least one course in dysphagia and should address alternative nutrition within that course. Many did not recommend specifics that should be addressed related to alternative nutrition because the area had not been covered at all in their training. As stated previously, a majority of professionals commented that they had acquired the bulk of their knowledge of dysphagia outside of their graduate training programs usually through work experience. This could be attributed to the field's traditional emphasis on training speech-language pathologists for practice in public school settings and also to the relative newness of dysphagia within the realm of speech-language pathology. Specifics that were reported to be important to address in dysphagia courses related to alternative nutrition were as follows: viewing the patient from a more broad, holistic standpoint (19%); ethics (14%); quality-of-life issues (9%); end of life issues (9%); diagnostic skills for determining non-oral status (5%); nutrition (5%); and decision-making (5%).

Continuing Education

Speech-language pathologists reported distinct preferences for continuing education and training opportunities. Seventy-six percent of speech-language pathologists reported that conferences, workshops, or seminars were the preferred vehicle for obtaining continuing education. Comments about attending conferences were that regional offerings with limited travel involved were preferable but were not always available and that the opportunity to attend conferences had been decreased recently in many settings due to budgetary constraints. Other convenient resources for continuing education that were reported were internet or e-mail (29%), professional journals (19%), independent reading (5%), and self-paced computer programs (5%). Speech-language pathologists strongly preferred learning in a hands-on manner (62%). Other preferred methods of learning were by group meetings or group interaction (29%), visual materials (14%), lecture (10%), and videos (5%). Comments about the most useful continuing education courses attended recently were that these provided practical applications, had dynamic speakers, provided new information, and provided good hand-outs.

Current Roles of Speech-Language Pathologists

The speech-language pathologists who were interviewed for this study were typically involved in a wide range of aspects of patient assessment and treatment with feeding tubes. Respondents reported their current roles with patients with feeding tubes as the following: Performing a modified barium swallow (MBS) study a majority of the time to assess dysphagia, using the results of the MBS to recommend non-oral feeding, implementing ongoing treatment of swallowing, collaborating with dietary and nursing staff in weaning the patient from a feeding tube to oral nutrition, and performing at least some aspects of patient or family education. Speech-language pathologists who were working outside of the hospital setting reported sending patients out to have the modified barium swallow study conducted and then either using the results to make recommendations for nutritional intake to the physician or allowing the hospital speech-language pathologist to perform that role. These speech-language pathologists were usually working in long-term care settings and reported that they then participated in a wide range of therapeutic and assessment roles that included daily dysphagia therapy, weaning trials, and patient and family education. Speech-language pathologists outside of hospital settings appeared

to be performing similar roles as hospital-based professionals except in the use of the modified barium swallow study because the equipment needed for this test is usually only available in hospitals. Only 14% of professionals stated that they were not involved in education of the patient and family about alternative nutrition usually because that role was delineated to another medical professional such as physician, nurse, or registered dietician.

Perceptions of Appropriate Roles

Data were gathered from respondents regarding their perceptions of the roles that speech-language pathologists should be performing with patients with feeding tubes and any ways in which these roles should be changed or expanded. All of the professionals who were currently performing a full range of responsibilities from assessment to weaning were satisfied with their roles and felt that they were appropriate. The consensus among respondents was that speech-language pathologists should strive to perform their current roles better rather than expanding into other areas. The ways that professionals felt that these roles could be improved were for speech-language pathologists to increase their knowledge base of alternative nutrition and its ramifications and to develop additional strategies for

patient and family education. Two speech-language pathologists stated that expanded roles in patient and family education would be beneficial since the speech-language pathologist is often a liaison between the patient and other professionals and since physicians often do not have enough time to address all of the patient's questions. One professional stated that speech-language pathologists should not make specific recommendations about the formula to be placed through the feeding tube and should leave this duty to the registered dietician. Several respondents reported that the type of feeding tube that a patient receives should be decided by the physician.

Determining Non-Oral Feeding

Speech-language pathologists were asked about their criteria for recommending non-oral nutrition for a patient with a swallowing disorder. Overwhelmingly, professionals stated that this was an individual decision based on the unique characteristics and needs of the patient (86%). This was information not revealed by the survey instrument since the respondents were forced to choose a set criteria in that multiple-choice format. These professionals stated that a method of alternative nutrition and especially a gastrostomy tube was recommended only as a last resort when the patient could not use swallowing precautions,

compensatory strategies, or avoid aspirated consistencies. Many speech-language pathologists stated that they would recommend a nasogastric tube if it appeared that the patient would recover quickly or simply needed some short-term support for fluid or nutrition.

Speech-language pathologists reported that they not only use aspiration but also use other criteria for determining whether to recommend alternative nutrition. These considerations were cognitive status, level of alertness, prognosis, and respiratory status. The presence of pneumonia was used by one speech-language pathologist as justification for non-oral feeding; inadequate oral intake was cited by 5%; aspiration of all consistencies of food was the criterion for one speech-language pathologist. Most speech-language pathologists described themselves as being conservative about recommending alternative nutrition and the elimination of oral feeding unless the patient was obviously unsafe for any type of food or drink.

Ethical Dilemmas

Speech-language pathologists were asked about ethical challenges or dilemmas that had occurred recently related to dysphagia and alternative nutrition. Several trends and commonalties were found in the data. Twenty-nine percent of speech-language pathologists reported that patients

often needed a feeding tube from a nutritional or swallowing standpoint but either the patient or the family refused this intervention. This was often a difficult scenario for the professionals because they felt in many cases that the patient would benefit from the feeding tube. Twenty-four percent of speech-language pathologists reported that patients or families often wanted the patient to eat or drink material that was not safe for them as revealed by the swallowing assessment.

Respondents reported ethical dilemmas with alternative nutrition related to interactions with physicians. At times, the physicians may pressure the speech-language pathologist to continue therapy and even feed a patient who has been judged to be unsafe to have oral nutrition. It was also reported by 24% of the professionals that physicians often refuse to authorize alternative nutrition for a patient even after the speech-language pathologist has determined that swallowing is unsafe or too inefficient to maintain adequate nutrition. Physicians were reported to ignore requests for alternative nutrition or delay these requests for significant lengths of time which places the patient at risk for nutritional deficiencies. Another reason that physicians were reported to refuse alternative

nutrition for a patient was to maintain, in the physician's opinion, the quality-of-life of the patient.

Speech-language pathologists had experienced many diverse ethical challenges related to families and other medical professionals. Some of these challenges that were reported by speech-language pathologists were pressures for them to feed patients who were unsafe to have oral intake and dealing with facilities that were feeding at-risk patients without appropriate swallowing assessment. Other medical staff members were reported to ignore swallowing risks at times and to provide ice chips to patients who were documented to aspirate liquids. One respondent stated that a patient had recently died from complications of a gastrostomy tube placement. Overall, speech-language pathologists reported being challenged by quality-of-life issues for chronically-ill patients.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Purpose and Design

Health care has changed rapidly as new procedures, life-sustaining techniques, and medications have been developed. Men and women are able to live longer and often healthier lives because of these advances. Conversely, the advances in health care have created dilemmas since the ability to sustain a person's life must be balanced with the benefits of simply living longer. Additionally, recent changes in insurance programs and Medicare benefits have decreased the amount of rehabilitative health care that individuals in different settings often receive (Gilroth, 1990, p. 29; Melvin, 1999). Patients are discharged from acute-care settings earlier and sicker, and rehabilitation professionals are forced to be maximally effective in a shorter amount of time.

Speech-language pathologists in medical settings spend a significant part of their time working with patients with dysphagia which adversely impacts an individual's ability to safely or effectively eat. When a person cannot eat orally, the decision may be made to implement an alternative means of nutrition such as a feeding tube. The

incidence of dysphagia is increasing in accordance with the growth in the number of older individuals and because older patients are more likely to suffer from conditions like a stroke or Parkinson's Disease which predispose them to dysphagia. As the population of older adults increases with demographic changes in society, speech-language pathologists will see an increasing number of patients on their caseloads with swallowing disorders that may cause subsequent nutritional dilemmas.

Speech-language pathologists are the professionals who assess the integrity of the swallowing mechanism and make recommendations to the physician about the patient's ability to eat orally or the need for an alternative source of nutrition. Speech-language pathologists also conduct ongoing swallowing therapy, work with nursing and dietary staff to transition the patient back to oral feeding from a feeding tube, and provide patient and family education about dysphagia and nutritional concerns related to swallowing.

