A FOCUSED NUTRITION AND MEDICATION ASSESSMENT OF THE OLDER ADULT IN PRIMARY CARE: IMPACT ON FUNCTIONAL STATUS

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by

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ABSTRACT

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In 1996 the first of the "baby boomers" turned 50 and it is estimated that by 2030 the population of people 65 and older will be approximately 20% and it is projected there will be a decrease in available resources to provide care for these individuals. Therefore, emphasis needs to be placed on prevention and health maintenance with the older adult to help them maintain independence and to maximize the use of available resources. One method to do this is through assessing the older adult's ability to care for themselves and in seeking early interventions when needed.

This scholarly project is an enhanced protocol that was developed to assess the older adult's current ability to provide self-care. Two additional factors that influence the older adult's ability to provide self-care, nutrition and medication, were added to basic functional status questions. This protocol is based upon General Systems Theory, which allows the health care provider to have a more person-centered holistic view of the older adult. This protocol was designed to be used in a primary care setting and to function as a baseline assessment of the older adult's current ability to care for themselves including nutritional status and medication usage.

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INTRODUCTION

The Problem

The population of people over the age of 65 in the United States in 1996 was 12.8% (U.S. Census Bureau, 1997). The estimated growth of this population in the 1990's has slowed somewhat due to the small number of babies born during the Great Depression of the 1930's (American Association of Retired Persons, 1997). However, the first of the "baby boomers" turned 50 in 1996 and it is estimated that by 2030 the population of individuals 65 years and older will be approximately 20% (AARP, 1997). There will be a significant increase seen in 2010 when the first of the "baby boomers" reaches the age of 65.

National figures show that approximately 4% of the 65 and older population live in long term care (LTC) facilities (U.S. Census Bureau, 1997). That means the majority of 65 and older population is living in the community. It is estimated that 30% of the 65 and older population lives alone. The remainder live with a spouse (48% of the women and 77% of the men), or with other relatives or non-relatives (AARP, 1997).

As the individual ages, they undergo many physical changes. These physical changes can interact with the individual's environment and leave them vulnerable to the development of many diseases that may effect their ability to continue living independently. To be successful at aging, the individual and their health care provider must understand what is "normal" and what is "abnormal" aging systems changes. They must also be able to identify the factors that influence the ability to provide self-care. Two areas that influence the individual's ability to live independently are nutritional status and the medications that they consume.

As will be demonstrated later, both an individual's nutritional status and their medication usage are closely tied to the older adult's ability to care for themselves in a community setting. Both factors, if not identified and monitored, can lead to the development or worsening of any disease process. This then eventually could result in the hospitalization of the individual (Ebley, Hogan & Fung, 1997).

It is estimated that up to 88% of people over 65 are at moderate to high risk for malnutrition (Jackson, 1998). Malnutrition has been called a "silent crisis" among America's older adults (Cope, 1996). Warning signs of malnutrition are often missed by both the older adult and their health care provider. The result then is a slow insidious compromise of the individual's physiologic reserves (Cope, 1996). This contributes to the development of disease processes that often require hospitalization. Kresivic, Mezey and the Niche Faculty (1997) have reported a 20% - 40% decline in function during hospitalization of the older adult.

Changes with aging will also influence the pharmokinetics of medications that may be taken. Falling is often associated with adverse drug reactions (Cumming, Miller, Kelsey, Davis, Arfken, Birge & Peck, 1991; Ebly et al, 1997; Liu, Topper, Reeves, Gryfe & Maki, 1995). Fear of falling may lead to a loss of function in the older adult and eventual placement in an institutional setting (Liu et al, 1995). Other adverse effects to medications include impairment in cognitive function as manifested by the development of delirium or pseudo-dementia (Schuster, 1997).

With the 65 and older population growing, it is conceivable that this group will comprise a good portion of the practice of the primary care provider. Individuals 65 and older wish to remain living as independently as

possible in the community. One of the roles of the Advanced Practice Nurse (APN) should be to help individuals achieve this goal. This can be achieved by becoming an active partner in the health maintenance of the older adult and being alert to the influence of medication and nutrition on the ability to provide self care.

Purpose of the Study

This proposed protocol is geared toward assessing the older adults ability to care for self, their current medication regime and their nutritional status in an effort to prevent hospitalization and/or institutionalization. In today's health care environment, it is imperative that appropriate allocation occurs for the limited resources available. This protocol would allow the primary care provider (PCP) to detect variations in their client early and therefore seek interventions to help prevent devastating disabilities in the future.

Most clinical studies of function among older adults utilize self-report to assess self-care, nutritional status and medication (Fried, Bandeen-Roche, Williamson, Prasado-Rau, Chee, Tepper & Rubin, 1996; Merrill, Seeman, Kasl & Berkman, 1997). Self-report is often utilized because it is quick, economical and requires less training (Langlois, Maggi, Harris, Simonsick, Ferrucci, Pavan, Satori & Enzi, 1996). There does not currently exist a protocol that uses self-report to assess self-care, nutritional status and medication usage by the older adult. Such a protocol, if developed, could be sent to the older adult prior to their office visit to be completed by them and/or their primary care giver. It would serve as a baseline to the PCP and allow early intervention by the health care team to help the older adult to

prevent hospitalization and/or placement in a nursing home. It can also serve as a method of alerting the older adult that help may exist for some problem that they accept as "normal aging", thus making them more participative in their health maintenance.

This proposed protocol is based upon General Systems Theory, which allows for a more people centered holistic view of the older adult. This theory demonstrates the relationship between the older adult, their medication usage, nutritional status and ability to live independently.

CONCEPTUAL FRAMEWORK

General Systems Theory was first introduced by biologist Ludwig von Bertalanffy in the 1920's to help explain how living organisms are organized (Briggs, 1997). As time progressed, many other disciplines discovered that systems theory was applicable. In fact, it forms the basis for some nursing theories, such as Roger's Theory of Unitary Man (1979), Neuman's Systems Theory (1982) and King's Open Systems Model (1981).

A system is defined as a "regularly interacting or interdependent group of items forming a unified whole" (Merriam-Webster's Collegiate Dictionary, 1996, p. 1197). A system is distinct from the environment in which it exists and a system may be classified as open or closed.

