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The Relationships Between Dizziness and Anxiety, Depression, Perceived Well Being, and Functional Independence in a Geriatric Inpatient Rehabilitation Setting

by

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Abstract

Dizziness is a very common and poorly understood condition (Cappon, 1970), and is especially common in seniors, affecting approximately one-third of older adults living in the community (Sloane & Baloh, 1989). Very little research on dizziness in the elderly had been conducted to date, and essentially none has been performed with older adults not living in the community. Dizziness is a complex biopsychosocial phenomenon which can have numerous physical and psychological causes. Although variables such as anxiety have been found in the literature to be significantly related to dizziness, psychological factors contributing to dizziness are generally dismissed in preference of physiological explanations. The current research attempted to expand the literature by examining the prevalence and nature of dizziness, along with its associations with anxiety and other important psychological and health factors, in a group of older adult medical inpatients undergoing rehabilitation treatment. Results found strong support for the importance of investigating dizziness in this population. Dizziness was very prevalent, with 46.8% of participants suffering from this problem. Many dizzy patients experienced symptoms at least daily, and over half of participants experienced dizziness for at least two years or longer in total. Dizziness was most often experienced as lightheadedness, feeling at risk for falling, feeling a fear of falling, or loss of balance. Falls were very commonly associated with dizzy spells, occurring in almost half of individuals. Overall, non-medical variables, specifically perceived health and anxiety, appear to be important factors to consider when working with dizzy older adults with medical problems.

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Introduction

Dizziness is a very common and poorly understood condition (Cappon, 1970). A disorder of human spatial orientation, dizziness is experienced as an abnormal sensation of movement or balance (Drachman, 1994; Drachman & Hart, 1972; Ross & Robinson, 1984). Dizziness does not represent a single disease or disorder, and can be caused or influenced by various different physical and psychological conditions (Drachman & Hart, 1972). Although this symptom occurs across all ages (Cappon, 1970), it is especially common in seniors, affecting approximately one-third of older adults living in the community (Sloane & Baloh, 1989). As the Canadian population ages, an increase in the number of patients suffering from this widespread problem is expected (Nedzelski, Barber, & McIlmoyl, 1986). However, very little research on dizziness in the geriatric population has been conducted, and essentially none has been performed with older adults not living at home due to various health reasons.

Much more work on the frequency, nature, and correlates of dizziness is necessary in order to adequately assess and treat the growing segment of our population who are most affected by this complicated and serious problem. In response to this need for a greater understanding of dizziness symptoms in diverse groups of older adults, the present paper explored the prevalence and nature of dizziness, along with its associations with other important psychological and health factors, in a group of medical inpatient seniors undergoing rehabilitation treatment in a hospital setting. Although this research was particularly interested in the relationship between dizziness and anxiety, the relationships among dizziness and depression, functional ability, and perceived health

were also determined.

Definition and Categories of Dizziness

To gain a fuller understanding of a complex biopsychosocial phenomenon such as dizziness, it is useful to review the generally accepted definitions and categories of this problem. Since dizziness can vary in its nature or description, and can be caused by various different medical and psychological conditions, the symptom is not seen by experts to be a particular disease entity (Drachman & Hart, 1972). Rather, dizziness is considered a disorder of human spatial orientation, or an uncertainty of one's position or motion in space (Drachman, 1994; Drachman & Hart, 1972). Thus, dizziness is often defined as an abnormal experience of movement or imbalance (Ross & Robinson, 1984), which can include symptoms such as unsteadiness, orthostatic clouding, loss of consciousness, feelings of lightheadedness, or feelings of unreality (Grimby & Rosenhall, 1995). In an attempt to simplify the various symptoms or feelings that are described as dizziness, experts typically separate dizziness into four different types: dysequilibrium, presyncope, lightheadedness, and vertigo (Hazlett, Tusa, & Waranch, 1996; Ross & Robinson, 1984). However, the literature shows that dizziness tends to be multidimensional in occurrence and idiosyncratic in nature, so that these four types of dizziness are usually found to overlap to varying degrees depending on the individual (e.g., Colledge, Wilson, Macintyre, & MacLennan, 1994; Sixt & Landahl, 1987; Sloane, Hartman, & Mitchell, 1994). A brief discussion of these four proposed categories helps clarify the nature of dizziness, the various forms it can take, and provides insight into how this symptom is typically understood by researchers in this field. The factors

typically considered to cause each of these four types of dizziness follows a discussion of the possible etiologies of dizziness in general.

Dysequilibrium, is a feeling of imbalance that occurs when standing or walking (Hazlett et al., 1996). This first category of dizziness does not involve the presence of any abnormal head sensation, and occurs only when the patient is walking, and thus is sometimes referred to as "dizziness in the feet" (Drachman, 1998). Dysequilibrium essentially persists when the person is in an upright position (Baloh, 1992). Typical complaints of dysequilibrium-type dizziness include unsteadiness, clumsiness, tendency to fall, or disturbed balance (Drachman, 1982). The second type of dizziness, presyncope, is the sensation of impending faint or brief unconsciousness (Olshansky, 1998). Patients suffering from presyncope typically complain of blackouts or a sinking sensation (Ross & Robinson, 1984), with sensations being either episodic or continuous (Baloh, 1992). Vertigo, the third category of dizziness, is a combination of disorientation in space, or 'rotational dizziness', and the illusion of movement of either one's self or one's surroundings (Drachman, 1998; Ross & Robinson, 1984). Finally, lightheadedness is the most imprecisely described form of dizziness, and is a grouping used to include symptoms that do not reliably fit into the categories of dysequilibrium, presyncope, or vertigo (Drachman, 1998). Lightheadedness includes various sensations described as numbness, wooziness, swimming, floating, pressure in the head, and spatial misperceptions (Ross & Robinson, 1984). Such symptoms are often continuous in nature (Baloh, 1992).

Etiology of Dizziness

Before discussing the specific etiology of the four kinds of dizziness, the causes of dizziness in general must be reviewed. Overall, there are many and varied possible reasons for dizziness symptoms. Physiological etiologies are first discussed, followed by pharmacological, unknown, and psychological etiologies. Then the complicating issue of overlapping causes leads to a discussion of the causes of the four different types of dizziness and the limitations of this categorization system.

The reason for a particular patient's dizziness is often difficult to determine, partly because there are more than 60 physical disorders that can result in dizzy symptoms. Common examples of health problems that may contribute to dizziness include disorders of the vestibular labyrinth, central and peripheral nervous systems, emotional state, eyes, heart, peripheral vascular system, lungs, kidneys, hematologic system, and joints of the cervical spine and lower extremities. Any of these disorders may show dizziness as either the primary symptom or an important and sometimes disabling secondary symptom (Drachman, 1998). More than 90% of these possible etiologies can be organized into seven common areas that include both medical and psychological factors: peripheral vestibular disorders; hyperventilation syndrome; multisensory dizziness; psychiatric disorders (anxiety, panic, agoraphobia, depression); brainstem cerbrovascular accident; neurological disorders (multiple sclerosis, parkinsonism, other); and cardiovascular disorders (Drachman, 1994; Drachman & Hart, 1972). According to Drachman (1994), the first five categories in this list account for more than 85% of diagnoses. An alternate categorization of possible causes of dizziness proposed by Anderson and colleagues (Anderson, Yolton, Reinke, Kohl, & Lundy-Ekman, 1995) includes the following

categories: sensory conflicts, psychological problems, blood flow disorders, pharmaceutical effects, and systemic disease (including aging).