Since dysphagia is a relatively new area of practice for speech-language pathologists and the medical field in general, many graduate training programs have only recently added dysphagia courses to their curriculum. Currently, graduate programs may only address dysphagia as part of

another course or as independent study. If a separate dysphagia course is available, it may be an elective rather than a requirement. Therefore, the knowledge base of new graduates and of practicing professionals is not uniform. Many speech-language pathologists who are currently practicing have a limited background in swallowing disorders from graduate school and have used on the job training and continuing education courses to acquire their knowledge and skills. Also, it is unclear what the level of knowledge of the new graduate is related to swallowing disorders and alternative nutrition since all training programs are unique in their curricular requirements. Even the speech-language pathologist who has taken a graduate level course in swallowing will likely report areas in which additional training would be beneficial since dysphagia is such a complex and comprehensive area. One graduate-level course is considered the minimum criteria from which to begin assessment and treatment of swallowing disorders under supervision of an experienced speech-language pathologist. Advanced knowledge of anatomy and physiology, nutrition, evaluation instruments, and therapeutic techniques is critical due to the serious nature of a swallowing disorder and to the actual risk of death to a patient.

Along with the increase in individuals with swallowing disorders from conditions such as stroke, there is an increasingly large population of patients with dementia who often become unable to eat orally as the dementia progresses. Speech-language pathologists frequently assess and make recommendations about the swallowing safety and adequacy of these individuals. Patients with dementia frequently exhibit difficulty with eating and swallowing, require the assistance of others, and often demonstrate significant weight loss and malnutrition. The use of feeding tubes with these individuals has become increasingly common; however, the risks and benefits of using feeding tubes with frail elderly patients are complex and the outcomes uncertain (Gillick, 2000, P. 206).

Feeding tubes have not been shown to extend life span, improve nutritional status, or improve the quality-of-life for many populations (Gillick, 2000, p. 208). Feeding tubes have significant risks and possible complications for the individual. Since speech-language pathologists are at the forefront for making recommendations about the nutritional options for patients who are unsafe to eat orally, then these professionals must have adequate knowledge of all the issues involved.

The purpose of this study was to describe the knowledge levels, perceptions, and roles of speech-language pathologists working in health care settings related to alternative nutrition. Professionals' perceptions of their knowledge and an objective measure on a knowledge assessment test were obtained. Demographic data about employment, education, work setting, and current roles and responsibilities were also obtained. The professionals' perceptions of the critical knowledge components needed by speech-language pathologists related to feeding tubes were also elicited.

Summary of Findings

Review of Procedures

Data for this study were gathered by the use of a descriptive survey instrument that was distributed through the mail. This instrument was designed by a comprehensive review of the dysphagia, nutrition, and gastroenterology literature followed by the review of subject-matter experts in the medical disciplines of speech-language pathology, nursing, gastroenterology, and nutrition. The instrument was also pilot-tested with a group of speech-language pathologists after the review of the subject-matter experts.

The survey was sent to a national sample of 500 speech-language pathologists working in medical settings who were randomly selected from the American Speech-Language-Hearing Association membership database. The instrument consisted of five sections: Demographics, Prevalence, Role of the Speech-Language Pathologist, Continuing Education, and Knowledge Assessment. Responses were received from 138 participants for a 28% return rate.

Interviews with Non-respondents

Additional data was gathered from non-respondents in order to compare the speech-language pathologists who responded to the mail survey and those professionals who did not respond. There are many reasons that people do not complete mail surveys including lack of time, problems with mail service, incorrect addresses, apathy, and forgetfulness. Interviews with non-respondents were conducted to demonstrate that these professionals were similar to respondents and simply failed to return the survey and participate in the study. Telephone interviews were conducted using the first four sections of the survey instrument (Demographics, Prevalence, Role, Continuing Education) and eight questions from the Knowledge Assessment section. The eight multiple choice knowledge

questions were chosen because of their high loadings on the factor analysis.

A sample of 30 non-respondents that was stratified proportionally from each of the three employment settings (general medical, rehabilitation hospital, and nursing home) was targeted. Since many professionals were unavailable at their contact telephone number, telephone numbers were incorrect or unavailable, and some contacts were no longer working in dysphagia, a sample of 21 subjects was obtained. Data from respondents and non-respondents were analyzed with t-tests for each of the items in the survey. The goal of the analysis was to assess for differences between speech-language pathologists who returned the survey and those who did not return the survey. The results of the t-tests indicated no significant differences between the groups on the demographic variables, but the t-tests did reveal differences on six of the eight Knowledge Assessment variables and the total score for the eight items. Non-respondents scored lower than the professionals who responded to the mail survey on six of the eight individual items that were administered and on the total score. These differences indicate that low scores may be underrepresented in the data. Therefore, the results from

this study should be interpreted cautiously with respect to generalization to the entire population of speech-language pathologists in medical practice. It is possible that the differences that were found between respondents and non-respondents were due to the method of administering the knowledge items since the non-respondent group had the added difficulty of answering complicated content questions over the telephone.

Multivariate and univariate statistical analyses were performed with the data from the survey instrument. Frequency distributions, mean scores, and standard deviations for each of the variables on the survey were calculated and used to describe the sample. A Knowledge Assessment score for the group and for each individual was calculated using the 26 content-level questions in the survey. Factor analysis was performed with the Knowledge Assessment items and revealed four factors that summarized the 26 individual items into underlying constructs. These factors were named Foundations, Complications, Use, and Therapeutic Intervention.

Discriminant Analysis

The Knowledge Assessment score was used to form two groups that were further analyzed using discriminant analysis. These groups were defined by an 80% accuracy

score criteria; those individuals scoring 80% and above were named Experts, and those scoring below 80% were named Moderates. The discriminant function that was found to differentiate between Expert and Moderate performers on the Knowledge Assessment of alternative nutrition was named Specific Medical Experience. This discriminant function was 73.91% accurate in classifying cases into groups and thus was a 23.91% improvement over chance.

Cluster Analysis

Cluster analysis was performed to determine homogeneous groups among the respondents based upon the Knowledge Assessment scores. Five distinct groups of speech-language pathologists were revealed by the data. Analysis of variance and discriminant analysis were then performed upon the clusters in order to further describe and name the groups and also to describe the process that made the groups distinct from each other. The only significant difference found between the groups on demographic variables that was judged to provide insight into the composition of the groups was current hours per week working in an acute-care setting. The differences between the groups that were used to name and describe the groups were the items on the Knowledge Assessment. Two items on the Knowledge Assessment were not used in the

analysis because of the lack of variance on the items, and the analysis of variance revealed that 17 of 24 variables were significantly different among the clusters. Three discriminant functions were judged to explain the processes that separated the five clusters. These functions were named Initiation of Tube Feeding, Determination of Risks, and Education of Patient and Family.

The five clusters that were determined through the analysis were named Novices, Intermediates, Technicians, Generalists, and Specialists. The Novices were notable for the lowest scores on the items on the Knowledge Assessment. This group scored most similarly to the Intermediates and demonstrated a need for training on all aspects of alternative nutrition including assessment of the patient's needs, determining risks and benefits, and educating others about alternative nutrition.

Intermediates were characterized by inconsistent but mostly low scores on the Knowledge Assessment. This group had a fair knowledge of the mechanics and use of feeding tubes but needed training regarding research implications and the risks of alternative nutrition. Intermediates were notable for their highest scores on standard criteria (Logemann, 1998) for recommending non-oral feeding. This may indicate that this group follows a pre-determined may

indicate that Intermediates rely on a predetermined criterion for recommending non-oral feeding rather than individualize their assessment and recommendations. Intermediates may need a stronger knowledge base in order to use critical, clinical decision-making skills and to weigh the risks to benefits of feeding options. Their standards for recommending non-oral feeding may be too rigid which could possibly lead to over-recommending feeding tubes for patients.

Technicians were characterized by moderately strong knowledge on Initiation of Tube Feeding. The group demonstrated the need for more training about the risks of alternative nutrition in order to improve their clinical decision-making and patient education skills. Technicians exhibited a good knowledge base of the mechanics and use of alternative nutrition but had areas of training need regarding the complications and dangers of feeding tubes. Like Intermediates, Technicians exhibited their highest scores on criteria for recommending non-oral feeding. This may indicate that Technicians also tend to recommend non-oral feeding based on a fixed criteria rather than considering individual patient differences and characteristics. This could lead to recommending a feeding tube to the physician more often than is necessary.

The Generalists were notable for their strong knowledge of dysphagia-specific concepts especially related to the risks of aspiration with gastrostomy feeding tubes and the rationale for initiating tube feeding. Generalists would be stronger clinicians and would be more effective with patient and family education with additional training about general complications of feeding tubes and regarding the mechanics of different types of feeding tubes.