An open system is one that has interactions from its subsystems or from the environment in which it exists. The open system strives toward harmony and order, also known as negentrophy (Briggs, 1997). A closed system does not interact with its subsystems or its environment. This system is isolated, inflexible and resistant to change. It eventually will evolve to a state of entrophy or chaos or disorder (Briggs, 1997).

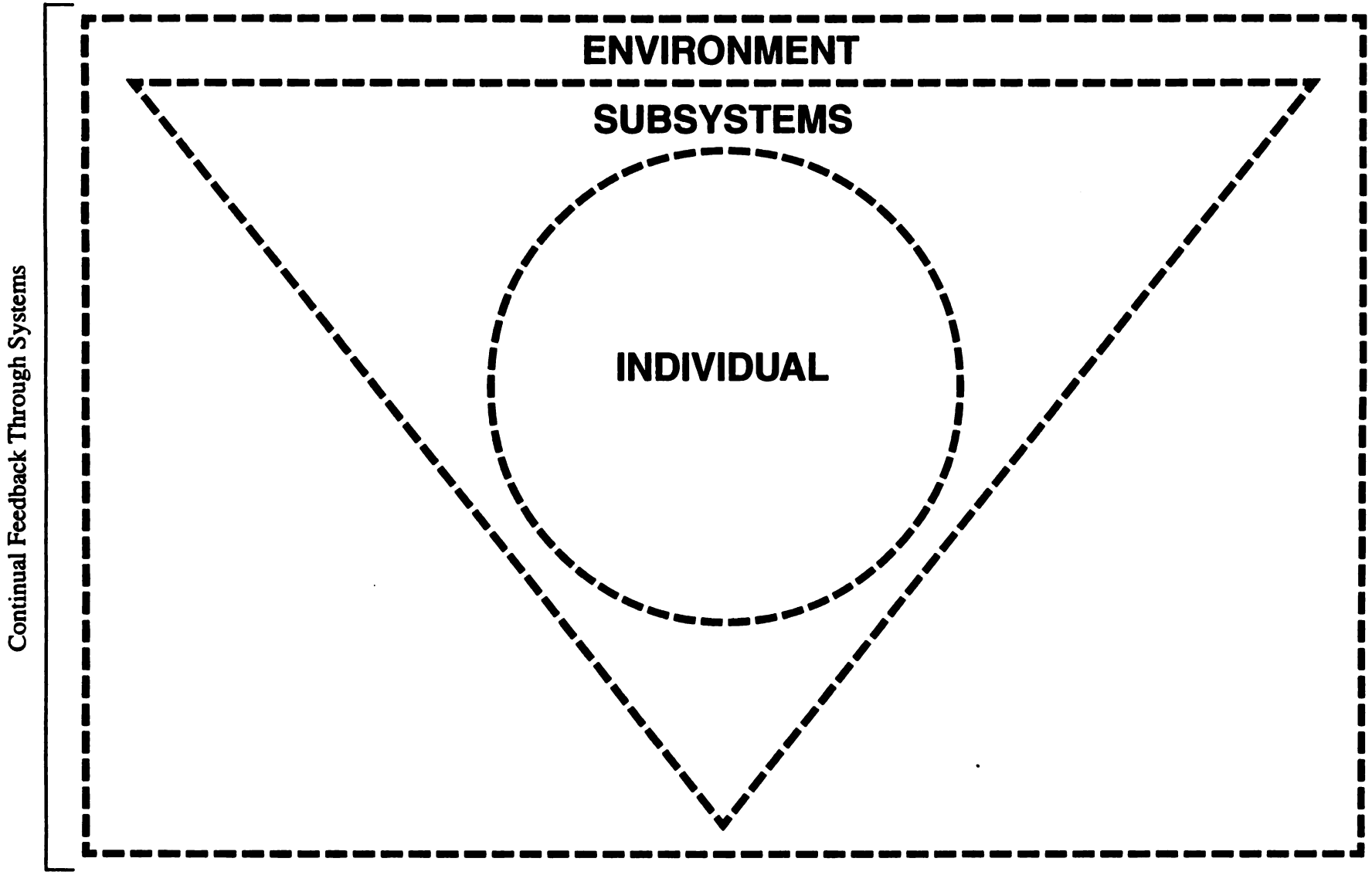

Figure 1. Open System

A system is a sum of all of its parts and cannot be identified or examined by its parts, but rather holistically. A change in one subsystem will cause a change in the system as a whole. Changes in the environment and within the system will affect each other. The system attempts to maintain homeostasis as it reacts to interactions through a feedback loop. The system will evaluate how the interaction has affected its equilibrium and attempt to adapt (Figure 1).

The individual is balanced at the center of their subsystems which are balanced within their environment. Figure 1 illustrates an open system (dotted lines) that is in negentrophy.

Changes in either the individual, their subsystem or their environment may result in an area becoming off balanced. The feedback mechanism however, will allow the system to return to its balanced state as it adapts to this change.

Application of this theory for the APN provides a more wholistic look at the individual and their environment. The older adult is a whole system composed of many subsystems. He/she is distinct from the environment in which they exist. Interactions with this environment, as well as some of its subsystems, will cause changes in the older adult that they will attempt to control to maintain homeostasis (Figure 2).

The older adult is the center of their subsystem. The subsystems include normal age changes, nutrition, medications and the ability to care for self (functional status). The older adult and these subsystems exist in an environment that includes the APN/PCP.

Changes in the subsystem that will affect the environment of the older adult are normal system changes that occur with aging. The older adult