A few studies in the literature report specific findings on physiological or medical etiologies for dizziness. Drachman and Hart (1972) found in a study of 104 patients consecutively admitted to a dizziness clinic that peripheral vestibular disorders were the most common cause (38%), with multiple sensory deficits (13%), brainstem cerebrovascular accident (5%), neurological disorders (4%), cardiovascular disorders (4%), and other problems (6%) accounting for smaller numbers of cases. In another study investigating older (over age 50) dizzy men, Davis (1994) found that peripheral vestibular system causes were the most common (accounting for 56% of principal causes), followed by structural lesions of the brainstem or cerebellum or metabolic disorders (22%), proprioceptive system problems (7%), visual system problems (1%), and unknown etiologies or multiple equally involved systems (14%). In an investigation of younger patients from general medical practices (average age 39.43 years), Yardley, Burgneay, Nazareth, and Luxon (1998) discovered that causes of dizziness were most often peripheral vestibular dysfunction (48.4% of participants), other medical conditions (19.4%), no dysfunction (16.1%), and central dysfunction (9.7%). Kroenke and his colleagues (1992) observed in their sample of outpatients (mean age 62 years old, and age range of 20 to 85 years old) with persistent dizziness that vestibular disorders were the most common medical causes of the problem. Using somewhat broader categories of etiology, Kroenke & Mangelsdorff (1989) found in their study of 1000 medical clinic patients that the probable etiology of dizziness was organic in only 18% of individuals.

Finally, Sloane and Baloh (1989) investigated older adults visiting a neurotology clinic and found that the most common medical diagnoses were benign positional vertigo (25.9% of patients) and cerebrovascular disorders (21.6%). One or more specific diagnoses were identified in 86.2% of participants. Of the remaining patients who could not be definitively diagnosed, symptoms were frequently described as "presyncopal lightheadedness". Overall, although each study discussed here produced findings somewhat different from the others, all etiologies noted in this body of work fit into the medical causal categories labeled above as most important by dizziness experts (e.g., Anderson et al., 1995; Drachman, 1998).

Complicating the diagnosis of dizziness is the fact that many drugs may cause the symptoms as adverse side-effects (Drachman, 1998). According to Anderson and colleagues (1995), of the more than 4000 drugs listed in the *Physician's Desk Reference* (1990), more than 25% listed dizziness as a possible side effect. A wide range of drugs - even drugs used to treat dizziness! - have been found to cause dizziness symptoms, including: antianxiety drugs, tricyclic antidepressants, antihypertensive drugs, antituberculous drugs, aminoglycosides, local anaesthetics, non-steroidal anti-inflammatory drugs (Wennmo & Wennmo, 1988), alcohol, and anticonvulsants (Baloh, 1992). Indeed, distinguishing between medical disorders and the drugs used to treat these medical disorders as causes of dizziness can often be frustrating (Anderson et al., 1995). Moreover, Luxon (1991) emphasizes that drugs become especially problematic with elderly patients. In seniors, the following must be considered as possible causes of dizziness: (1) an unexpected side effect of a drug; (2) an unexpected result of a standard

dose, due to altered pharmacodynamics of aging; and (3) an accidental overdose due to poor compliance or drug interactions.

Unfortunately, the cause of a particular patient's dizziness is not always recognized, which obviously can lead to inappropriate treatments and continued suffering in some cases. In fact, according to various investigators, anywhere from 10 to 80% of dizzy individuals are not diagnosed with an etiologic disorder (Afzelius, Henriksson, & Wahlgren, 1980; Drachman, 1994; Drachman & Hart, 1972; Kroenke, Arrington, & Mangelsdorff, 1990; Kroenke & Mangelsdorff, 1989; Magnusson, Nilsson, & Hendriksson, 1977; Nedzelski et al., 1986; Sullivan et al., 1993) (Macrae, 1960; Brandt, 1996). In general, cases where a medical explanation for the dizziness cannot be found are usually thought to be "psychogenic" dizziness (Magnusson et al., 1977). Alternate terms for such psychogenic dizziness include psychiatric dizziness, functional dizziness, psychophysiologic dizziness, psychic dizziness, hyperventilation syndrome, phobic postural vertigo, and somatization (Furman & Jacob, 1997).

Historically, many different psychological causes of dizziness were considered by researchers. Freud originally believed that dizziness represented psychological insecurity and a threatened self-identity (O'Connor, Chambers, & Hinchcliffe, 1989). Related to this idea, individuals with obsessive-compulsive characteristics have been thought to have insufficient defense mechanisms which eventually lead to regression and finally dizziness (Magnusson et al., 1977). Neurotic disorders such as depression, hysteria, and hypochondriasis have also traditionally been thought to be prevalent causes of dizziness (Drachman & Hart, 1972; Levy & O'Leary, 1947). Borderline psychosomatic reactions,

such as cataplexy, akinetic epilepsy, and hypotension or hypoglycemia associated with anxiety, have also been implicated. Further, derealization-depersonalization syndrome, involving distortion of time, space, body boundaries, and weight, has been considered (Cappon, 1970). Although some of these ideas about the etiology of dizziness have been held up to the present time, many current ideas about psychogenic dizziness tend to have a stronger cognitive emphasis (O'Connor et al., 1989). Presently, the major psychological problems thought to result in subjective experiences of dizziness include anxiety disorders, depressive disorders, hyperventilation syndrome, adjustment reactions, and psychotic disorders (Drachman, 1982).

Estimates of the prevalence of psychological disorders as etiologic factors in dizziness complaints range from 2% to 50%, or over 80% if unknown etiologies are included (Azfelius et al., 1980; Brandt, 1996; Davis, 1994; Drachman & Hart, 1972; Kroenke & Mangelsdorff, 1989; Macrae, 1960; Nedzelski et al., 1986; Sloane et al., 1994). Afzelius and colleagues (1980) found that 50% of patients consulting otologists had a functional source, specifically "nervousness", for their dizziness. Drachman and Hart (1972) discovered that of the patients visiting their dizziness clinic 23% had hyperventilation syndrome, 9% had psychological disorders, and another 9% had uncertain diagnoses as the cause of their dizziness. In a study of men aged 50 years old and older, Davis (1994) found that psychological diagnoses were the major etiological factor for dizziness in 3% of the sample and that etiology of unknown origin accounted for up to 14% of cases. Kroenke and Mangelsdorff (1989) studied the records of 1,000 patients from an internal medicine clinic, and noted that in those experiencing dizziness,

2% had probable psychological causes and 80% had unknown causes. In another investigation, Kroenke and his colleagues (1992) discovered that 16% of their outpatient sample of dizzy adults had psychological disorders as the primary cause, 1% had hyperventilation as the primary cause, and etiology was unknown in 8% of the sample. In research looking at 2,515 patients (mean age 48 years old) attending a dizziness unit, Nedzelski and colleagues (1986) noted that 21.1% had psychological causes for their dizziness and that 18.9% were "undiagnosed". Sloane and colleagues (1994) argued that 5.4% of their sample had psychological disorders as the primary cause of dizziness and 32.1% had psychological disorders as secondary causes, with anxiety disorders, depression, and adjustment reactions being the most common. Due to their results, these investigators concluded that psychological disorders are more common as contributing or modulating causes rather than as primary causes of dizziness. Sloane and Baloh (1989) discovered that 9% of dizzy complaints were caused by psychophysiologic disorders (i.e., anxiety and depression) and that in 14% of complaints no etiology could be determined. Taken as a whole, it appears that up to half of all cases of dizziness may actually involve somatization; that is, psychological disorders manifesting as the more acceptable complaint of dizziness (Drachman, 1998).