Specialists were notable for their strengths in all areas of knowledge related to alternative nutrition. This group demonstrated the highest scores of the five groups. Specialists demonstrated excellent knowledge of the rationale for initiating tube feeding and were well apprised of the risks and benefits of alternative nutrition. Specialists were able to view the patient from a broad clinical perspective and to integrate signs and symptoms outside of swallowing instead of being narrowly limited to the domain of dysphagia. Specialists would be excellent patient, family, and staff educators with their knowledge of the use and types of feeding tubes and should be able to answer most questions from patients or professionals. The strong and comprehensive knowledge base of Specialists should allow them to use an individual decision-making protocol for each patient regarding non-

oral feeding rather than having to rely on a standard approach. The use of an individualized approach to patient care indicates mature clinical judgment and the ability to integrate information from multiple sources. Specialists' expertise and clinical judgment would be beneficial to the patient because the individual's specific needs and strengths would be considered in this crucial determination about their safest method of nutritional intake.

Interviews with Respondents

Telephone interviews were conducted with a sample of speech-language pathologists who responded to the initial survey. Questions in these interviews were open-ended and elicited qualitative data to verify and expand upon trends evident from the quantitative data analysis and elicited additional data about perceived training needs. At least three members of each of the five cluster groups were contacted which represented high, middle, and low scores on the Knowledge Assessment. A total of 21 speech-language pathologists were included in the interview data set. Interviews were semi-structured in format because the questions were predetermined and consistent across subjects. Data were reported across the clusters for trends in perceived training needs, continuing education preferences, current roles of the speech-language

pathologist related to alternative nutrition, criteria for non-oral feeding, and ethical challenges related to alternative nutrition.

One way in which the research design could have been improved was with the use of specific questions for each cluster of speech-language pathologists. This type of approach would have elicited more specific data about professional's knowledge levels. Interviews could have been uniformly initiated with a general format and then been tailored according to the characteristics of the cluster. This type of questioning could have elicited data that would have made possible more specific training recommendations for each of the five groups of speech-language pathologists. With the data that were obtained, only general training recommendations are possible.

Conclusions and Recommendations

Medical Speech-Language Pathology

Speech-language pathologists in medical settings perform diverse roles that require multiple skills and an extensive knowledge base in dysphagia.

Since speech-language pathologists have an integral role in the care of patients with feeding tubes, they need the appropriate knowledge base from which to practice.

Speech-language pathologists in medical settings are involved in a variety of roles and responsibilities with

patients with swallowing disorders including recommending and educating others about alternative nutrition.

Professionals working in hospitals, nursing homes, and rehabilitation facilities are extensively involved in clinical work with patients with feeding tubes. This finding was validated by both the frequency data from the mail survey and from the interview comments of speech-language pathologists in follow-up data collection.

Nearly 51% of speech-language pathologists reported that they recommended alternative nutrition for patients at least once a month. Seventy-one percent of professionals were frequently involved with patient and family education about the feeding tube. Although 74.6% of speech-language pathologists reported confidence in their ability to answer patient and family questions, 42% of professionals reported dissatisfaction with their current knowledge levels related to issues surrounding alternative nutrition. This dissatisfaction demonstrates that professionals have identified areas in which their knowledge and skills could be improved and may be frustrated by difficult clinical questions or situations that they can not easily resolve with their current knowledge levels.

A majority of speech-language pathologists (81%) who responded to the initial survey and then participated in

the telephone interviews reported being involved with diverse aspects of care for patients with dysphagia. These professionals performed the initial swallowing assessment and diagnosis of dysphagia, made recommendations to the physician about the safety of oral nutrition, conducted ongoing dysphagia therapy, implemented measures to wean the patient back to oral feeding, and participated in at least a portion of patient and family education about the feeding tube. The diverse roles of speech-language pathologists and their primary responsibility for assessing and treating swallowing disorders indicate that professionals need a very strong and comprehensive knowledge base about alternative nutrition and need the ability to evaluate risks and benefits of feeding tubes. Speech-language pathologists also need knowledge about the mechanics of the different types of feeding tubes, the indications and contraindications for the use of feeding tubes, and the results that can be expected from alternative nutrition.

Content-related items such as those in the Knowledge Assessment are an effective way to identify different levels of expertise of professionals in the field of speech-language pathology

It is possible to differentiate between groups of speech-language pathologists based upon their knowledge of alternative nutrition. When speech-language pathologists

were grouped as Experts and Moderates based on their knowledge level of alternative nutrition, it was found that these two groups could be distinguished by the numbers of hours per week spent working in an acute-care hospital, the number of years of dysphagia experience, and the number of years of medical experience. An acute-care work setting accounted for nearly twice as much of the discriminating power as the other variables. Thus, working in an acute-care hospital is related to having a higher knowledge level about alternative nutrition. This higher knowledge level could be due to training provided on the job, due to more opportunity to work with patients with feeding tubes in acute-care settings, or due to pressure from the work responsibilities in acute-care to seek more continuing education about the area of alternative nutrition.

Speech-language pathologists have greater knowledge about alternative nutrition as their years of medical experience and dysphagia experience increase. The length as well as the type of medical experience is important. Those speech-language pathologists who had been practicing in acute-care and who had been practicing longer were more knowledgeable about aspects of alternative nutrition. One reason for this may be that there are more patients with dysphagia who need feeding tubes in acute-care hospitals

because patients in acute-care hospitals are more critically-ill and may be unable to eat or swallow. Treatment of serious illnesses such as a stroke, motor vehicle accident, or respiratory failure is initiated in acute-care hospitals, and patients often need immediate and aggressive medical attention in order to survive.

Another possible reason for the higher knowledge levels of acute-care speech-language pathologists could be that since feeding tube placements must be performed in a hospital, then professionals working in this setting have more opportunities to evaluate and treat patients who are admitted to the hospital for the procedure. Conversely, acute-care therapists may have the opportunity to become more knowledgeable about alternative nutrition because they are practicing in a setting that has more professionals from which to learn, has state of the art medical equipment, and may be large enough to have several levels of acuity and rehabilitative care. Large hospitals also have more facility inservice training, quality assurance programs, and a full complement of diverse professionals from which to learn.

Speech-language pathologists working in acute-care hospitals can be used as resources for training.

The speech-language pathologists who were working in acute-care medical settings knew more about alternative nutrition than did those professionals working in other settings. Clinicians grew stronger as their years of medical and dysphagia experience increased. Since these professionals can be identified as having excellent skills and abilities in both content knowledge and in the process of using their knowledge, then they can be used as resources for the field. Speech-language pathologists with acute-care backgrounds who work with patients with feeding tubes should be integrally involved in training programs especially since professionals prefer to learn through hands-on training. These skilled speech-language pathologists who were most likely Specialists can also be utilized as mentors for inexperienced clinicians or for those who are new to the medical setting. Specialists can also be used as mentors for students and to provide inservices to other professionals. University training programs should be seeking internships for students with speech-language pathologists in acute-care settings since these professionals possess the greatest knowledge and skill levels.

Distinct groups of speech-language pathologists exist, and these groups are different in three ways related to alternative nutrition.

Five distinct groups of speech-language pathologists as defined by their knowledge level of alternative nutrition exist. They are Novices, Intermediates, Technicians, Generalists, and Specialists. The processes that separate and define these groups relate to Initiation of Tube Feeding, Determination of Risks, and Education of Patient and Family.

Novices score lower than the other groups. This group may be inexperienced or not extensively trained in dysphagia and needs more education and training in order to practice safely and effectively with patients who have swallowing disorders and nutritional concerns. Alternative nutrition may be an unfamiliar area for Novices. Novices need training on all knowledge areas of alternative nutrition including the types of feeding tubes, when and why to initiate tube feeding, the risks and benefits involved with tube feeding, and the mechanics and daily use of tube feeding. Novices may have difficulty with accurately assessing the need for and appropriateness of initiating tube feeding, weighing the risks of oral versus alternative nutrition, and providing education to others about tube feeding. Training should begin at a basic

factual level and progress in difficulty to application to patient scenarios. It would be beneficial for Novices to work with patients with dysphagia under the mentorship of a speech-language pathologist in the Specialist group.

Intermediates score generally low in all areas related to alternative nutrition but exhibit scattered and inconsistent scores. They do not demonstrate a particular area of strength or weakness or discernible pattern in their skills. Intermediates are similar to but higher than Novices in their knowledge levels across the domains of alternative nutrition. Intermediates have stronger knowledge about areas related to alternative nutrition that are narrowly confined to swallowing and of the criteria for recommending the elimination of oral intake. However, based upon their knowledge levels, Intermediates may tend to follow a standard guideline for recommending non-oral nutrition for all patients and may over-recommend feeding tubes due to this reliance on a predetermined criteria. Intermediates need training in basic factual knowledge of feeding tube mechanics, types, complications, benefits, and risks. Further training in these areas can help Intermediates to establish a more comprehensive knowledge base in order to be more effective and more critical clinical decision-makers and patient and family educators.