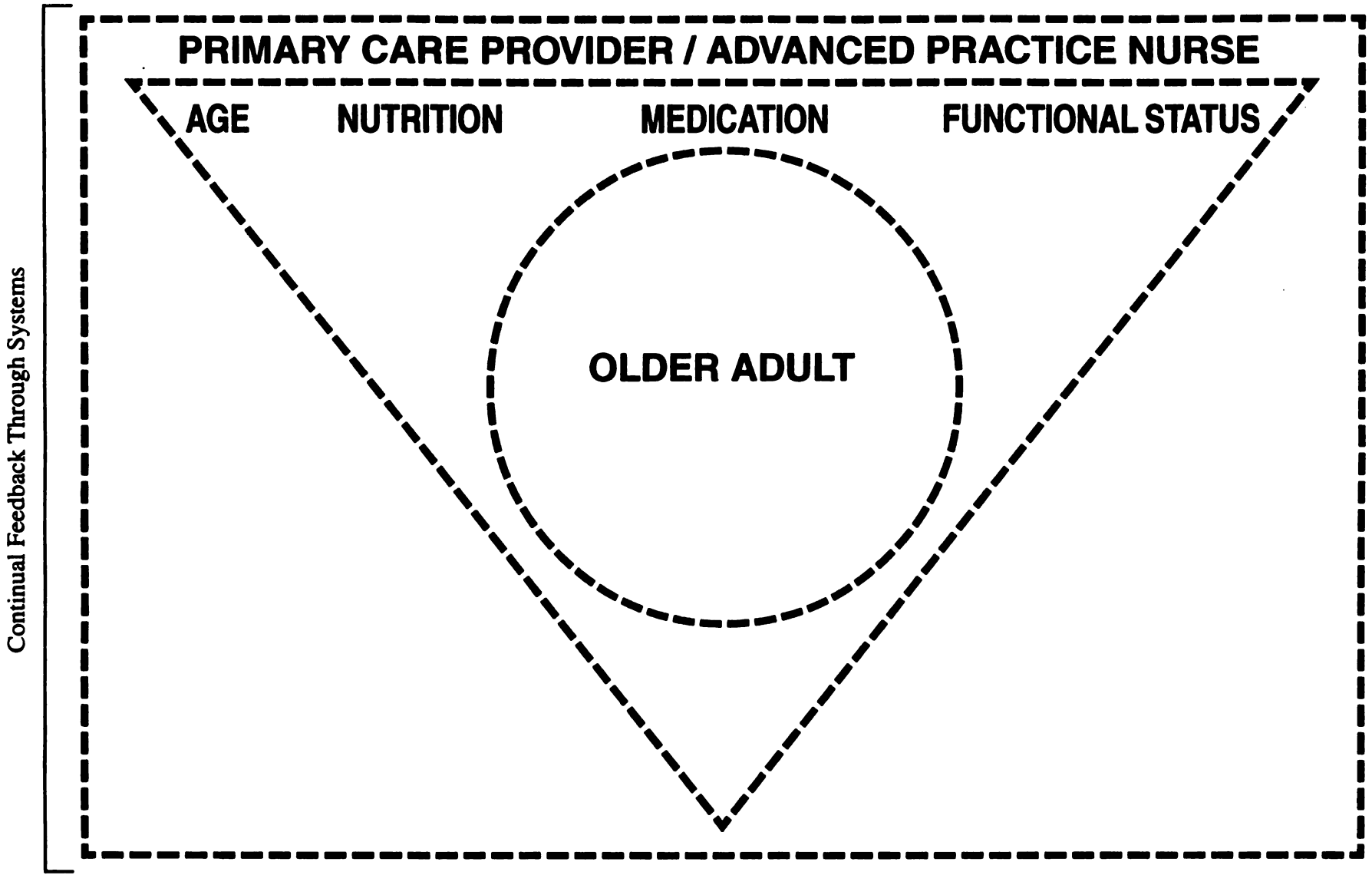
PRIMARY CARE PROVIDER / ADVANCED PRACTICE NURSE
AGE
NUTRITION
MEDICATION
FUNCTIONAL STATUS
OLDER ADULT
Continual Feedback Through Systems

Figure 2.

attempts to adapt to these changes to maintain equilibrium and the ability to continue living in harmony in their chosen environment. Some older adults maintain an open system and do an adequate job of adapting the environment to these system changes.

A study conducted by Williamson and Fried (1996) found that many older adults had adapted to system changes from aging in ways that they did not perceive as affecting their functional status. For example, they were still able to do their own grocery shopping and did not perceive it as a problem that they had to lean on the shopping cart as they proceeded through the store and make frequent rest stops to continue the activity. They had adapted to the change in their systems by aging and possible disease to maintain equilibrium in their environment based upon a feedback loop. Eventually however, the older adults will not be able to compensate for these changes and the result is generally a decline in function that jeopardizes their ability to live independently.

Another subsystem of the older adult that would effect their environment is the normal system changes that affect nutritional status. The development of a sub-clinical or clinical malnutrition will cause chaos in the individual as evidenced by the development of a disease process and/or impairment in functional status. Outside environmental intervention would most likely be required to bring equilibrium back into the system. This is also true for any interaction between the subsystems, such as medications and nutrition. These two subsystems can interact and affect the environment of the older adult. Conversely, the environment could act on these subsystems and that will also affect the equilibrium of the system. An example of this is the polypharmacy effect of medications ordered by the APN not only causing

adverse drug reactions, but also interfering in the older adults nutritional status.

If the older adult has a closed system, they become very isolated and resistive to change. These individuals are generally seen by the PCP/APN during some crisis event. Even then, they may be resistive to any intervention by the outside environment. These individuals will continue a downward spiral with death being the eventual outcome.

General Systems theory as applied to the APN becomes people centered (Beckman, Fernandez & Coulter, 1996). The emphasis is on the individual and their environment rather than the subsystem of presenting symptoms. The APN assumes the role of facilitator and teacher in collaboration with the older adult to help them maintain their goal of independent living. This is accomplished through actively listening to what the older adult is saying. The older adult then needs to actively participate in discovering interventions to help maintain system equilibrium.

General Systems Theory very clearly illustrates the principle behind the development of this protocol. As will be demonstrated shortly, normal age changes, medications and nutrition are subsystems of the older adult that interact closely with the individual to influence their ability for self-care. One subsystem alone cannot be analyzed to get a true picture of the older adult. All subsystems and the environment must be viewed as a whole to identify potential problems and develop early interventions.

In developing this protocol, it is important to know the current knowledge of factors that may influence the older adult's ability to live independently. The following literature review will define self-care (functional status) and show how normal aging changes, medications and

nutrition may influence the older adult's ability to provide self-care. It will also review current tools being used by the PCP to assess these areas.

LITERATURE REVIEW

Functional Status

Functional status refers to an individual's ability to accomplish necessary or desired tasks (Bonder & Wagner, 1994). Activities of Daily Living (ADL's) are defined as those tasks necessary for self-care: bathing, grooming, locomotion, toileting, transferring, dressing and feeding. Instrumental Activities of Daily Living (IADL's) are the more complex tasks necessary for self-care: taking medications, using a telephone, preparing a meal, grocery shopping, housekeeping, and balancing a checkbook.