In addition to the etiological work that has been conducted on dizziness in general, there has been a large amount of theory and research devoted to discovering which factors lead to the various categories of dizziness. According to most experts, the first type of dizziness, dysequilibrium, is normally a result of either: cerebellar ataxia (due to, for example, cerebellum degeneration, or a tumor in or near the cerebellum)

(Samuels, 1984), Bruns (frontal lobe) apraxia of gait, a dorsal column or peripheral nerve sensory impairment, or impaired motor control (Drachman, 1994, 1998), found in patients with neurological disorders such as Parkinson's and Alzheimer's disease (Ross & Robinson, 1984).

Most researchers believe that presyncope, the second category, usually indicates that the entire brain is not being adequately supplied with blood and/or nutrients by the cardiovascular system (Drachman, 1998). As such, presyncope is most often caused by diminished cardiac output, arrhythmias, antihypertensive drugs, atherosclerosis, spondylosis, cervical arthritis, anemias, leukemias, thyroid disease, or hypoglycemia.

Vertigo can be either temporary or pathologic. Air, space, sea, and automobile travel may produce temporary, or "physiologic", vertigo. Vertigo caused by the abnormal stimuli of these modes of travel disappears immediately after leaving such vehicles (Ross & Robinson, 1984). This first form of vertigo frequently begins abruptly, is episodic (Baloh, 1992), and can be accompanied by nausea and vomiting, a feeling that the ears are blocked, and the threat of irreversible hearing loss (Drachman, 1998; Ross & Robinson, 1984). Pathologic vertigo is usually caused by disorders of the vestibular system, divided into peripheral causes (i.e., inner ear problems, problems at the end organs, or problems in the peripheral nerves) and central nervous system causes (i.e., problems in the cerebellum, brain stem, or projections to parts of the cerebral cortex) (Samuels, 1984). Examples of peripheral-type problems include Meniere's disease, labyrinthine drug toxicity, and benign positional vertigo. Central nervous system causes of vertigo include cerebrovascular disease, tumors, and herpes-zoster infections (Ross &

Robinson, 1984).

Lightheadedness, the last category of dizziness, may be a result of fractional or poorly described forms of the disorders that cause complaints of the other categories of dizziness (Drachman, 1998). Alternatively, lightheadedness can be due to multiple sensory deficits, anxiety or other psychological disorders, hyperventilation, or chronic systemic diseases (Drachman, 1998; Ross & Robinson, 1984). Overall, psychological factors are generally believed to be the most common cause of this type of dizziness (Hazlett et al., 1996).

Although there tends to be a consensus among researchers regarding which factors most frequently cause the different categories of dizziness, there are limitations to using this categorization system. First, in a large number of patients, anywhere from 12.5 to 52% (Davis, 1994; Drachman, 1994; Kroenke et al., 1992), more than one condition contributes to or causes the dizziness. The phenomenon of multiple causation makes research, diagnosis, and treatment of dizziness very challenging. Indeed, considerable comorbidity of physical and psychological disorders have been found in dizzy patients (Drachman, 1982; Yardley et al.,1998). For instance, there has been much research on the overlap of vestibular and psychological problems in dizzy sufferers (Clark, Hirsch, Smith, Furman, & Jacob, 1994; Eagger, Luxon, Davies, Coelho, & Ron, 1992; Furman & Jacob, 1997; Jacob, Furman, Durrant, & Turner, 1996; Simon, Pollack, Tuby, & Stern, 1998; Stein, Asmundson, Ireland, & Walker, 1994). In fact, psychological problems such as panic disorder have been found to be equally prevalent in dizzy patients with and without vestibular problems (Stein et al., 1994). This comorbidity often makes attempts

at distinguishing between medical and psychogenic causes futile. As opposed to single medical or psychological factors causing the symptoms, dizzy patients often exhibit chronic biopsychosocial syndromes, the result of various psychophysiological and somatopsychic processes (Clark, Sullivan, et al., 1994; Jacob, 1988; Jacob, Furman, & Balaban, 1996; Yardley & Hallam, 1996). This multiple causation tends to result in an overlap of categories being found in individuals (e.g., Kroenke et al., 1992; Grimby & Rosenhall, 1995; Sixt & Landahl, 1987; Sloane et al., 1994).

As the present report is mainly interested in associations between dizziness and anxiety, another limitation of using the four categories is particularly relevant. That is, although psychological problems are traditionally thought to occur mainly in patients with lightheadedness, many articles point to associations between psychological problems and the other categories of dizziness. Psychological factors have been associated with each of dysequilibrium, presyncope, and vertigo. Evidence of both psychogenic dysequilibrium and presyncope has been discussed in various studies (e.g., Clark, Sullivan, et al., 1994; Kroenke et al., 1992; Yardley, 1998). However, more research on this topic of psychogenesis has been conducted with vertigo (Afzelius et al., 1980; Drachman & Hart, 1972; Furman & Cass, 1999; Kroenke et al., 1992; Magnusson et al., 1977; Stein et al., 1994). In fact, according to Errera (1962) connections between vertigo and anxiety problems in particular have been noted as early as the eighteenth century. Overall, psychological causes of vertigo have been shown to be very prevalent, with various authors claiming that 30 to 50% of vertigo cases are actually psychogenic (Afzelius et al., 1980; Drachman & Hart, 1972; Williams & Corbin, 1962). The

important message for the present investigation is that individuals experiencing any of the four types of dizziness can potentially have psychological factors contributing to or causing their symptoms, thus emphasizing the often biopsychosocial nature of dizziness.

Importance of Dizziness in the Elderly

Dizziness is a very prevalent problem for people of all ages. A retrospective review of medical outpatient records that included both younger and older adults found that dizziness was the third most common new symptom reported by patients after chest pain and fatigue (Kroenke & Mangelsdorff, 1989). A subsequent study by the same research team (Kroenke et al., 1990), again including both younger and older adults, found that dizziness was the ninth most common presenting complaint in a group of medical out-patients, with 17% of patients reporting this symptom. However, dizziness is of special concern for the elderly because the prevalence of this problem increases with age. According to the National Center for Health Statistics (as cited in Sloane, Blazer, & George, 1989), dizziness is among the top three reasons why older individuals visit their family physicians, and is the fifth most common reason that they visit general internists. Moreover, for patients aged 75 and older dizziness becomes the most common presenting complaint (Koch & Smith, 1985). According to the literature, approximately one third of community-dwelling elderly individuals experience dizzy symptoms (Colledge et al., 1994; Grimby & Rosenhall, 1995; Sixt & Landahl, 1987; Sloane et al., 1989). Thus, studies to date suggest that the prevalence of dizziness in community elderly is double that found in younger samples. Please see Table 1 for the prevalence rates and nature of dizziness found in previous articles examining geriatric samples (Colledge et al., 1994;

Grimby & Rosenhall, 1995; Sixt & Landahl, 1987; Sloane & Baloh, 1989; Sloane et al., 1989, 1994).

Table 1 shows that the prevalence of dizziness in elderly community samples is quite consistent with approximately one third of participants complaining about this symptom. The prevalence of categories of dizziness are not as consistent. Dysequilibrium appears to occur most frequently. If the categories of environmental spinning and personal spinning are added up to derive a total vertigo frequency, vertigo appears to occur second most frequently. The categories of lightheadedness and dysequilibrium are endorsed somewhat less often. Interpretation of this data is complicated for a number of reasons. For one, not all categories of dizziness are assessed by all investigators, thereby limiting comparability among studies. For example, Colledge et al. (1994) do not investigate presyncope. Authors also tend to add categories that don't fit neatly into those four proposed by experts in the field. Examples include "feeling both lightheadedness and dysequilibrium", "feelings of unreality", "other symptoms", and "no description". Moreover, even when all categories are included, different names for these types of dizziness are used. For instance, although all of the authors measured frequency of a vertigo-type symptom(s), each called this symptom something different. Colledge et al. (1994) only used the term "vertigo". Each of Grimby and Rosenhall (1995), Sixt and Landahl (1987), and Sloane et al. (1994) on the other hand used two groupings for vertigo, but each research team used different terms to label these groups.