Additionally, further training would allow Intermediates to develop their skills for assessing patients and determining the safest method of nutritional intake based upon the individual's unique profile.

Technicians have moderately-strong knowledge levels in almost all domains of alternative nutrition. However, the areas in which this group demonstrates weaknesses can be life-threatening with severe ramifications for the patient. Technicians need training about the risks that exist with feeding tubes and the complications that can arise with a feeding tube placement. Technicians demonstrate strengths in the mechanical aspects of feeding tubes, but knowing how a device works is not as critical as knowing that the device is potentially dangerous. Without knowledge of the risks and complications associated with feeding tubes, Technicians could not make the best recommendations to the patient or supply complete information about the procedure. Further training to extend their knowledge base can allow this group to use more effective clinical judgment and an approach to patient evaluation that allows for individual patient differences. Professionals must first have the factual knowledge before they can translate this information into patient applications and novel situations (Bloom, 1956).

Generalists are a group with strong knowledge levels in the use, mechanics, and procedural aspects of feeding tubes. Most of the areas that are training needs for Generalists are less-critical in the potential effects on the patient such as the mechanical and placement aspects of feeding tubes. However, Generalists would be better able to answer all patient and family questions about the feeding tube operation and be more effective troubleshooters with additional training. Additionally, Generalists need additional information about the incidence of general complications of feeding tubes unrelated to aspiration. This knowledge can improve their clinical evaluation and judgment skills and their abilities to educate patients, families, and professionals.

Specialists demonstrate excellent knowledge in all areas of alternative nutrition and can be effective diagnosticians of the need for non-oral feeding; can critically determine the risk to benefit ratio of nutritional options for the patient; and can educate the patient, family, and other professionals regarding dysphagia and alternative nutrition. Specialists can benefit from training about some of the procedural aspects of feeding tube use. These are functions that are usually performed by nursing staff but which can be helpful

knowledge for educating the patient and family and for troubleshooting with feeding tubes.

Clinical judgment and evaluation skills with a strong knowledge base of dysphagia and alternative nutrition are critical in order to make the best recommendations for each individual patient.

Decisions about alternative nutrition should be formed upon a case-by-case basis with input from all medical team members, the patient, and the family members. Overall, the speech-language pathologist's role is to educate the patient, family, and physician about the patient's swallowing abilities and the risks of oral feeding and then leave the final decision about nutrition to the patient and family in conjunction with the physician. Therefore, speech-language pathologists need the underlying content knowledge and critical reasoning skills and must employ evaluative clinical judgment to weigh the risks and benefits of nutritional options and the patient's strengths and weaknesses. Speech-language pathologists must have a strong theoretical foundation for the recommendations that they are providing for patients with swallowing disorders. Professionals with strong knowledge and skills can avoid being easily swayed by the desires of the family, physician, or the facility in decision-making.

In addition to strong content knowledge, critical thinking and reflection skills are necessary to make reasonable and logical clinical assessments. These evaluative and reasoning skills must be integrated into speech-language pathology education and could be taught by experienced and knowledgeable professionals such as those from the Specialist group. Dysphagia assessment allows only a small window of opportunity to make assessments and understand the patient's system, and although the field of speech-language pathology has some excellent evaluation measures, these are not absolute. Speech-language pathologists need to be cognizant of the fact that dysphagia is not a concrete, static area of practice so that they can be questioning and evaluating recommendations and treatments. Patients with dysphagia are dynamic individuals and will fluctuate based upon other illnesses or conditions, cognitive level, fatigue level, and the level of family and staff support.

Factors besides swallowing must be considered in the recommendation of a nutritional method which makes the evaluation even more challenging for the speech-language pathologist. These factors include psychosocial parameters, general health, and the patient's beliefs of appropriate treatment. A nutritional choice is ultimately

the decision of the patient and family and is facilitated by current and accurate information from the speech-language pathologist. The speech-language pathologist must be operating from a strong, accurate knowledge base using critical evaluation and reflection in order to weigh all of the options and possible confounding factors of the patient's condition. In this way, the speech-language pathologist can determine the appropriate recommendations for feeding and swallowing for each patient.

Speech-language pathologists can play a vital role in the assessment of the need for and the recommendation of alternative nutrition for patients with swallowing disorders.

There are differences in knowledge levels about alternative nutrition among speech-language pathologists in various medical settings. Swallowing disorders affect the ability of a person to eat and to maintain adequate nutrition and general health and thus are a life-threatening condition. Speech-language pathologists who are not currently involved in assessing and treating patients with feeding tubes need to fully understand the potential impact that they can make and should expand their roles. Many patients especially in long-term care settings may have a feeding tube for their nutritional source

simply because they have not been re-assessed for the possibility of transitioning to oral feeding (Groher, 1994, p. 234). With the changes in health care funding and shorter hospital stays, there may be little continuity of care and communication between speech-language pathologists in different settings.

The transition from alternative nutrition to oral nutrition is an area best addressed by the speech-language pathologist who is the only professional trained to assess dysphagia and design swallowing treatment programs (Groher & McKaig, 1995, p. 530). Patients who can be identified as being safe to start an oral-feeding program receive numerous benefits including increased social interaction, oral and olfactory stimulation, and increased "normalization" (Gillick, 2000). Speech-language pathologists also benefit from identifying these patients by increasing the number of patients on their caseload and by demonstrating the efficacy of dysphagia treatment.

Speech-language pathologists encounter many ethical challenges with their patients with severe dysphagia.

Speech-language pathologists must have a strong background in medical ethics, legal precedents, and patient's rights in order to address issues that arise related to the use or withholding of alternative

nutrition. Professionals must often educate families and physicians who want to continue to feed a patient whose swallowing causes eating to be unsafe. The speech-language pathologist's recommendation for a feeding tube as the source of nutrition may be ignored which places the professional in a precarious situation both ethically and legally. Families and physicians may request that the speech-language pathologist feed the patient or advise them on how to feed the patient even though the professional has made the recommendation that the patient should not have oral intake. Patients and their families may refuse to implement feeding tubes even upon the recommendation of the speech-language pathologist after a swallowing evaluation.

Additionally, decisions about the benefits of alternative nutrition for chronically-ill patients and especially those with severe dementia are difficult. Patients may appear to have a poor quality-of-life with a feeding tube, but the determination to withhold or remove the feeding tube can be excruciating for a family. Speech-language pathologists need a background in the content, format, and use of advance directives so that they can interpret and understand

their patient's wishes about life support. Speech-language pathologists must know the status of each of their patients regarding advance directives, powers of attorney, and health care proxies so that the professionals are legally protected. The speech-language pathologist may be the patient's advocate in these decisions and should educate the medical team so that the patient's wishes are respected and followed.

Continuing Education Training Needs

Training for speech-language pathologists about alternative nutrition can be organized into the areas of Foundations, Complications, Use, and Therapeutic Intervention.

The Knowledge Assessment was effective in identifying differences in the levels of professional knowledge of practicing speech-language pathologists. Factor analysis revealed that the concepts from the field can be organized into the categories of Foundations, Complications, Use, and Therapeutic Interventions. These factors helped to establish the construct validity of the instrument because each was related to the original discipline or area from which the instrument was formed. In this manner, the factors serve to delineate the four broad areas for training and can be used to design specific educational objectives.

Bloom's Taxonomy can be applied to the four training areas for speech-language pathologists related to alternative nutrition in order to demonstrate the level of cognitive complexity of each area.

The four factors were analyzed to determine the relatedness between the individual items and the level of cognitive complexity involved with each factor. Bloom's Taxonomy was applied to the factors to determine the level of cognitive processing required by each. Foundations involves knowledge that is at Bloom's Comprehension level; it is indirect to the area of swallowing but integral to the operation and use of a feeding tube. Complications includes knowledge of the risks of feeding tubes from aspiration and from other causes unrelated to swallowing. This factor is more critical in its impact on the safety of the patient than Foundations and also involves higher level cognitive processing at the Application level. Like Complications, Use contains concepts at the Application level and addresses initiating a feeding tube, the type of feeding tube to be initiated, anatomical aspects of feeding tubes, and appropriate uses of feeding tubes. Therapeutic Intervention requires Synthesis level cognitive processing and is the most challenging factor. Therapeutic intervention requires the speech-language pathologist to evaluate patient scenarios and make clinical judgments

about the appropriate action to implement for a patient's health and safety. Advanced clinical evaluation and decision-making are necessary in Therapeutic Intervention.