ADL and IADL activities are classified according to complexity. Feeding oneself is a low complexity task compared to toileting oneself, where the individual must not only recognize the need to use the toilet, but must be able to transfer on and off the toilet while manipulating clothing. Grocery shopping would be classified as an even higher complex task as it involves the cognitive ability to prepare a shopping list, the motor function of transport to the store and shopping for the desired items, and the ability to manage money to pay for the purchases.

Nationally, approximately 40% of older adults reported having at least one area of ADL's and IADL's where they required assistance (Williamson & Fried, 1996). In the Provena-United Samaritans Medical Center service area, a study completed by the author reported approximately 67% of the population surveyed needed some assistance with ADL's or IADL's (Geriatric Care Committee, 1997). Functional decline in the older adult can

be caused by a myriad of factors. The influence of normal aging changes, nutritional status and medication usage on functional status will be reviewed.

Body System Aging Changes

As the individual ages, the body undergoes many normal changes. It is important for the PCP/APN to recognize what these normal changes are so that appropriate interventions can be initiated toward the abnormal changes. By doing so early, there will be a conservation of resources and a prevention of decline in the older adult.

The older adult may show some physical or cognitive decline with these normal body system changes, but they should not impact functional ability. These changes however, leave the older adult with very little reserve so that any untoward event could tip the scales into a functional decline (Krach, DeVaney, DeTurk & Zink, 1996). Normal age changes that occur in the older adult that may impact ADL's and IADL's are in the neuromuscular system, the cardiopulmonary system and sensory changes. The normal declines seen with aging will vary from individual to individual and progress along a continuum with the greatest decline seen in the oldest old (Krach et al, 1996). Aging changes are in the absence of any disease process.

Neuromuscular System

Changes in the neuromuscular system that may affect functional status are in the areas of muscle strength, posture, balance, gait, coordination and speed of movement (Bond & Wagner, 1994). Strength is the amount of force that can be exerted by a muscle and involves not only the muscle tissue itself, but also the neurons innervating it. As an individual ages, there is evidence of a loss of lean skeletal muscle mass, sometimes up to 30% (Miller, 1995). A

relationship between loss of lean skeletal muscle mass and the subsequent loss of muscle strength, especially in hand grip, has been reported (Miller, 1995; Richards & Palmiter, 1997). Motor neuron units innervate the skeletal muscle fibers and are responsible for controlling the contraction time, resistance to fatigue and enzyme activity. As an individual ages, there is evidence of an overall loss of motor neuron units which would effect the response time and coordination of the muscle to a stimuli. There is also evidence of disuse syndrome playing a role in exaggerating some of the effects of aging on muscle strength. Bedrest, for example, is associated with a loss of strength of from 1% to 5% per day (Schwartz & Buchner, 1994). Physical activity and exercise help to maintain overall muscle strength (Shumway-Cook, Gruber & Baldwin, 1997).

Overall motor function is coordination between the motor cortex and other areas in the brain like the basal ganglia, and the muscles themselves (Mitchell, Hodges, Muwaswes & Walleck, 1988). With aging there is also a loss of motor fibers, a replacement of lost muscle mass with fatty tissue, and a slowing of nerve conduction velocities. As a result, the individual may see a minor loss of fine motor skills, a decrease in coordination, and a increase in reaction time (Miller, 1995).

Proprioception is the ability to maintain an upright position without falling (Nichols, 1996). Proprioception depends upon the use of balance, posture and movement. In response to gravity, the body constantly responds to subtle shifts in weight and alignment. This is called postural sway. Due to the increase in reaction time as the individual ages, postural sway increases (Bonder & Wagner, 1994). This, and changes in the basal ganglia with

aging, may cause the individual to develop a wider base of support with movement and a more head forward position with gait.

Balance and coordination require an integration of many muscle groups and afferent and efferent pathways (Wilson, 1992). With aging there is a decrease in the afferent feedback to the central cortex that affects postural stability. This influences dynamic balance or the ability to keep the body upright with movement (Woollacott & Tang, 1997).

All of these normal changes in the neuromuscular system may influence the older adult's functional status. For example, the loss in strength in hand grip could make it difficult for the older adult to open up jars of food or the child-proof cap on medication bottles. The lengthening of reaction time and changes in postural sway may effect their balance and gait, thus limiting their ability to get to the grocery store or prepare a meal.

Cardiopulmonary System

With aging there are structural and functional changes to the cardiopulmonary system that may also affect ADL and IADL activity. As the individual grows older, there is a gradual stiffening of the ventricular walls of the heart (Leuckenotte, 1996). This will impede contraction and will subsequently result in a decrease in the overall cardiac output. The body attempts to compensate for this structural change by a longer ejection phase and delaying diastole. As a result functionally, the heart will contract less frequently and with less force. This will affect the heart's response to exertion and an increased demand for oxygen (Dean, 1997).

With aging there is a stiffening and thickening of the arterial system related to an increase in collagen and a decrease in elastin (Lakatta, 1994).

This results in a decrease in the ability of the arterial walls to stretch and recoil in response to variations in blood volume. This also means a decrease in the blood volume that can be stored in the arterial system.

There are changes in the peripheral baroreceptors and chemoreceptors with aging. This will affect the body's ability to adjust heart rate and blood pressure in response to stressors (Dean, 1997).

There is a calcification of the costal cartilage with aging that result in a stiffening of the thoracic cage. This results in a decrease in chest compliance and an increase in dead space of up to almost one half the inspiratory tidal volume (Lueckenotte, 1996). This increase in dead space results in less air being available for gas exchange (Leuckenotte, 1996). There are structural changes that occur in the alveoli that result in a decreased number, or a decrease in surface area, available for gas exchange. And finally, there is a decrease in chest muscle strength as part of the overall decrease in skeletal muscle strength. This will result in a decrease in the inspiratory and expiratory effort. All of these structural and functional changes to the pulmonary system cause it to be less responsive to the body's demand for an increase in oxygen (Dean, 1997).

This may mean that when the older adult performs an ADL or IADL activity, they may feel short of breath and fatigue more easily. This may cause a reluctance to perform that activity, which would lead to an eventual functional decline.

Sensory Changes

There are many sensory changes that an individual undergoes as they age. The two that may effect the older adult's overall nutritional status are a change in taste and smell.