Using different labels begs the question of whether these authors are using

Table 1

Prevalence Rates and Nature of Dizziness in Community-Dwelling Elderly Samples

Variable	Study				
	Colledge et al.	Grimby & Rosenhall	Sixt & Landahl	Sloane & Baloh	Sloane et al.
Prevalence (%)	30	29	40 (women) 30 (men)		29.3
Categories (%)					
1)dysequil-ibrium	24	78	72 (women) 73 (men)	28	87.5
2)lightheaded	21	19	14 (women) 10 (men)		75.0
3)vertigo	32			42	
a) environment spinning		21	16 (women) 13 (men)		48.2
b) patient spinning		23	25 (women) 24 (men)		32.7
4)presyncope		14	20 (women) 16 (men)		30.9
5)lightheaded and dysequilibrium	18				
6) presyncopal lightheadedness				13	
7)feeling of unreality		9			
8)other symptoms/ no description	6			17	39.3

different definitions for their categories; that is, are these authors actually referring to and reporting on the same symptoms as one another? Colledge et al. (1994) report employing a questionnaire to obtain a description of the dizziness, but only report the names and not the descriptions of the categories used. Sloane et al. (1994) state using a standardized dizziness history form, but again only report the names of dizziness categories. Sixt and Landahl (1987) merely mention that dizziness was separated into five groups via an interview. Grimby and Rosenhall (1995) asked questions about the nature of dizziness in a medical examination, but again no description of what is meant by the different categories of dizziness is provided for the reader. Since none of these authors provide definitions for their categories, there is no way of knowing whether these authors are interested in and are measuring the same categories of dizziness. Thus, although four main categories of dizziness have been proposed and indeed are used by researchers, these types of dizziness appear to be defined and used differently by various investigators, thereby limiting their utility in research and practice. Previous studies have also examined the frequency of dizziness, associated symptoms, and provoking factors. Table 2 reveals the frequency of dizziness, duration of dizzy spells, and total duration of symptoms discovered in past research with older adults (Colledge et al., 1994; Grimby & Rosenhall, 1995; Sixt & Landahl, 1987; Sloane & Baloh, 1989; Sloane et al., 1989). As can be seen from the table, the frequency of dizziness varies from experienced constantly to once or twice a year. The studies differed, however, in the percentages of participants found in each of these categories. Whereas Colledge et al. (1994) found that 18% experienced symptoms at least daily, Grimby and Rosenhall (1995) and Sixt and Landahl

(1987) discovered that approximately 33% of their participants experienced symptoms at least this frequently. Sloane and Baloh (1989) and Sloane et al. (1994) noted even higher frequencies, with 41.1% of their sample experiencing symptoms constantly. Because Sloane and colleagues simply cited the rest of symptoms occurring in "attacks" or as "episodic", it is difficult to know whether most of these attacks occurred daily, weekly, or less often. Overall, about a third of older adults living in the community appear to be bothered by dizziness constantly or at least daily, with another third experiencing symptoms weekly or monthly, and a final third suffering from dizziness less often. These numbers reinforce the importance of further studying the common problem of dizziness in the elderly. Only Colledge et al. (1994) reported findings on the duration of dizzy spells (see Table 2). These authors conclude that a substantial number, 15%, of dizzy spells last approximately an hour or more. About 40% of spells last from a minute to several minutes, and nearly 50% experience spells lasting several seconds. As Colledge et al.'s was the only study that investigated the length of spells, more work is clearly needed with other geriatric populations. From Table 2, research on the total duration of dizziness symptoms concludes that over 50% of older adults have experienced symptoms for at least 2 to 10 years. Another third of individuals sampled have experienced symptoms for 6 months up to 2 years. These numbers indicate that most older adults have suffered from this problem for a significant length of time, further emphasizing the importance of this symptom in this age group.

Past studies have examined symptoms frequently associated with dizziness as well as the factors that often provoke dizziness. Table 3 reveals the findings on these

factors in community-dwelling seniors from the literature to date (Colledge et al., 1994; Grimby & Rosenhall, 1995; Sixt & Landahl, 1987; Sloane et al., 1989). The associated symptoms that appear to be most important in older adults are breathlessness, nausea, headache, tinnitus, and falls (see Table 3). However, since different authors have explored slightly different associated symptoms, not a lot of overlapping data exists to date on the nature of associated symptoms in dizzy older adults. As such, the limitations of interpreting such scarce data must be acknowledged. Studies of the elderly indicate that many factors seem to provoke dizziness. Bending over and rising from lying to standing both provoke dizziness in over 40% of dizzy seniors. Turning one's head, looking up, tilting one's head, and walking each tend to provoke dizziness in approximately 20 to 30% of older adults. Sitting and lying provoke symptoms of dizziness in far fewer individuals. Thus, it appears that certain factors are more dizzy-provoking than are others. As with the research on associated symptoms, the data conducted so far on factors provoking dizziness has been quite limited, with some factors only being examined in one geriatric study to date. More research must be conducted on both symptoms associated with dizziness and factors provoking this symptom. Overall, the comparatively small amount of literature on geriatric dizziness reveals the importance and severity of this symptom in community-dwelling older adults, and emphasizes the need for further research.

Problems Associated with Dizziness in the Elderly

Medical Problems. In addition to the high prevalence and severity of dizziness found to date in geriatric samples, older adults suffering from dizziness have also been

Table 2

Frequency of Dizziness, Duration of Dizzy Spells, and Total Duration of Symptoms in Community-Dwelling Elderly Samples

Variable	Study				
	Colledge et al.	Grimby & Rosenhall	Sixt & Landahl	Sloane & Baloh	Sloane et al.
Frequency (%)					
a)constant	6		5 (women) 5 (men)	40 ("continuous")	41.1 ("continuous")
b)daily	12	32	27 (women) 31 (men)	60 ("episodic")	58.9 ("attacks")
c)weekly	9	27	27 (women) 27 (men)		
d)monthly	8	32 ("seldom")	28 (women) 25 (men)		
e)< monthly	21				
f)once or twice/year	32		10 (women) 13 (men)		
Duration of spells (%)					
a)seconds	47				
b)< minute	16				
c)several minutes	22				
d)< hour	8				
e)> hour	6				
Total Duration (%)					
a)< 1 or 2 months	5	8	4 (women) 4 (men)	16	
b)1 or 2-6 months	14	5	9 (women) 13 (men)	32 (2-12 mo)	
c)6 months-2 years	36	28	27 (women) 33 (men)		
d)2-10 years	28	44	38 (women) 34 (men)	40 (1-5 yrs)	
e)> 10 years	16	15	20 (women) 16 (men)	12 (> 5 yrs)	

Table 3

Associated Symptoms and Provoking Factors of Dizziness in Community-Dwelling Elderly Samples