Using Bloom's Taxonomy helps to understand the hierarchy with which these clinical skills develop and the order in which skills need to be taught in training for speech-language pathologists. Speech-language pathology educators can use this information to identify the cognitive precursors for developing the clinical skills needed in the area of alternative nutrition and the levels at which continuing education should be designed for various learners. Educators can design activities at levels and with objectives to facilitate the development of higher-level cognitive skills needed for successful clinical practice.

Distinct trends exist for speech-language pathologists in training needs, continuing education preferences, current roles, criteria for recommending non-oral feeding, and ethical challenges with alternative nutrition.

There are a number of common trends among speech-language pathologists working with patients with alternative nutrition. More continuing education programs need to be offered especially specific to dysphagia and alternative nutrition. Respondents reported training needs about the types of feeding tubes, the risks and benefits of

feeding tubes, quality-of-life issues, patient's rights, nutrition, and ethical issues. This basic factual knowledge could be addressed in hands-on group activities during which the equipment is actually demonstrated. Risks of feeding tubes, patient's rights, ethics, and quality-of-life issues could be addressed together for advanced clinicians who have the basic foundational knowledge of dysphagia and alternative nutrition upon which to build. Medical ethicists, social workers, and legal specialists could be facilitators in these continuing education courses since quality-of-life and patient's rights are these professional's areas of specialty.

Speech-language pathologists prefer continuing education activities that can be provided in a group setting.

Speech-language pathologists prefer learning through hands-on activities during which concepts can be immediately applied.

Additional continuing education courses for practicing speech-language pathologists are needed specifically to address nutritional concepts, use, mechanics, and types of feeding tubes, ethical considerations with alternative nutrition, end-of-life issues, and risks and benefits of alternative nutrition. These continuing education courses should be offered in various formats but be predominantly regional conferences during which the professionals have

the opportunity to interact in small group activities. Learning should be through hands-on, practical application tasks, and actual equipment and demonstrations should be utilized whenever possible. Speech-language pathologists should be able to practice all the concepts learned and use any equipment that is discussed. Conferences should be designed with adult learning principles in mind and be learner-centered and directly related to the current problems and issues. The practical applications should be clearly demonstrated to participants so that the reasoning underlying the information or skills presented is apparent.

Continuing education courses should be designed in ways that address the current needs of speech-language pathology professionals. Most speech-language pathologists prefer to obtain continuing education and research findings through organized conferences. This finding is in contradiction to the recent trend of educators in distance education to provide continuing education that is decentralized and isolated. Organizations and professionals are promoting distance education for continuing education and for degree programs, but professionals clearly want something other than these offerings. Many internet and video-teleconferencing educational programs have been implemented recently

(Chesbro, 2000), but this study indicates that professionals still prefer to learn in small groups with direct hands-on contact.

Continuing education that is offered in a conference format should involve small group interaction and hands-on learning and activities in order to be most beneficial to the learning process. Speech-language pathologists learn best by interacting with other similar professionals and by discussing challenging patient scenarios. Small group settings can also facilitate the creation of relationships and professional contacts that continue to be beneficial beyond the realm of the continuing education activity. Professionals need to also be able to see the relevance of the content material and to make immediate application of the material. Facilitators or expert presenters at continuing education activities should be engaging and skilled in using principles of adult learning and should provide quality hand-out materials so that professionals can use these later in their work setting as a memory tool and for educating others.

A current trend in many facilities is for speech-language pathologists and other health care professionals to provide training for peers about the continuing education courses that they have attended in order to

disseminate knowledge in a cost-effective manner. In order to best deliver the content information to their peers, speech-language pathologists need to have knowledge of adult learning principles and methods to facilitate the learning process. These skills will help the professional to develop the interest of the learners in the topic and to make the applications of the information clearly apparent and relevant.

Other ways to supplement continuing education are through e-mail updates on sources like the dysphagia list-serve and tutorials in speech-language pathology clinical practice journals. These modes may have a much smaller audience and reach fewer individuals. One way in which to increase the use of resources like professional journals and tutorials specifically is to write articles with a practical application focus for clinicians rather than a strict research and theory focus. Additionally, tutorials and other articles could be made available on the American Speech-Language-Hearing Association website so that professionals could access the resources through the internet from work or home. Continuing education credit could be provided for professionals who read tutorials and respond to the accompanying study questions in order to satisfy state licensure requirements. Even though these

are not the most preferred learning activities identified by speech-language pathologists, they are convenient and easily accessible, and a variety of resources are needed in order to facilitate professionals to lifelong learning. It is also important that continuing education options exist for those times that an individual does not have the financial means or time to travel to a group meeting or conference or for when a conference is not available.

Different levels of continuing education activities are needed since there are varying knowledge levels among professionals.

Continuing education activities must be designed for different levels of professionals since speech-language pathologists have varying degrees of knowledge and skills about dysphagia and alternative nutrition. Activities should be clearly identified for the level of skill and cognitive complexity that will be involved so that the professionals who attend have the appropriate background and knowledge level. Alternatively, educators can determine the knowledge levels and backgrounds of professionals prior to the activity and design the content level and objectives appropriately. Specialists can participate in advanced coursework at the Evaluation and Synthesis levels of Bloom's Taxonomy involving topics like medical ethics and new areas of research. Novices and

Intermediates need continuing education that teaches the basic foundations of alternative nutrition and immediately applies this information to patient scenarios. Generalists and Technicians need continuing education focused upon the skills needed for clinical decision-making that facilitate the use of higher-level cognitive processing like Analysis, Evaluation, and Synthesis levels of Bloom's Taxonomy. Critical thinking, reflection, and judgment skills are an important component that should be integrated into all training activities for the speech-language pathologist.

Educational activities designed to facilitate the development of critical thinking and evaluation skills must be created and oriented toward different groups of learners. Since speech-language pathologists possess different knowledge and skill levels about alternative nutrition and dysphagia, the extent to which they are able to integrate information and form new hypotheses will differ. Specialists can benefit from training that sharpens their already strong critical thinking and problem-solving skills such as brainstorming solutions to ethical challenges. Intermediates and Novices need training on problem solving at a more basic level. This can begin with developing awareness of issues in the field, facilitating the use of critical questioning skills, and

designing activities that challenge professionals to identify their perceptions and make changes. These skills will help the professionals to manage the challenging ethical and quality-of-life areas of dysphagia practice that are difficult to easily remediate. Technicians and Generalists can participate in critical thinking and evaluation skill activities at an intermediate level with a professional to guide their problem-solving and help them identify content areas of weakness. Other skills for Technicians and Generalists to develop are generating and judging hypotheses and evaluating solutions to clinical problems with actual patients.

Speech-language pathologists need to be lifelong learners in order to stay abreast of changes in the field and to prepare for practice in diverse settings.

In order for professionals to develop strong decision-making skills, the field of speech-language pathology should integrate critical thinking skills and methods that encourage self-directed learning into all educational activities. The integration of these techniques into coursework will facilitate lifelong learners in the field and professionals who will constantly seek to update and expand their knowledge. Teaching clinical decision-making and evaluative

judgment skills requires educational objectives and tasks that are at a higher level on Bloom's taxonomy than simple knowledge-level memorization tasks. Decision-making skills must be taught at the level of Application, Analysis, Synthesis, and Evaluation because these levels are required for the tasks that speech-language pathologists perform in their clinical roles (Bloom, 1956, p. 122). Simply learning facts without having the skills to apply the information to actual scenarios is not beneficial. "Most of what we learn is intended for applications to problem situations in real life" (p. 122). Therefore, educators need to teach medical professionals in this manner rather than decontextualizing knowledge and education.

In order to think critically and to act upon these reflections, speech-language pathologists need the skills to identify and attack a problem, to apply theory to the problem to design a solution, and to then evaluate the solution to determine its effectiveness and appropriateness (Bloom, 1956, pp. 122-123). These are all skills that can be taught to the learner. With these underlying problem solving and application skills, speech-language pathologists should be able to make recommendations and

design and evaluate treatment programs for their patients to insure maximum health and safety. These abilities are critical since dysphagia is a life-threatening medical condition.

Graduate-Level Training Needs

Coursework in dysphagia should be required of all speech-language pathology students regardless of where they plan to be employed since patients with swallowing disorders are present across settings.

There is a critical need for dysphagia training at the master's level, and this coursework should address alternative nutrition as one of its components. Many practicing speech-language pathologists have not been trained in dysphagia and alternative nutrition until they enter a medical work setting. Mandatory graduate-level dysphagia coursework should be viewed as entry-level information and should be followed by supervised on-the-job training. More internships in medical settings working with patients with dysphagia should be provided in graduate programs. Mentor programs that pair new graduates with experienced and well-educated dysphagia specialists should be initiated.