As the individual ages, there is a decrease in the number of functioning taste buds and therefore a decrease in taste (Cope, 1996). It appears that the sweet and salt taste buds deteriorate before the bitter and sour. With aging, there are neurological changes in the olfactory system resulting in a diminished capacity to smell odors. These two senses work together to adversely affect the nutritional status in the older adult, as something must smell good and taste good to trigger appetite (Yen, 1996).

Another sensory change that may effect the older adult's nutritional status and medication usage is in vision. There are several changes that occur in the eye as part of normal aging. Two that may affect functional status are light sensing threshold and color perception.

The rods and cones of the lens undergo neurological degeneration as part of the normal aging process (Michaels, 1996). This means that adaptation from a light to dark environment is delayed. Other changes in the lens are the development of opacities in the lens nucleus, a yellowing of the lens and a loss of luteal pigment in the macular area (Leukencotte, 1997). This affects color perception with the loss of ability to see greens and blues as well as reds or yellows.

This overall loss of visual acuity could mean difficulty in reading the label on a medication bottle, or being unable to distinguish between the colors of different medications. It also could be difficult reading labels in the

grocery store or in the kitchen because of low lighting or glare from too bright lighting.

Nutrition

Successful aging and the declines in function and prevention of disease have been closely related to diet and nutrition (Chapman, Ham & Pearlman, 1996). As previously mentioned, the age-related changes in taste and smell will affect the older adult's appetite. Due to these alterations, the older adult may not eat a well-balanced meal. There are additional age related changes that may also affect the nutrition of the older adult.

Basal metabolism is related to the metabolism that occurs in lean muscle mass. As lean muscle mass decreases with aging, the energy requirements diminish by approximately 100 calories per decade (Gidden & Shenkin, 1997). As the energy requirements decrease, it becomes more difficult for the older adult to meet their micronutrient requirements through diet alone. Micronutrients include vitamins, minerals, essential fatty acids, and essential amino acids. Vitamins and minerals are also affected by the normal age related changes seen in the gastrointestinal (GI) system. For example, there is diminished absorption of Vitamin B_{12}, calcium, iron, folic acid and zinc due to the decrease secretion of hydrochloric acid in the stomach of some adults over the age of 70 (Leuckenotte, 1996). This leaves the older adult vulnerable to multiple diseases that would affect functional status, for example: pernicious anemia, iron deficiency anemia and osteoporosis. Low blood levels of certain vitamins have also correlated to poor performance on memory testing and abstract thinking (Chapman, Ham & Pearlman, 1996).

The macronutrients are protein, fat, carbohydrates and water. Protein and water are affected by normal system changes. A decrease in gastric secretions of up to 80% may occur in people over the age of 60 (Leuckenotte, 1996). A decrease in hydrochloric acid production is a normal system change. There is also a decrease in the digestive enzyme pepsin that may be related to the decrease in hydrochloric acid production (Cope, 1996). Pepsin is important in the breakdown of proteins into amino acids and is converted from its inactive form in an acidic environment (Watson, 1997). As the individual ages, protein breakdown may be less efficient. Protein is measured by the serum albumin level, which has a slightly lower value in the older adult to reflect this normal change (Jackson, 1998). Immune function has also been shown to depend upon adequate micro and macronutrients (Chapman et al, 1996).

As the individual ages, the total body water is diminished. This is a result of a blunted response to vasopressin (anti-diuretic hormone) by the renal system (Leuckenotte, 1996). Also, for unknown reasons, the thirst response to dehydration becomes blunted as the individual ages (Mentes & Buckwalter, 1997). Dehydration has been linked to the development of acute confusion, which is a transient brain dysfunction (Mentes & Buckwalter, 1997). If not prevented, the outcome for the older adult is poor, resulting in hospitalization, increased mortality and often discharge to a higher level of care (Mentes & Buckwalter, 1997).

Another nutritional concern in the older adult is obesity. With aging, lean body mass is replaced with fatty tissue. This and the diet of most Americans that is composed of up to 50% dietary fat, leaves the younger old (those under the age of 75) with a tendency toward obesity (Leuckenotte,

1996). There has been much documentation showing a relationship between obesity and the development of Type 2 diabetes, hypertension, degenerative joint disease and cardiovascular disease (Jackson, 1998).

Medication Use

Medications, both prescription and over the counter (OTC), that the older adult uses can affect ADL and IADL performance. The older adult accounts for 25% - 30% of all prescription medications and 40% of all OTC medications (Leuckenotte, 1996; Swonger & Burbank, 1995). Adverse drug reactions can occur in up to 50% of older adults taking medications in an outpatient setting (Hanlon, Schmader, Koronkowski, Weinberger, Landsman, Samas & Lewis, 1997). Adverse drug reactions can be severe enough to result in hospitalization of up to 30% of this population (Hanlon et al, 1997). There are several reasons why the older adult is susceptible to adverse drug reactions.

Pharmokinetics of medications are altered due to normal body system changes in the GI, hepatic and renal systems. There is a decrease in hydrochloric acid production and a decrease in protein synthesis with aging (Schwartz, 1994). Some medications require an acidic environment for metabolism and some medications bind with protein for distribution (Swonger & Burbank, 1995). If the appropriate environment is unavailable, then the dosage of medication administered will not be effective. There is also a delay in gastric emptying with aging which may cause a delay in drug absorption and delay of onset of drug action (Leuckenotte, 1996).

There are normal age related changes in the liver that will affect hepatic protein synthesis. This may then affect the liver metabolism of some medications (Swonger & Burbank, 1995).

The loss of lean body mass with aging has been described. Some medications depend upon lean body mass for distribution. If the lean body mass is not present for distribution, then medication is circulating in the system and the result may lead to adverse drug reactions.

The renal system is very important for the excretion of many of these medications. Due to changes in renal arterial perfusion, glomerular filtration becomes less efficient (Schwartz, 1994). As a result, there is competition for excretion sites. This then may mean an extension of the half-life of the medication (Swonger & Burbank, 1995).

Many of the adverse drug reactions occur in the older adult because very few clinical trials of medications include people over the age of 65 (Hanlon et al, 1997). Often these individuals are experiencing multiple disease processes and for that reason are excluded from clinical trials. There is little documentation into recommended dosage, rate and route of delivery to prevent adverse drug reactions except in post-clinical applications (Schuster, 1997).