Variable	Study			
	Colledge et al.	Grimby & Rosenhall	Sixt & Landahl	Sloane et al.
Associated symptoms (%)				
a)chest pain	4			
b)breathless	20			
c)nausea	17	11	8 (women) 2 (men)	
d)headache	18	6	10 (women) 3 (men)	
e)tinnitus	22	8	5 (women) 1 (men)	
f)fall	10	32		
g)blurred vision		7	3 (women) 4 (men)	
h)loss of muscular strength		7	5 (women) 3 (men)	
i)hearing loss		6	3 (women) 1 (men)	
j)double vision			2 (women) 2 (men)	
Provoking factors (%)				
a)bending over	42			
b)rising from lying to standing	42	45	44 (women) 52 (men)	
c)turning head	29	21	28 (women) 22 (men)	
d)looking up	29			
e)walking	15		40 (women) 38 (men)	
f)tilting head		18	25 (women) 19 (men)	
g)sitting		7	7 (women) 2 (men)	
h)lying		5		

found to experience significantly more physical health problems than their non-dizzy counterparts. Grimby and Rosenhall (1995) discovered that as the number of medical diagnoses increased the proportion of participants with dizziness also increased. Participants with dizziness had an average of 2.7 diagnoses whereas those without dizziness had a significantly lower average of 1.7 diagnoses. These researchers learned that elderly individuals with dizziness were more likely to suffer from locomotor disorders (i.e., disorders in knee, hip, upper extremities, and the spinal cord), angina, urinary incontinence, and stroke or paresis (Grimby & Rosenhall, 1995). Moreover, individuals with self-perceived bad health were more likely to be dizzy than to be not dizzy. Grimby and Rosenhall also discovered sex differences in the dizzy group, with women being more likely to suffer from back pain and joint disorders, but men being more likely to suffer from cardiovascular disease and more severe ill health overall.

Sloane and his colleagues (1989) noted strong associations between dizziness and several neurosensory symptoms, including history of a neurologic disease, trouble walking, numbness in extremities, and poor vision. These investigators also found significant associations between dizziness and several cardiovascular variables, such as current cardiac disease, a past history of stroke, a history of arteriosclerosis, and current hypertension. Similarly, Colledge and her colleagues (1994) reported significantly more ischaemic heart disease and current anti-hypertensive therapy in dizzy participants. As stated earlier, other symptoms commonly associated with dizziness include breathlessness (Colledge et al., 1994), headache, nausea, tinnitus (Colledge et al., 1994; Grimby & Rosenhall, 1995; Sixt & Landahl, 1987) sudden loss of muscular strength,

hearing loss, blurred vision, and double vision (Grimby & Rosenhall, 1995; Sixt & Landahl, 1987). Medications have also been found to be highly associated with dizziness. Grimby and Rosenhall (1995) observed that dizzy individuals consumed significantly more drugs than did non-dizzy individuals, and that dizzy women consumed significantly more drugs than did men. As in Grimby and Rosenhall's study, Sloane and colleagues also discovered significant associations between dizziness and several measures of drug use.

Another problem often associated with dizziness is risk for falling (Venna, 1986). Grimby and Rosenhall (1995) observed that 32% of dizzy participants reported falls, which was higher than the percent reported by non-dizzy participants. Colledge and colleagues (1994) noted that 10% of their elderly participants had fallen while dizzy. Further, Sixt and Landahl (1987) discovered that about 20% of their sample had fallen as a result of dizziness. Falls are extremely important for elderly individuals because they can cause physical injury or even death, and result in disabling loss of confidence and independence for the individual (Campbell, Reinken, Allan, & Martinez, 1981; Nevitt, Cummings, Kidd, & Black, 1989; Prudham & Evans, 1981; Venna, 1986). In fact, for individuals age 75 years and older, falls are the leading cause of death by injury in the United States (Baker, O'Neill, & Karpf, 1984). Moreover, falls are often a factor in the decision to place an elderly individual in a nursing home (Smallegan, 1983). Finally, Burker and colleagues (1995) found that 47% of elderly individuals with chronic dizziness express fear of falling, whereas only 3% of controls indicate having this fear.

Psychological Problems.

Psychological issues affecting dizzy persons are important to consider for a number of reasons. First, as mentioned above, psychological problems are often contributing factors in dizziness cases. Second, elderly dizzy patients experience much more psychological distress than non-dizzy elderly individuals (Sloane et al., 1994). Various authors have commented on the many associations that have been found between dizziness and different psychological disorders. Researchers have noted somatopsychic consequences of dizziness such as anxiety (Drachman, 1998), panic attacks (Pratt & McKenzie, 1958), fear of going out alone (Levy & O'Leary, 1947), worry about dizziness interfering with one's occupation (Haye & Quist-Hanssen, 1976; Nobbs, 1987), feelings of unreality and depersonalization (Grigsby & Johnston, 1989), and depression (Drachman, 1998). For instance, Sloane and colleagues (1989) found strong associations between dizziness and both self-perceived nervousness and depressive symptoms. Grimby and Rosenhall (1995) discovered that anxiety was significantly correlated with the frequency of dizziness in men and the presence and duration of dizziness in both men and women. In addition, these researchers found that dizziness was significantly correlated with nervousness and depression in men. More research on both anxiety and depressive problems is needed with dizzy older adults.

Dizziness has been found to exert a detrimental influence on many areas of quality of life and activities of daily living in older individuals (Clark et al., 1993; Grimby & Rosenhall, 1995; Whitney, Hudak, & Marchetti, 1999). Dizzy individuals have reported more problems than non-dizzy persons with various dimensions of quality of life, such as lack of energy, pain, emotional disturbance, sleep, social isolation, and

physical mobility (Grimby & Rosenhall, 1995). Dizzy individuals also experience more problems with household activities, hobbies, and holidays. Moreover, both Grimby and Rosenhall (1995) and Sixt and Landahl (1987) observed that about one-third of dizzy individuals reported dizziness to be an obstacle for their everyday activities. Not only was the use of walking-aids and transport for the handicapped more common among dizzy individuals (Sixt & Landahl, 1987), but Grimby and Rosenhall (1995) found that individuals' reported ability to walk without sticks or other walking aids was also lower in dizzy participants. This experience of decreased functional independence may contribute to the finding that dizzy seniors are more likely to have self-perceived bad health than are their non-dizzy counterparts (Grimby & Rosenhall, 1995). Another consequence of lessened functional ability is often that dizzy patients begin restricting their daily activities, travel, and social commitments in the hope that such restricted living may reduce the risk of provoking dizziness symptoms and the social embarrassment and stigma that can accompany dizziness (Yardley, Todd, Lacoudraye-Harter, & Ingham, 1992). Seniors may develop secondary agoraphobia, thereby further limiting their everyday activities by actually avoiding certain situations and places in which they fear their dizziness may lead to embarrassment (Furman & Jacob, 1997). Further research is needed to more fully examine the relationships between dizziness and both functional ability and perceived health in seniors.

According to Clark and colleagues (1993), regardless of the presence of a medical disorder, dizzy symptoms are more disabling when the individual has a psychological disorder. Moreover, Stein and associates (1994) learned that dizzy individuals with

psychological disorders considered themselves to be significantly more handicapped than those without any psychological problems. That is, the presence of psychological disorders is more strongly associated with both decrements in physical and role functioning and adverse perceptions of general and mental health than is the presence of medical disorders. These findings concur with those of other researchers that elderly patients' psychological problems greatly influence their dizzy symptoms and their responses to the dizziness (Burker et al., 1995). For instance, Sloane and colleagues (1989) believe that the psychological problems affecting some dizzy persons increase these individuals' awareness of feelings of disorientation and dizziness (Sloane et al., 1989). Moreover, Hallam and Hinchcliffe (1991) observed that psychological problems such as anxiety influence the reporting of dizziness symptoms. These authors concluded that symptoms of dizziness create more severe problems for those already disposed (due to psychological factors) to find the symptoms distressing. Other than psychiatric disorders, other types of psychological factors that may influence the impact a person's dizziness will have on his or her life include personality characteristics such as trait anxiety (Eagger et al., 1992; Hallam & Hinchcliffe, 1991; Yardley, Masson, Verschuur, Luxon, & Haacke, 1992), cognitions about the significance and consequences of the dizziness (Yardley, 1994a), and the use of coping strategies (Yardley, 1994b).