Speech-language pathologists need at least one course in dysphagia regardless of the setting in which they plan to work upon graduation. Swallowing disorders are not

limited to a specific medical diagnosis or age, and speech-language pathologists will encounter patients with dysphagia regardless of their work setting. Therefore, all speech-language pathologists need at least a basic foundation from which to begin their professional practice so that they can ask questions and identify resources for further training. An advanced swallowing course should be available and offered as an option for graduate students in speech-language pathology who plan to specialize in medical practice.

The content of graduate level courses in professional training programs should address normal anatomy and physiology, swallowing disorders, and swallowing assessment methods and treatment techniques in order for the clinician to have a foundation of normal and disordered swallowing knowledge. In addition to these aspects of dysphagia, coursework should address mechanics, uses and types of feeding tubes, risks and benefits of alternative nutrition, ethical issues and concerns, patients' rights, advance directives, and quality-of-life issues because these are the areas of need that have been identified by the field. Since the majority of patients with dysphagia are adults, speech-language pathology graduate training programs should also teach the principles of adult learning so that

professionals are able to design treatment plans and educational programs that best fit the needs of their adult patients and families.

Adult Education

Speech-language pathologists have diverse roles with patients with feeding tubes and need training in adult patient education skills in addition to content knowledge.

The roles of speech-language pathologists in medical settings with patients with dysphagia involve patient care related to initializing the assessment and recommendation of a feeding tube when necessary, following the patient in ongoing swallowing treatment, transitioning the patient to an oral diet, and performing patient and family education. Every intervention with an adult patient or family member should be educational in order to be successful, and patient education is an integral part of the scope of practice of speech-language pathologists (ASHA, 1998). Speech-language pathologists have varying levels of responsibility as patient and family educator. Some professionals are the primary educators for the medical team; other speech-language pathologists only address swallowing; and others seem to fill in the gaps left by the physician, registered dietician, or nurse. In order to effectively and accurately serve as an educator for

patients and families, speech-language pathologists need a more complete knowledge base of all of the aspects of alternative nutrition and feeding tubes in order to answer patient and family questions. In addition to this content and process knowledge, speech-language pathologists need training in adult learning principles and in the learning process. This training will help the professional to design more effective interventions in conjunction with the patient and family and with a priority upon the patient's identified needs. If interventions are not designed to meet the immediate needs of the patient, then the recommendations of the professional are less likely to be acted upon and completed by the patient and family. The goal of treatment should be to enlist the cooperation of patients so that they will choose the recommended course of action (Rankin & Stallings, 196, p. 101). The use of adult learning principles in patient education enables the speech-language pathologist to be most effective in this ongoing aspect of their job.

Speech-language pathologists also need training about patient education and counseling and applying adult learning principles to the clinical setting. Speech-language pathologists are frequently the professional whom patients and their families approach with questions about

their medical case which may be even unrelated to speech, language, or swallowing. This may be due to the fact that the speech-language pathologist is a communication specialist who provides an atmosphere conducive to discussing concerns and asking questions. Additionally, therapists in general spend a significant amount of time at the patient's bedside whereas the nurse and physician are often quickly in and out of a patient's room. Therefore, since speech-language pathologists are viewed as approachable and skilled in their content area by patients and families, then they need the adult patient education skills with which to facilitate the teaching of other adults.

Speech-language pathologists who are highly skilled can be the primary team educator about dysphagia and alternative nutrition.

Speech-language pathologists are the ideal professionals to perform patient and family education because they are specialists in communication and have extensive training in normal and disordered swallowing. Therefore, speech-language pathologists should broaden their scope to become an integral part of the patient and family education team. In this effort, they should strive to become the primary educator.

In order to educate others, speech-language pathologists need both the content knowledge and knowledge of the process of adult learning. Required content knowledge of alternative nutrition includes the use, complications, and benefits of feeding tubes to the patient so that the professional can answer all of the questions of the patient and family accurately and effectively. A more extensive knowledge base will also help the professional to use critical questioning and evaluation of the appropriateness of recommendations from other professionals and to evaluate the patient's symptoms and behaviors. Techniques to use with adults include focusing on the learner's identified needs at the time, using practical applications for teaching concepts, clearly identifying the importance and relevance of the concepts being taught, facilitating the patient's tendency toward self-directed learning, and building upon the learner's experiences (Knowles, 1980; Rankin & Stallings, 1996, p. 153). Above all, the speech-language pathologist should project respect and a value of the patient as an individual.

In addition to being the primary educator for patients and families, speech-language pathologists should expand their educational roles with other professionals. Many medical professionals including physicians and nurses

may not be well-informed of the basics of dysphagia and normal swallowing and of the risks, benefits, and considerations when using alternative nutrition. Additionally, speech-language pathologists can teach other professionals about the adult learning process and techniques for teaching adult patients.

One specific area about which speech-language pathologists should educate other professionals is that aspiration often occurs with patients on a continuum of severity and is not an exact predictor of pneumonia. Thus, oral feeding may still be the best option and the choice for many individuals even with questionable swallowing skills. Other medical professionals need to be informed of the range of behaviors and skills of patients with swallowing disorders. Medical professionals outside of speech-language pathology need to be educated about the risks of non-oral feeding and of the fact that bypassing the mouth does not eliminate the risks of aspiration since aspiration can occur from other sources. Speech-language pathologists need to stress to other professionals the importance of analyzing the entire clinical profile of the patient and of placing priority on the patient's beliefs and choices about treatment options.

Research in Speech-Language Pathology

Although speech-language pathologists are integrally involved in clinical practice with patients with dysphagia and alternative nutrition, the field as a whole has not taken an active role in research efforts involving speech-language pathology and alternative nutrition.

Speech-language pathologists may not be aware of the importance of their role in the decisions that patients must make about alternative nutrition. Many speech-language pathologists are unaware of the risks of feeding tubes and of their questionable benefits especially for chronically-ill older patients. Therefore, more research and information about the relationship of speech-language pathologists and alternative nutrition should be published in the discipline's clinical practice journals, be included in continuing education courses and in college courses, and be subjects in dysphagia texts. Articles that explore and encourage the view of the patient from a broad, holistic perspective and that are not just isolated to swallowing should be published.

Issues of quality-of-life, aging, advance directives, and patient decision-making need to be addressed by and applied to speech-language pathologists. Additionally, research should explore

the nature of patient education conducted by speech-language pathologists, the affects of patient education on treatment efficacy, and the extent to which patient and adult education skills are taught in training programs and continuing education courses. Overall, the field of speech-language pathology needs to assume alternative nutrition and all of the surrounding issues related to dysphagia as a cause of the entire discipline. These training and research issues are wide-reaching and affect all speech-language pathologists.

Summary

Speech-language pathologists are an integral part of the health care team for patients with swallowing disorders. An inherent issue with a person who has a swallowing disorder is the decision about an alternate source of nutrition. As the population ages and people survive to older ages, there will be an increased incidence of diseases and conditions in which swallowing disorders are present. Speech-language pathologists must be well-trained in the areas of swallowing and nutrition in order to make the best assessment and recommendations for their patients. Not only must the professional be knowledgeable of the basic mechanics of swallowing and feeding tubes, but

also the speech-language pathologists must understand issues related to quality-of-life, the risks of alternative nutrition, patient rights, and end-of-life decisions. The speech-language pathologist is the professional who provides education about these topics for the patient, family, and medical team and is the professional who performs direct therapeutic interventions. Therefore, the speech-language pathologist holds the primary responsibility for managing this area of medical care.

Speech-language pathologists in medical settings demonstrate varying knowledge levels about alternative nutrition. Those professionals currently working in acute-care hospital settings and those with the most medical and dysphagia experience exhibit the strongest knowledge levels. Four areas of content training need are apparent and can be used to develop continuing education courses and other resources. Current practitioners are operating at different knowledge levels as indicated by the five groups of speech-language pathologists that were found and the three processes that were discovered to separate the groups. Specific instructional design and adult education principles can be utilized both for teaching adult patients and families about alternative nutrition and for training

speech-language pathologists at the graduate student and professional levels.

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Appendices

Appendix A

Author's Permission to use Survey

From: BRICKMANS@aol.com <BRICKMANS@aol.com>
To: tdavis@webzone.net <tdavis@webzone.net>
Date: Saturday, August 21, 1999 4:42 PM
Subject: Re: Trach Survey Article

Dear Lori -

It would be fine with me if you chose to use portions of the questionnaire. However, since it has been published, I think it is actually "property" of the journal. You may want to contact them and see what they say. If they tell you to ask the authors then its ok with me.