In addition to not being included in clinical medication trials, many older adults experience polypharmacy (Schuster, 1997). Due to the multiple diseases many older adults experience, they may see more than one health care provider. Each health care provider may prescribe medications, many times in ignorance of other clinicians this person may be seeing, and what medications they may be taking (Hunter, Florio & Langbery, 1996; Lee,

1996). These multiple medications can leave the older adult vulnerable to drug-drug interactions.

Adverse drug reactions are many times treated by the PCP with another medication, thus potentiating "polypharmacy". The number of medications that an older adult takes has been linked to an increase in falls (Miller, 1996).

Another problem with polypharmacy is the drug interactions that may occur that will affect the nutritional status of the older adult (Lewis, Frongillo & Roe, 1995). One example of this are antacids that affect the absorption of folate, phosphate and calcium, and anti-inflammatory agents, such as aspirin, that affect the absorption of Vitamin C, folate and iron (Leuckenotte, 1996). Both medications are available to the older adult OTC and could potentiate the nutritional effect of a prescription medication, such as hydralazine, which also effects absorption of folate. These medications, in combination, may effect the overall nutritional status of the older adult and leave them vulnerable to the development of a macrocytic anemia (Lewis, Frongillo & Roe, 1995).

Another adverse medication effect that could influence nutrition is dry mouth. 50% of community dwelling older adults take one or more medications that can lead to dry mouth (University of Michigan, 1996). Saliva is important for clearing plaque and bacteria from dental and oral mucosa with its flushing action and in lubricating food so that it may be swallowed. If dry mouth is a problem for the older adult, they may develop dental caries and its subsequent sequela, or have difficulty swallowing their food. Both, if they occur, will affect the overall nutritional status of the individual.

The older adults who "shop" around for the best price for their prescriptions are at an even greater risk from the effects of polypharmacy, as they have removed a safeguard mechanism (Hanlon et al, 1997). Dealing with more than one pharmacy leaves no one having the knowledge of all the medications that are being taken and interceding, if necessary, to prevent adverse drug reactions.

The normal body system changes that occur with aging and their influence on functional status have been reviewed. The effects of medication usage and nutritional status as they relate to functional status have also been reviewed. Next the current tools used by the PCP/APN to assess functional and nutritional status and medication usage will be reviewed.

Functional, Nutritional and Medication Assessment Tools

Functional assessment tools are a systematic method to objectively evaluate the level at which an individual is performing in many different areas (Mitchell et al, 1988). Functional assessment tools have become very useful to the health care team when dealing with the older adult. The tools used by health care team members assesses ADL and/or IADL status. Some tools are all encompassing and look at the social support, mental health and economic resources available or utilized by the older adult. Some tools are used as self-reports, although some tools require performance evaluation and specific settings to be utilized. Table 1 lists the more well known tools currently in use for assessing ADL, IADL activity, medications and nutrition.

The Katz Index of ADL was developed in 1963 and is still widely used today. This tool evaluates the functional dependence or independence of the individual in six categories: bathing, dressing, toileting, transferring,

Table 1

Comparison of Functional, Nutritional and Medication Assessment Tools

Tool	Year Developed	Type		Measurement			
		Performance	Self-Report	ADL	IADL	Nutrition	Medications
Katz Index of ADL	1963	x		x			
Barthel Index	1965	x		x			
Functional Independence Measurement (FIM)	1987	x		x			
Instrumental Activities of Daily Living	1969		x		x		
Older Americans Research & Service Center (OARS)	1978		x	x	x		x
Mini Nutritional Assessment	1994	x	x			x	x
Determine Nutritional Health	1991		x			x	

continence and feeding. The older adult's actual performance of a task score this tool rather than their potential ability to perform the task (Bonder & Wagner, 1994). For example, the individual is scored as dependent if they refuse to perform the task, even if they are able to do so. Although this tool was designed as a performance tool, the primary care provider often uses it as a self-report tool (Bonder & Wagner, 1995; Judge, Schechtman, Cress & the FICSIT group, 1996; Krach et al, 1996; Sinoff & Ore, 1997). No studies appear in the literature that show how this use influences the reliability and validity of the tool. If used as a self-report tool of function, it takes 5 - 10 minutes to complete. If used as a performance tool, the time for completion could be up to thirty (30) minutes and obviously could not easily be completed in the primary care providers office.

Another popular tool to measure ADL function is the Barthel Index that was developed in 1965 and measures ten items of self-care and mobility. It was designed as a performance evaluation measurement; however, it is also being used in the primary care setting as a self-report tool. A study conducted by Sinoff and Ore (1997) showed limitations in this tool as a self-report evaluation in people over the age of 75 and recommended a performance appraisal be utilized. This tool measures feeding, transferring, grooming, toileting, bathing, ambulating on a level surface, ascending and descending stairs, dressing and continence of bowel and bladder. The individual is scored as either being independent or requiring assistance with each item. A total score of 100 indicates independence in all items. The tool may also be utilized for showing gains or losses in individual tasks, rather than a cumulative score. Again, this tool is designed as a performance

evaluation and if used as such, it is difficult to administer outside of a rehabilitation setting.

The Functional Independence Measurement (FIM) expands areas of the Barthel Index to include communication and social cognition. This eighteen (18) item tool was developed in 1987 by a joint task force of the American Congress of Rehabilitation Medicine and the American Academy of Physical Medicine and Rehabilitation (Johnston, Findley, DeLuca & Katz, 1991). Along with self-care management, sphincter management, transfers and locomotion, this tool also assesses the individual's ability to communicate (comprehension and expression) and social cognition, as expressed by social interaction, problem solving and memory. This tool is scored on a seven-item scale that ranges from total independence to total dependence. A score of 126 means total independence on all eighteen items assessed (Heinemann, Linacre, Wright, Hamilton & Granger, 1994). Generally, a score of 80-100 indicates the ability to live in a community setting with some assistance. This tool is designed to look only at a cumulative score and therefore a gain in one area and loss in another area may not be reflected in the overall score. Time to administer this performance tool is approximately forty minutes. This tool is being used in some acute care settings to predict discharge disposition (Mauthe, Haaf, Hayn & Krall, 1996). No studies are in the literature that document how the reliability of the tool is affected when used as a self-report.