Researchers have found interesting relationships between psychological variables, complaints of dizziness, and objective assessments of dizziness. Anxiety is more closely related to individuals' complaints of dizziness than to objective assessments of imbalance (Hallam & Stephens, 1985). In other words, subjective experience (i.e., the intensity of

the reported dizziness) and the objective or organic severity of the dizziness are not strongly related (Hallam & Stephens, 1985; O'Connor, Hallam, Beyts, & Hinchcliffe, 1988). Relatedly, Clark, Sullivan, and colleagues (1994) determined that autonomic and psychiatric factors were more useful than dizziness symptoms in diagnosing causes of dizziness. Patients who are anxious about their dizziness are often very preoccupied with the fear of either being unable to cope in public (and the subsequent social embarrassment that this would cause) or else the possibility of serious medical illness underlying the dizziness. The aversiveness that patients report with respect to their dizziness may have as much to do with the meaning or implication of the attack - that is, their anxiety about the attack - as with the physical sensations themselves (Beyts, 1987; Hallam & Stephens, 1985). The above findings citing the magnitude of psychological problems and the influence of psychological variables on the experiences of dizzy patients stress the importance of further research on psychosocial issues with dizzy individuals.

Importance of Anxiety

As mentioned earlier, dizziness is often associated with anxiety (Downton & Andrews, 1990; Hallam & Stephens, 1985; Yardley, Masson, et al., 1992; Yardley, Verschuur, Masson, Luxon, & Haacke, 1992). In fact, Errera (1962) has pointed out that in the late eighteenth century, phobias were termed "vertige hysterique" or "vertige hypochondriaque" (hysterical or hypochondriacal vertigo), stressing the idea that dizziness was a defining symptom of cases of anxiety. Indeed, in terms of the various psychological problems that have been found to be associated with dizziness, anxiety

may be of special interest since patients' complaints of dizziness have been found to be specifically associated with anxiety much more so than with other psychological disorders such as depression. Indeed, some experts point out that the experiences of dizziness and anxiety are often indecipherable (Beyts, 1987; Hallam & Stephens, 1985). Some studies have discovered signs of abnormal vestibular functioning in patients with anxiety disorders (e.g., Jacob, Furman, Durrant, et al., 1996), and others have found that dizziness is often associated with increased levels of anxiety and emotional problems (Yardley & Hallam, 1996).

Using the most current psychological diagnostic terminology, Sloane and colleagues (1994) found that the most common cause of psychogenic dizziness in a group of older adults visiting a dizziness clinic was panic disorder and other related anxiety disorders. Moreover, these authors discovered that not only were the anxiety disorders the most common primary psychological causes of dizziness, but that they were also the most common secondary psychological causes. Depression, adjustment reactions, and conversion disorder accounted for smaller numbers of dizziness cases. Another group of researchers (Simpson, Nedzelski, Barber, & Thomas, 1988) found that 94% of the patients in their study with psychogenic dizziness had anxiety disorders. Seventy-six percent of these individuals had a panic disorder or agoraphobia diagnosis, 24% had other phobias, and 6% had generalized anxiety disorder. In contrast to the high numbers of anxiety diagnoses, only 18% of these dizzy patients had a depressive disorder. Further pointing to the importance of the relationship between anxiety and dizziness, a review by Simon and colleagues (1998) states that rates of panic disorder in dizzy patients range

from 14.9% to 41%, which is 5 to 15 times higher than the rate normally observed in the general population (Stein et al., 1994; Clark, Hirsch, et al., 1994; Frommberger, Tettenborn, Butler, & Benkert, 1994; Eagger et al., 1992; Kessler et al., 1994). Moreover, researchers have discovered a link between dizziness and both anxious and neurotic personality traits (Hallam & Stephens, 1985). Thus, the evidence to date suggests that complaints of dizziness with psychological etiologies may not be due to general emotional distress so much as anxiety problems in particular (Hallam & Stephens, 1985).

The relationship between dizziness and anxiety is biopsychosocial and hence causation is often bi-directional in nature. That is, not only may persons who experience anxiety subsequently become dizzy but, alternately, persons who experience dizziness may subsequently become anxious. Further, anxiety and dizziness may reciprocally influence one another, so that the extent of the impact of either factor on the individual may be difficult to determine (Yardley, Masson, et al., 1992; Yardley, Verschuur, et al., 1992). Also, it is important to note that dizziness and anxiety may merely be comorbid in some cases. For instance, Drachman and Hart (1972) found that some of their dizzy participants had a variety of comorbid psychological problems, including anxiety disorders, that were neither the cause nor the result of their dizziness.

Since the present article stresses the circularity of the relationship between dizziness and anxiety, it holds that causality can occur in either direction. Despite the bi-directionality of the relationship, individual articles tend to focus on a single direction of causality. Many articles have discussed cases of dizziness causing feelings of anxiety, a

process which involves "somatopsychic" mechanisms. Patients with dizziness symptoms may mis-interpret internal stimuli (e.g., vestibular dysfunction) as implying immediate physical danger (Clark, 1993; Clark, Hirsch, et al., 1994; Jacob, 1988; Jacob, Furman, Clark, & Durrant, 1992; Lilienfeld, Jacob, & Furman, 1989). Once the individual's sensitivity to vestibular sensations becomes heightened, feelings of anxiety also increase, and the process of conditioning can lead to the development of panic disorder (Eagger et al., 1992; Sullivan et al., 1993; Pratt & McKenzie, 1958). The interpretation of symptoms as catastrophic may be more likely in individuals predisposed for developing anxiety disorders (e.g., having a family history of panic disorder). Through interoceptive conditioning, panic disorder can persist even after the original vestibular disorder has been treated, since non-vestibular physical sensations can begin to trigger feelings of panic (Davey, 1992). Moreover, agoraphobic behaviors may also persist after treatment of vestibular disorder because successful avoidance of situations that previously provoked dizziness prevents the unlearning of avoidance behaviors (Jacob & Rapport, 1984). As a specific example supporting the somatopsychic model, Sloane and colleagues (1994) concluded from their study of older dizzy patients that psychological problems such as anxiety disorders are rare as primary causes of dizziness in the elderly but are common as contributing or modulating factors. In other words, these authors believe that psychological problems usually appear only after the onset of dizziness, and affect only pre-existing dizziness, by increasing the individual's awareness of bodily sensations (Sloane et al., 1994). Another specific study (Drachman & Hart, 1972) pointed out a different reason for the somatopsychic relationship that sometimes occurs

between dizziness and anxiety. In Drachman and Hart's investigation, some patients developed secondary psychological reactions (including symptoms of anxiety) to their dizzy symptoms in reaction to the long-standing disability produced by their dizziness.