I sent the questionnaire and a cover letter to rehab hospitals, longterm care facilities and skilled nursing facilities. I got the names/addresses by calling and asking different companies for listings of all their facilities across the US. So many different companies have multiple facilities all across the country (i.e. - HCA, Beverly etc...). I also had some contacts at different sites that were able to help me out (I work for a skilled nursing facility). I mailed 750 questionnaires - response rate was average. It was difficult to follow up and get a higher response rate because the questionnaires were anonymous. I would encourage you to include return envelopes with your questionnaires. We did and the response was still only average.

Good Luck.

Stacy Manley



8/21/99

September 20, 1999

Kirsten Gardner
American Speech-Language-Hearing Assoc.
10801 Rockville Pike
Rockville, MD 20852

Dear Ms. Gardner:

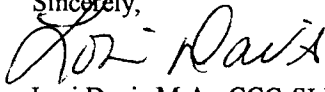
I would like to request permission from the American Journal of Speech-Language Pathology (AJSLP) to use portions of an article published in the May 1999 edition for my dissertation research. The article that I would like to use is titled: *Preparation of Speech-Language Pathologists to Provide Services to Patients with a Tracheostomy Tube: A Survey*. This article is by Manley, Frank and Melvin, p. 171-180.

I have contacted Stacy Manley, the principle author and received his permission via email to use any sections of his questionnaire that I needed. I plan to modify some of the questions from his questionnaire to apply to my population of speech-language pathologists, those dealing with patients with feeding tubes. Although I am using some questions similar to the Manley study, my premise is much larger, and I am looking at more areas. I am also using a premise similar to the Manley article by administering a knowledge assessment along with a demographic, information gathering survey.

The goal of my research project is to describe SLP's knowledge of and roles with alternative nutritional methods. I also will seek to identify those critical knowledge components needed by SLP's for working with patients with feeding tubes.

Please contact me if I can provide any further information.

Sincerely,


Lori Davis M.A., CCC-SLP
Speech-Language Pathologist

*Permission granted contingent
on author's consent.*

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Kirsten Gardner 24 September 1999

Appendix B

Speech-Language Pathologists and Alternative Nutritional Methods

Section 1. Demographic Information - Please complete all items by writing your answer or by checking the appropriate box.

1. From which program did you receive your degree in speech-language pathology?

Undergraduate: University _____
Location _____ Year _____

Graduate: University _____
Location _____ Year _____

2. How long have you worked as a speech-language pathologist?
_____ yrs

3. How long have you worked as an SLP in a medical setting?
_____ yrs

4. In what medical settings have you worked? (List all and number of years).

Acute care hospital	# years: _____
Rehabilitation hospital	# years: _____
Rehabilitation unit within a hospital	# years: _____
Skilled nursing unit (SNF) in a hospital	# years: _____
Nursing home	# years: _____
Home health agency	# years: _____
_____ Other (Please specify)	# years: _____

5. What is your current work setting? (Check all that apply. Specify hours in each setting if employed in multiple settings).

Acute care hospital	# hours: _____
Rehabilitation hospital (freestanding)	# hours: _____
Rehabilitation unit within a hospital	# hours: _____
Skilled nursing facility/unit (SNF)	# hours: _____
Nursing home	# hours: _____
Home health agency	# hours: _____
Other (Please specify)	# hours: _____

6. What is the total bed/patient capacity of your medical facility? _____

7. How many speech-language pathologists, including yourself, work in your medical setting? (Include full-time personnel only). _____

Section 2. Prevalence Information

8. Did you have coursework in dysphagia as part of your undergraduate and/or graduate training program?
Yes No Was this optional ? or required ?
9. Did you have training in your graduate and/or undergraduate coursework that addressed alternative nutritional methods like feeding tubes?
Yes No
10. If yes, how were you prepared? (Check all that apply).
Coursework
Reference materials
Symposium/guest lecturer
Independent study
Practicum
Other_____
11. Did you work directly with patients who had feeding tubes during your practicum experience(s)?
Yes No
12. Do you feel well prepared to address the issues related to alternative nutrition that occur with your patients?
Yes No
13. How many years of experience do you have in evaluating and treating patients with dysphagia?
_____yrs
14. How often do you perform modified barium swallow studies in your current setting?
daily
weekly
monthly
less than monthly
never
15. How long have you been performing modified barium swallow studies?

16. How often do you recommend an alternative nutritional method (like a g-tube) to the physician as the primary means of nutrition for a patient?
less than once a month
once a month
once a week

more than 3 times/week
never

17. Has there been an increase in the number of patients on your caseload who received a feeding tube in the last year?
Yes No

Section 3. Role of the Speech-Language Pathologist

18. Are you involved in patient/family counseling and education about feeding tubes once alternative nutrition has been recommended?
Yes No
19. Which professional in your facility provides the most information about feeding tubes to the patient and family?
nurse
physician
social worker
registered dietician
speech-language pathologist
other (please specify) _____
20. Do you feel well prepared to answer patient/family questions about feeding tubes?
Yes No
21. If you recommend to the physician that a patient use a method of non-oral feeding instead of eating orally, how often is this recommendation implemented?
always
frequently
rarely
not allowed to initiate this recommendation

22. Are you satisfied with your knowledge level about types of alternative nutritional methods and issues related to non-oral feeding?
Yes No

Section 4. Continuing Education

23. What types of training on the job have you received regarding feeding tubes? (Check all that apply).
hands-on training by nursing staff
hands-on training by physician
hands-on training by registered dietician
hands-on training by another speech-language pathologist

facility inservice/written material
other _____
none

24. From which professional would you most likely seek further information about feeding tubes? (List only one).
- nurse
 - dietician
 - speech-language pathologist
 - gastroenterologist or other physician
 - other_____
25. How many continuing education courses (any type) with a component on alternative nutrition have you attended in the last five years?
- _____
26. What resources have you used to obtain information on feeding tubes and alternative nutrition in the last five years? (Check all that apply).
- books
 - conferences
 - journal articles
 - other reference materials
 - observations
 - none
27. From which resource have you learned the most about feeding tubes? (Check only one).
- continuing education course
 - work experience
 - employer sponsored training
 - college/university course
 - self-study
28. How important is it that more information be published in speech-language pathology journals regarding alternative nutrition?
- very important
 - somewhat important
 - neutral
 - unimportant
29. How important is it for university programs to add coursework related to speech-language pathology and alternative nutrition?
- very important
 - somewhat important

neutral
unimportant

30. How important is it that more continuing education courses or additional training regarding speech-language pathology and alternative nutrition be available?
- very important
 - somewhat important
 - neutral
 - unimportant

Section 5. Alternative Nutritional Methods - Please complete all of the following multiple choice items by circling your item of choice. Since we are interested in the knowledge that you carry with you daily on your job, outside resources are not necessary for selecting your answers.

1. Research indicates that patients with gastrostomy feeding tubes demonstrate:
 - a. a decreased risk of aspiration
 - b. aspiration occurrence as high as 40-60%
 - c. aspiration only when ignoring dietary restrictions
 - d. aspiration only when a neurological disorder is the primary etiology
2. Gastrostomy or PEG tubes are placed into the:
 - a. esophagus
 - b. small intestine
 - c. pharynx
 - d. nose
 - e. stomach
3. Which of the following is **not** a common complication of enteral tube feeding:
 - a. aspiration
 - b. gastroesophageal reflux
 - c. diarrhea
 - d. local infection at the tube site
 - e. anemia
4. Placement of a Percutaneous Endoscopic Gastrostomy (PEG) tube is performed:
 - a. by a registered nurse
 - b. with the patient conscious but sedated
 - c. in the operating room under general anesthesia
 - d. by inserting a tube through the patient's nasal cavity
5. This type of feeding tube is inserted into the small intestine:
 - a. gastrostomy
 - b. nasogastric