The Instrumental Activities of Daily Living was developed by the Philadelphia Geriatric Center in 1969. Also known as the Lawton Scale of Instrumental Activities of Daily Living, this tool includes nine items: using the telephone, walking distances, shopping for groceries, preparing meals, doing housework, doing handiwork, doing laundry, taking medications and

managing money. This tool is scored by self-report on ability to carry out the task. Some items are gender specific, such as preparing meals and doing handiwork. Items are marked on a three-point scale of performing independently, performing with some help or unable to perform. This scale can be completed in approximately five minutes.

The Older Americans Research and Service Center (OARS) is a tool developed in 1978 at Duke University (Duke University, 1978). This 105-item tool covers five broad areas: social resources, economic resources, physical health, mental health and ADL's. The OARS tool has frequently been utilized as separate evaluation tools, e.g. OARS Social Resource tool, as opposed to administering the entire questionnaire. Scoring is done in each domain and then a cumulative score is derived. This questionnaire takes a minimum of one hour to administer.

None of the comprehensive assessment tools looks at nutrition as it relates to functional status. The OARS does ask the individual what medications they take by classification as part of the physical health assessment portion.

The Mini Nutritional Assessment tool was developed in 1994. This tool helps to evaluate the risk of malnutrition to allow early intervention for the individual (Vellas & Guigoz, 1995). There has only been one study to date that has demonstrated reliability of this tool (Vellas & Guigoz, 1995). There are five areas that are evaluated: anthropometric measurements (height and weight); biological measurements (albumin and cholesterol); the individuals perception of their nutritional health; a global assessment that looks at lifestyle, number of medications taken and mobility; and a dietary assessment that looks at the number of meals per day, food and fluid intake

and ability to feed self. This approximately thirty item questionnaire takes about fifteen minutes to complete. It is scored as indicating no risk to high risk for malnutrition.

Another nutritional screening assessment is the Determine Nutritional Health (Nutrition Screening Initiative, 1991). This was developed in 1991 as part of the Public Awareness Checklist in conjunction with the U.S. National Screening Initiative. This ten item questionnaire is designed to be completed by the individual. If they score as a high nutritional risk, they are encouraged to bring the form in to their PCP. The PCP then completes a Level I and Level II screening that encompasses Body Mass Index (BMI), eating habits, functional status, living environment, anthropometric measurements, number of medications taken and mental status. This screening assessment has poor specificity (Vellas & Guigoz, 1995).

Summary

All ADL and IADL activity requires movement. The neuromuscular system is an integral part of performance of these activities. Changes in strength with aging may affect the ability to perform such activities as medication administration and meal preparation. Changes in coordination, proprioception and balance may affect the locomotion of the older adult and their ability to grocery shop or prepare meals.

Changes in the aging cardiopulmonary system affects the body's ability to respond to an increase in tissue demand for oxygen. This may leave the older adult feeling short of breathe and weak when they wish to perform some more complex motor activities, such as getting to and from the grocery store and ambulating around the store to make their purchase.

Some sensory changes may affect the ability of the older adult to eat a well balanced meal. Normal system changes with aging affect the ability to meet the micro and macronutrient requirements. Immune function has been linked to insufficient micronutrients and acute confusion can be caused by inadequate hydration. The development of disease processes from insufficient nutrition will add a burden to the older adults ability to maintain ADL and IADL function.

With the older adult accounting for the consumption of a significant portion of prescription and OTC medications, they become more susceptible to adverse drug reactions. Cognitive changes are a common reaction which may affect IADL and eventually ADL activity. Some adverse drug reactions can also impair the nutritional status of the older adult. All of these will affect the ADL and IADL activity of the older adult.

Current methods to determine ADL and IADL activity were reviewed. Many tools are being used as assessments through self-report although they were not designed as such, therefore, the reliability and validity of the tool comes in question. The Determine Nutritional Help Assessment is a self-report that depends upon the individual bringing the results to the primary care provider for further evaluation if they score as a high risk for malnutrition.

No tool or screening combined ADL, IADL, medications and nutritional assessment. The literature review has shown the connection between these areas and how vital they are in helping the older adult to continue to live independently in the community.

THE PROTOCOL

Overview

The protocol consists of two parts. The first part (Appendix A) is a brief, inexpensive, easy to administer form that can serve as a baseline to the APN/PCP of the older adult's ability to care for self. It includes an area of data collection on nutritional status and medication usage that is currently not available to the APN/PCP in one format. This protocol is designed to be used in the primary care setting. It will serve as a reminder of their appointment and will be mailed to the client to be completed prior to their scheduled appointment and returned at the time of the visit. It is designed to fit on one sheet of paper. It will be printed in larger font, to accommodate any vision problems and on white paper with black ink. Instructions are simple and important areas are in bold print. It should be sent to any person over the age of 65 at least on an annual basis.

Assessment of Self-Care

Items for assessment in this areas were adapted from ADL and IADL activity that were evaluated in the Katz Index of ADL, the Barthel Index, FIM and OARS. Items were arranged in order of descending complexity. A study by Judge et al (1996) showed that IADL activity decline will appear before ADL performance decline. Many IADL activity involves higher cognitive function and declines in this area can start the evaluation process to prevent further declines. A question was included in this section to ask about usual activity to try to compensate for any gender bias in IADL activity.

Since many older adults may adapt to a change in function and not recognize it as an inability to perform independently, a section was included to try and identify any adaptive behavior that is currently being used by the

older adult. This may again alert the APN/PCP to the need for some intervention immediately or in the near future. Asking about specific assistive equipment that is being used is also another method to gather a holistic image of the older adult.

Medications

This portion of the protocol asks the older adult to bring all prescriptive and OTC medications in on their visit. This is an effective method for the APN/PCP to see exactly what has been prescribed for the older adult and what OTC medications they may be using. With many medications now available in OTC and prescriptive strength, the potential for adverse drug reactions has increased. This section will also serve as a double check into IADL activity of taking medications and allow for interventions if necessary.

Nutrition

Because this form is mailed to the home, the older adult should be able to provide a "real-time" recall of intake for a typical day. This should be more effective than trying to do a recall in the office when other information may be of more concern to the older adult. From the recall, the APN/PCP should get an idea if nutritional needs are being met. Again, this will also be a double check to the APN/PCP into IADL function of grocery shopping and meal preparation.