Another major way in which dizziness and anxiety have been talked about is when anxiety problems lead to symptoms of dizziness via "psychosomatic" mechanisms. There are two main ways of thinking about psychosomatic processes involving anxiety and dizziness: increased awareness by anxious patients of very minor, normal sensations of disorientation, which become labeled as dizziness; and dizziness resulting from increased physiological arousal or hyperventilation associated with anxiety (Yardley, Todd, et al., 1992; Yardley & Putman, 1992). Before discussing these two main mechanisms however, it is important to realize that many anxious patients who show somatic symptoms such as dizziness may not be at all aware on a conscious level that they are indeed anxious. According to Yardley (1998), anxiety can be divided into three separate elements: a behavioral or motor response, a psychophysiological state of heightened arousal, and a "cognitive" element. The first element can include either "freezing" or attempts to escape or avoid the cause of the anxiety. The second element, which involves increased sympathetic autonomic nervous system activity, is often called the "fight or flight" reaction since it is presumed to facilitate the behavioral response. Finally, the third element involves conscious awareness of fear and anxiety-provoking thoughts. These three elements of anxiety are considered partially independent, so that it is possible to show psychophysiological signs of anxiety without conscious awareness of fear (Yardley, 1998). Explained in another way, Schur (1955) discusses the difference

between anxiety concomitants and anxiety equivalents. Anxiety concomitants are thought to be 'discharge phenomena' (i.e., any of the symptoms of anxiety mentioned above) that coincide with a conscious awareness of feelings of anxiety. Alternately, anxiety equivalents are discharge phenomena that involve only conscious awareness of the discharge phenomena themselves and no awareness of feelings of anxiety or fear. Thus, it is thought that many anxious individuals who experience dizziness are not aware that the origin of their symptoms are psychological.

The first main way in which anxiety is thought to relate to dizziness stresses that, although many normal people experience mild feelings of dizziness from time to time, most of these individuals ignore such common, everyday inner sensations. However, some individuals, such as those suffering from anxiety disorders, can become quite bothered by these sensations. Anxious individuals are often hyper-vigilant, constantly monitoring both their environments for signs of threat and their own bodies for physical symptoms, including dizziness, which they interpret as signs of impending bodily harm (Anderson et al., 1995). Such anxiety with associated dizziness symptoms can be either chronic, involving constant heightened awareness of internal and external environments, or can be acute, occurring as panic attacks (Sullivan et al., 1993). Either way, mild internal sensations become labeled as dizziness and catastrophized by the individual.

The second way of understanding the psychosomatic relationship between anxiety and dizziness involves the increased physiological arousal or hyperventilation that is associated with anxiety, which then causes dizziness. Hyperventilation syndrome, which according to Sullivan and colleagues (1993) is now believed to be synonymous with

panic disorder, is a major cause of dizziness (e.g., see Drachman & Hart, 1972). Hyperventilation syndrome can be defined as hyperventilation accompanied by an array of highly variable symptoms, usually caused by psychological problems (Brashear, 1984; Drachman & Hart, 1972). Hyperventilation acts to lower the carbon dioxide content of the blood, producing constriction of the cerebrovasculature and thereby increasing vestibuloocular reflex sensitivity and the symptom of dizziness. Interestingly, even normal participants can significantly drop their blood carbon dioxide levels within minutes by hyperventilating. And once a low level of blood carbon dioxide is achieved, individuals do not have to continue to hyperventilate in order to maintain these levels. Therefore it is possible to have chronically low levels of carbon dioxide in the blood without appearing to hyperventilate (Bass & Gardner, 1985). Symptoms resulting from hyperventilation include: general symptoms (exhaustion, weakness, fatigue, irritability); neurologic (dizziness, faintness, headaches, unsteadiness, impaired concentration/memory, paresthesias/numbness); cardiovascular (tachycardia, palpitations, chest pains); respiratory (dyspnea, frequent sighing, breathlessness); gastrointestinal (dry mouth, globus hystericus, bloating, belching, flatulence, dysphagia, epigastric pain); musculoskeletal (tremors, tetany, carpopedal spasms, myalgias, arthralgias); and psychological (anxiety, nervousness, apprehension) (Rice, 1950; Missri & Alexander, 1978). The frequency of these symptoms is quite variable depending on the population examined (Yu, Yim, & Stanfield, 1959). Interestingly, the symptom of dizziness, although part of the symptom complex of hyperventilation syndrome in most patients, can be overshadowed in many cases by one or more of the other symptoms listed above

(Reilly, 1991).

Dizziness that is a result of anxiety or other psychological disorders, discussed earlier as psychogenic dizziness, can be defined as occurring exclusively in combination with other symptoms as part of a recognized psychological symptom cluster. Further, this symptom cluster cannot itself be related to vestibular dysfunction (Jacob, Furman, & Balaban, 1996). Of all the psychological disorders, anxiety disorders seem to be most relevant with regard to this definition. Indeed, only panic disorder includes dizziness in its list of characteristics; however, psychogenic dizziness may also be part of the symptom cluster of other anxiety disorders (e.g., generalized anxiety disorder (Furman & Jacob, 1997). Even in cases where hyperventilation is not involved, anxious patients complaining of dizziness often manifest other somatic symptoms, such as tachycardia, palpitations, flushing, and tremulousness (Drachman, 1982).

A popular instrument that taps into the major biopsychosocial symptoms of anxiety is the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988). This questionnaire has been subjected to factor analysis in various reports in the literature. One study conducted by Wetherell and Arean (1997) looked at the psychometric properties of the BAI when conducted with older medical patients. These researchers found that a four factor solution was a good fit with their sample. Important for the present discussion about dizziness, one of the derived subscales, the neuromotor subscale, contained a group of symptoms including dizziness and related neurological symptoms. Since psychogenic dizziness is often found to be part of a psychological symptom cluster, whether or not hyperventilation accompanies the anxiety, the BAI becomes a relevant

instrument to consider when conducting a dizziness study with older medical patients. Moreover, each of the four BAI subscales contain many of the symptoms typically found in hyperventilation syndrome and anxiety problems.

Research Questions

Dizziness is a major problem both in terms of the sheer numbers of older individuals affected and the negative consequences dizzy symptoms can have on these individual's lives. However, research to date has been conducted primarily with a particular group of seniors, those living in the community (see Colledge et al., 1994; Grimby & Rosenhall, 1995; Sixt & Landahl, 1987; Sloane et al., 1989). Older adults suffering from multiple and serious medical problems, forcing them to be hospital inpatients, have not been studied. The prevalence and characteristics of dizziness in such patients could well differ from that of their more healthy peers. As such, one of the major purposes of the present investigation was to develop a tool to examine dizziness prevalence and symptomatology. The Dizziness Questionnaire (DQ) was used to determine the prevalence of dizziness symptoms in elderly patients who were undergoing rehabilitation within the Geriatric Assessment and Rehabilitation Program (GARP) at the Rockyview General Hospital. The DQ also determined the nature of symptoms of dizziness, associated symptoms, precipitating factors, frequency of symptoms, duration of dizzy spells, and total duration of dizzy spells. As the DQ itself has not been used in previous research, the instrument's reliability was assessed.

As discussed earlier, previous researchers have found a strong relationship between dizziness and anxiety in young and middle-aged adults, with very little research

being conducted with older adults. Since anxiety in older adults is a neglected topic of study, the relative lack of studies in the literature on the relationship between geriatric dizziness and anxiety becomes even more problematic (Sloane et al., 1994). The central tenet of this study was that many cases of geriatric dizziness would be associated with anxiety, regardless of whether or not patient and physician recognize that anxiety is present. Therefore the relationship between dizziness and anxiety in geriatric patients enrolled in the GARP program was investigated. The primary research hypothesis was that those individuals experiencing dizziness would be, on average, more anxious than those not experiencing dizziness. Dizziness was measured by a Dizziness Questionnaire (DQ) and anxiety was measured by the BAI (Beck et al., 1988).