- c. jejunostomy
 - d. esophagostomy
 - e. TPN (Total Parenteral Nutrition)
6. The patient with a new gastrostomy tube receiving bolus feedings should be checked for residual:
 - a. before each feeding
 - b. once a day
 - c. before going to sleep
 - d. checking for residual is optional
 7. The presence of residual in the stomach greater than 100cc may indicate:
 - a. normal status of the feeding tube
 - b. the patient should have the rate of tube feeding increased
 - c. sluggish peristalsis and delayed gastric emptying
 - d. the patient is dehydrated
 8. The gastrostomy feeding schedule most like oral feedings that allows the patient the greatest mobility is:
 - a. continuous night-time feedings with a pump
 - b. intermittent bolus feedings throughout the day
 - c. intermittent connection to the pump throughout the day
 - d. continuous pump feedings during the day
 9. To administer medications via gastrostomy tube:
 - a. crush all medications and insert them through the tube
 - b. allow the patient to take medications orally if medications cannot be crushed
 - c. use liquid medications whenever possible
 - d. crush tablets and open time-release capsules before inserting through the tube
 10. For patients requiring an alternative to oral feeding for longer than 3-4 weeks, the following method is preferable:
 - a. nasogastric tube (NG)
 - b. jejunostomy tube
 - c. total parenteral nutrition (TPN)
 - d. intravenous feedings (IV)
 - e. gastrostomy or PEG tube
 11. The major difference between a PEG and a surgical gastrostomy tube is:
 - a. gastrostomy tubes are placed six inches higher in the stomach.
 - b. PEG tubes are temporary while gastrostomy tubes are more permanent
 - c. PEG tubes are more difficult for a patient to dislodge
 - d. PEG tubes are placed by endoscopy while gastrostomy tubes require a more complex placement procedure

12. The following materials can be administered through a gastrostomy or PEG tube:
 - a. liquids only
 - b. enteral tube feeding only
 - c. enteral tube feeding and liquids only
 - d. enteral tube feeding, liquids and blenderized foods
13. The end of a gastrostomy or PEG feeding tube is clamped to prevent:
 - a. backflow of gastric contents onto the skin
 - b. dehydration
 - c. accidental removal of the tube
 - d. infection
14. This type of feeding tube may be recommended in patients with a history of or increased risk of aspiration:
 - a. nasogastric tube (NG)
 - b. jejunostomy (J-tube)
 - c. gastrostomy or PEG
 - d. esophagostomy
15. Gastrostomy and PEG tubes are:
 - a. difficult to remove
 - b. removed if the patient demonstrates the ability to eat safely and to maintain nutritional status.
 - c. usually not removed even if the patient returns to oral intake
 - d. removed through a surgical procedure
16. Residual drawn from the stomach through the gastrostomy tube:
 - a. is returned to the stomach because it contains elements needed for digestion
 - b. is disposed of with other medical waste
 - c. is usually tinged with blood
 - d. should be at least 150cc in volume in a normal gastrointestinal tract
17. If a patient remains elevated to at least 45° after a bolus feeding for a minimum of one hour, the following may be decreased:
 - a. peristalsis
 - b. agitation
 - c. lethargy
 - d. aspiration and reflux
18. Feeding tubes should be flushed with water after enteral feedings:
 - a. to water-down the formula
 - b. to remove bacteria
 - c. to increase the flow of the formula

- d. to prevent clogging of the tube
19. To transition a patient from tube feeding to oral feeding:
- a. stop the tube feeding and allow only oral intake
 - b. gradually increase the patient's oral intake and simultaneously decrease tube feedings
 - c. increase oral intake but keep the amount through the feeding tube stable
 - d. increase oral intake, remove the feeding tube and use an IV for supplemental hydration
20. This type of feeding tube is inserted through the nose, esophagus and into the stomach:
- a. nasogastric
 - b. jejunostomy
 - c. gastrostomy
 - d. TPN
 - e. esophagostomy
21. Total parenteral nutrition (TPN):
- a. is used in patients who are only moderately malnourished
 - b. is administered via a central line catheter directly into the bloodstream
 - c. uses enteral tube formula
 - d. is most commonly used for long-term nutritional maintenance
22. The elimination of oral feeding (NPO) should be recommended under the following circumstances:
- a. aspiration of 10% of any food or liquid consistency
 - b. consistent aspiration of liquids
 - c. silent aspiration of any consistency of food or liquid
 - d. aspiration of 10% or more on all food and liquid consistencies
23. Bolus feedings are administered to the patient:
- a. via nasogastric tube
 - b. via syringe
 - c. via feeding pump
 - d. via central line catheter
24. The presence of blue dye from enteral tube feeding in a patient's pulmonary secretions indicates:
- a. a productive cough mechanism
 - b. adequate airway protection
 - c. aspiration of enteral feeding from gastroesophageal reflux or fistula
 - d. insufficient lung compliance
25. The risk of complications, including mortality, during or after the placement of a feeding tube is:
- a. less than 1%

- b. significant only in patients with dementia
- c. significant only if using a nasogastric tube
- d. as much as 15-24%

26. The risk of aspiration is highest with this type of feeding tube:

- a. gastrostomy
- b. nasogastric
- c. jejunostomy
- d. TPN

Appendix C

Cover Letter

January 21, 2000

Dear Colleague:

We need your help. As a current rehabilitation professional, you have an opportunity to help expand the research literature related to speech-language pathologists and alternative nutritional methods. There is a need to explore and document our roles, knowledge and responsibilities with patients who use alternative nutritional methods. Patients with means of nutrition other than oral feeding are becoming more prominent on the caseload of the speech-language pathologist.

In order to make this study meaningful, your input is needed. The information you provide will help to document what is really occurring in daily clinical practice and aid in the development of curriculum, training opportunities, and practice guidelines. The purpose of the following questions is to gather information from you about your professional roles with patients with feeding tubes and your perceptions of this area of your clinical practice. Your answers will help describe speech-language pathologists' areas of strength and responsibilities with patients who have alternative nutritional methods. This is also your opportunity to document your perceptions and concerns.

The attached survey addresses various areas related to speech-language pathology and alternative nutritional methods. We are interested in your "off the cuff" responses, so you do not need to use outside resources to answer the questions. Your participation is voluntary; your answers will remain anonymous and will be used for research purposes only. By completing and returning this survey, you are implying your consent to be involved in the research study.

Please complete and return the survey in the enclosed postage-paid envelope by February 7, 2000. Please contact me at (405) 744-8944 if you have any questions or concerns. Your time and participation are greatly appreciated.

Sincerely,

Lori Davis, M.A., CCC-SLP
Visiting Lecturer

Appendix D

Respondent Follow-up Interview Questions

1. In the areas of dysphagia and alternative nutrition, what do you need to know more about to strengthen your practice? In other words, what do you need training on?
2. What does our field need to be teaching to speech-language pathologist's about dysphagia evaluation and treatment? Do you think other speech-language pathologists have the same training needs as you or could there be differences?
3. What is the best way for new information and training opportunities to be delivered to you? How do you like to learn best? What is the most useful training that you have had in the last year and what made this course so useful?
4. What is your role **now** with patients and feeding tubes?
5. What should the speech-language pathologist's level of involvement/role be with patients with feeding tubes?
6. What are your criteria for recommending non-oral feeding?
7. Have any situations occurred in your work in the last 6 months that presented ethical dilemmas for you? If so, please describe.

Appendix E

Institutional Review Board Approval Form

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD

Date: January 20, 2000

IRB #: ED-00-189

Proposal Title: "A DESCRIPTIVE STUDY OF SPEECH-LANGUAGE PATHOLOGISTS
ROLES, RESPONSIBILITIES AND KNOWLEDGE OF ALTERNATIVE
NUTRITIONAL METHODS"

Principal Investigator(s): Gary Conti
Lori Davis

Reviewed and
Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved



Signature:

Handwritten signature of Carol Olson in cursive.

Carol Olson, Director of University Research Compliance

January 20, 2000

Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modification to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

2

VITA

Lori A. Davis

Candidate for the Degree of

Doctor of Education

Thesis: A DESCRIPTIVE STUDY OF SPEECH-LANGUAGE
PATHOLOGISTS' ROLES, RESPONSIBILITIES, AND
KNOWLEDGE LEVELS OF ALTERNATIVE NUTRITION

Major Field: Occupational and Adult Education

Biographical:

Education: Graduated from Cleveland High School, Cleveland, Oklahoma in 1987; received Bachelor of Science Degree and Master of Arts degrees in Speech-Language Pathology from Oklahoma State University, in Stillwater, Oklahoma in 1990 and 1992, respectively. Completed the requirements for Doctor of Education Degree with a major in Adult Education in July, 2000.

Experience: Employed as a speech-language pathologist from 1992-1994 by Pikes Peak Bureau of Cooperative Educational Services; employed by Sundance Rehabilitation from 1994-1995; employed by Specialty Hospital of Tulsa from 1995-1996; employed by Patient's Rehabilitation from 1996-1999. Employed by Oklahoma State University, Department of Communication Sciences and Disorders as Visiting Lecturer from 1999-2000.

Professional Credentials: Certified by the American Speech-Language-Hearing Association; Licensed by the Oklahoma Board of Examiners for Speech-Language Pathology and Audiology; Member of Gerontology and Swallowing Special Interest Divisions of the American Speech-Language-Hearing Association.