Limitations

This portion of the protocol will provide the APN/PCP the opportunity to investigate any potential causes that may effect the older adult's ability to live independently. With regular review into self-care ability, nutrition and medications, the APN should be able to identify potential or actual problems

early and to seek interventions. This will help the older adult to maintain balance within their subsystems and within their environment.

One barrier to this may be the educational level of the older adult. Although language was kept simple, it still does require understanding of the written word. This may present a problem with an older adult with a cognitive deficit or literacy problem.

Although designed to be a reminder of their appointment, this form may not make its way back into the primary care setting. Information can still be obtained at the time of the visit, although diet recall may not be accurate and another trip to the primary care setting may be necessary for medication review.

Analysis

The second portion of this protocol is the analysis by the PCP/APN of the data that has been collected. Any identification by the older adult of assistance/adaptation in an IADL or ADL activity needs further in depth questioning. The PCP/APN will be determining the cause of the need for assistance/adaptation. For example, if the older adult states that they need assistance with meal preparation, the PCP/APN should investigate whether the need is from a cognitive decline that makes it unsafe to be around cooking surfaces; whether there is an inability to see adequately to prepare a meal; or whether reaching for equipment in the kitchen causes dizziness and the older adult has a fear of falling.

The identification of assistance or adaption in IADL and /or ADL activity will lead into an analysis of nutrition and medication usage. Using the above example, it would be important for the PCP/APN to evaluate all the

medications that the older adult is on as a potential cause of cognitive impairment or dizziness. The PCP/APN should evaluate the medications that are known to cause impairment in the older adult's cognitive function such as benzodiazepams, antihypertensives, antidepressants or sedative/hypnotics (Cummings et al, 1991; University of Michigan, 1996). It is also important for the PCP/APN to be aware of any medications in combination that may affect the older adult's functional status, for example, hydralazine and antacids in combination affecting folate absorption.

The same analysis needs to occur with the diet/fluid recall. This information needs to be combined with the anthropometric data that is routinely gathered with each office visit. Again using the same example, if the older adult needs assistance with meal prepartion then analysis must include how balanced of a meal that the individual is consuming. It is important to determine if they have an adequate fluid intake, adequate protein intake and adequate intake of essential vitamins and minerals. Change in cognitive function can occur with deficits in any of these areas. It then becomes necessary for the PCP/APN to determine whether they wish further laboratory work-up such as pre-albumin level, B_{12} level and/or folate to further pinpoint a nutritional cause to a cognitive decline.

This self-report questionaire puts all the information in one place for the PCP/APN to begin the analysis into the self-care ability of the older adult. No other tool currently used in primary care gets this data together in one place.

IMPLICATIONS

Research

Identification of problems and development of interventions with the older adult rely heavily upon self-report. There are very few studies out that demonstrate the reliability of self-report in this cohort. Although not economically practical, performance appraisal with the older adult will many times give a more accurate picture of adaptation. Further research is needed into cost-effective methods to investigate reliable means to determine self-care. Early intervention of maladaptive behavior can prevent functional decline and allow for continued independent living.

Education

As was stated previously, the older adult population is growing and will comprise a significant portion of the APN/PCP's practice. It is important therefore, that the APN/PCP become aware of the normal age changes and how they can work with nutrition and medication to effect independent living.

At the same time, it is important that the older adult be educated that loss of function is not a normal part of aging and that interventions should be sought if they are experiencing this. By having both the older adult and their health care provider aware of how all these systems interact with each other, a more proactive health care environment will exist that will facilitate independent living.

Practice

This protocol moves the focus of the APN/PCP and the older adult from "treating diseases" to "health maintenance". By looking at not only self-care items, but factors that may impede self-care, the focus becomes holistic and people-centered. The older adult and the APN develop a

relationship of mutuality and respect for each other with a common goal and outcome.

It is important with the older adult that their whole enviroment is evaluated rather than "presenting symptoms". This cohort of people are very complex and very easily sent into a decline in function. At the same time it takes them longer to recover. It becomes imperative that the PCP/APN recognize normal aging changes and how this will impact other systems of the older adult that can quickly impact their functional status. This self-report questionaire and the subsequent analysis by the PCP/APN of the data gathered provides much of the information in one place. It not only provides the opportunity for the PCP/APN to analyze the information, but also provides a jump off point for educating the older adult, thus making this truly a participative effort in health maintainance.

APPENDIX A

PLEASE COMPLETE THIS FORM AND BRING IT TO YOUR NEXT OFFICE VISIT ON _____AT _____.

NAME: _____ DATE: _____

DID YOU GET HELP COMPLETING THIS FORM? _____

CIRCLE THE ACTIVITY THAT YOU NEED HELP WITH

Grocery Shop	Use the toilet	Move from bed or chair
Cook Meals	Dress/Undress upper body	Bathe/shower
Clean house/apartment	Dress/Undress lower body	Brush teeth/comb hair
Balance checkbook/pay bills	Climb stairs	Feed self
Take your medicine	Walk distances outside of your home	

LIST ANY ACTIVITY ABOVE THAT YOU MAY NEED HELP WITH THAT YOU HAVE NOT NORMALLY DONE (e.g. balance your checkbook)_____

CIRCLE THE ACTIVITY THAT YOU DO NOT NEED HELP WITH, BUT THAT YOU MAY HAVE CHANGED OR MODIFIED HOW YOU NOW DO IT (e.g. bathe only at the sink, not in the tub/shower).

Grocery Shop	Use the toilet	Move from bed or chair
Cook Meals	Dress/Undress upper body	Bathe/shower
Clean house/apartment	Dress/Undress lower body	Brush teeth/comb hair
Balance checkbook/pay bills	Climb stairs	Feed self
Take your medicine	Walk distances outside of your home	

DO YOU USE ANY OF THE FOLLOWING?

☐ Wheelchair ☐ Crutch(s) ☐ Brace
Where? _____
☐ Commode ☐ Walker ☐ Cane Other _____

BRING ANY PRESCRIPTION AND NON-PRESCRIPTION MEDICATIONS THAT YOU USE WITH YOU FOR THIS VISIT

TAKE ONE "USUAL" DAY BEFORE YOUR APPOINTMENT AND WRITE DOWN EVERYTHING YOU EAT AND DRINK IN 24 HOURS.

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