The BAI has been factor analyzed when used with various populations in previous research, and has been found to have a cognitive factor and from one to four somatic-type factors. However, the BAI has often been found in the literature to have a four-factor structure when conducted with older adult inpatients, consisting of cognitive, autonomic, neuromotor, and panic subscales (e.g., Wetherell & Arean, 1997). The cognitive subscale includes the following items: "unable to relax", "fear of the worst happening", "terrified", "nervous", "fear of losing control", "fear of dying", and "scared". The autonomic subscale consists of the items "unable to relax", "feeling hot", "indigestion or discomfort in abdomen", "face flushed", and "sweating (not due to heat)". The neuromotor subscale includes questions about "numbness or tingling", "wobbliness in legs", "dizzy or lightheaded", "unsteady", "hands trembling", "shaky", and "faint". Finally, the panic subscale includes the items "heart pounding or racing", "feelings of choking", and

"difficulty breathing". As with anxiety in general, dizziness was also expected to be related to each of the symptom clusters of anxiety found in the four subscales. Although no specific hypotheses regarding differences in strength of relationships between dizziness and individual subscales could be put forward, dizziness could well have been more strongly related to certain subscales (e.g., neuromotor subscale) than to others.

Because another major psychological problem, depression, is also commonly related to dizziness (e.g., see Furman & Jacob, 1997), the relationship between dizziness and depression was also investigated. The second major research hypothesis was that dizzy patients would on average be more depressed than non-dizzy patients. Depression was assessed by the Geriatric Depression Scale - Short Form (GDS-SF; Sheikh & Yesavage, 1986), which is routinely administered to patients in the GARP program. In addition, this study investigated the relationships between dizziness and perceived physical and mental health, as perceived health has been found to be related to dizziness in older adults in previous studies (Grimby & Rosenhall, 1995). The third major research hypothesis was that, on average, patients with dizziness would perceive both their physical and mental health to be worse than would patients without dizziness. Perceived health was assessed by the Medical Outcomes Study Short-Form Health Survey (SF-36; Ware & Sherbourne, 1992). Finally, the relationship between dizziness and functional independence was determined, since previous studies have found dizziness to significantly affect functional ability (Clark et al., 1993; Grimby & Rosenhall, 1995; Sixt & Landahl, 1987; Whitney et al., 1999). The forth major research hypothesis was that those with dizziness would have lower functional independence than would those without

dizziness. Functional independence is routinely assessed in the GARP program using the Functional Autonomy Measurement System (SMAF; Hebert, Carrier, & Bilodeau, 1988). The relationship between dizziness and relevant demographic information as well as medical history and medications being taken was also assessed in all patients.

In summary, the primary research question proposed that dizzy individuals would be more anxious than non-dizzy individuals. The second major research question hypothesized that dizzy patients would be more depressed than non-dizzy patients. The third major research question suggested that patients with dizziness would perceive both their physical and mental health to be worse than those patients without dizziness. Finally, the forth major research question hypothesized that those with dizziness would have lower functional independence than would those without dizziness.

Method

Participants

Participants were elderly patients who were undergoing rehabilitation within the Geriatric Assessment and Rehabilitation Program (GARP) at the Rockyview General Hospital. The Seniors' Health (Acute Care) Program (SHAC) at the Rockyview General Hospital has 50 beds allocated to assessment and rehabilitation. Elderly patients with multiple medical problems and/or functional changes which require further investigation are eligible for admission. The average length of stay for patients is 30 days for those discharged to the community and 71 days for those discharged to continuing care. Involvement in the study was voluntary and formal consent was obtained from all participants. A copy of the consent form used in this study can be found in Appendix A.

Measures

Dizziness Questionnaire (DQ). The DQ was developed for the present study and includes questions on the nature of symptoms, total duration of symptoms, frequency of dizziness, duration of dizzy spells, associated symptoms, precipitating symptoms, and other related items. All responses required simple yes/no answers or else choice of five or so answers. In addition, some items provided opportunity for further verbal expansion of yes/no answers. Individuals were considered to endorse any one of the four categories of dizziness if they answered affirmatively to at least one relevant symptom item. For dysequilibrium, the items "feel at risk for falling", "feel a fear of falling", "tendency to fall", and "loss of balance when walking" were used to determine whether or not a participant experienced symptoms representing this category. The items "blacking out" and "loss of consciousness" were used to indicate the presyncope category. Vertigo was determined via the items "swimming sensation in the head", "objects spinning or turning around you", and "sensation that you are turning or spinning inside". The item asking about "lightheadedness" determined that an individual had experienced symptoms in this last category of dizziness. A copy of the DQ can be found in Appendix B.

Beck Anxiety Inventory (BAI). The BAI (Beck et al., 1988) is a 21-item self-report questionnaire that assesses common symptoms of anxiety. Respondents rate on a four-point scale the degree to which they have been bothered by each symptom over the past week, from 0 (*not at all*) to 3 (severely, I could barely stand it). Scores range between 0 and 63, with higher scores indicating greater symptom severity. Excellent reliability (e.g., Beck et al., 1988; Fydrich, Dowdall, & Chambless, 1992; Kabacoff,

Segal, Hersen, & Van Hasselt, 1997) and moderate (e.g., Beck & Steer, 1991; Kabacoff et al., 1997) to high (e.g., Steer, Ranieri, Beck, & Clark, 1993) validity have been reported. Exploratory factor analyses have found a cognitive factor and from one to four somatic-type factors (Beck et al., 1988; Beck, Steer, & Beck, 1993; Borden, Peterson, & Jackson, 1991; Cox, Cohen, Direnfeld, & Swinson, 1996; Hewitt & Norton, 1993; Kabacoff et al., 1997; Kumar, Steer, & Beck, 1993; Osman, Barrios, Aukes, Osman, & Markway, 1993; Steer, Ranieri, et al., 1993; Steer, Rissmiller, Ranieri, & Beck, 1993; Wetherell & Arean, 1997). A copy of the BAI can be found in Appendix C.

Geriatric Depression Scale - Short Form (GDS-SF). The GDS-SF (Sheikh & Yesavage, 1986) is a shorter version of the original GDS (GDS-LF), and is a self-rating questionnaire designed to measure symptoms of depression in the elderly. The GDS-SF consists of 15 items in a yes/no format, 10 of which indicate the presence of depression when answered positively, and 5 of which indicate depression when answered negatively (Sheikh & Yesavage, 1986). The GDS-LF has been shown to have acceptable reliability and validity (Laprise & Vezina, 1998). Validation studies have shown that the GDS-SF is highly correlated with the GDS-LF, and that the GDS-SF successfully screens for depression and thus can be used as an adequate substitute for the GDS-LF (Burke, Roccaforte, & Wengel, 1991; Herrmann et al., 1996; Lesher & Berryhill, 1994; Sheikh & Yesavage, 1986). A copy of the GDS can be found in Appendix D.

Medical Outcomes Study Short-Form Health Survey (SF-36). The SF-36 (Ware & Sherbourne, 1992) is a multi-purpose survey of general health status and outcomes, and is one of the most widely used general health measures administered to geriatric

patients. The SF-36 is a short form including 36 questions that measure eight health concepts. The questionnaire is scored from 0 to 100, with higher scores indicating better health, and can be scored as an eight-scale profile or summary physical and mental health measures. The SF-36 takes 5 to 10 minutes to conduct, and can be administered by interviewer, computer, or self-administered. Validity and reliability have been established in both general population samples and specific populations such as groups with heart disease, chronic lung problems, diabetes, hypertension, osteoarthritis, and major depression. Factor analyses of the eight scales have consistently identified two factors, interpreted as "physical" (including the following scales: physical functioning, role-physical, bodily pain, and general health) and "mental" (including the following scales: vitality, social functioning, role-emotional, and mental health) dimensions of health (Hays, Wells, Sherbourne, Rogers, & Spritzer, 1995; Stewart et al., 1989; Stewart, Hays, & Ware, 1988; Ware & Sherbourne, 1992; Ware, Snow, Kosinski, & Gandek, 1993; Wells et al., 1989). A copy of the SF-36 can be found in Appendix E.

Functional Autonomy Measurement System (SMAF). The SMAF (Hebert et al., 1988) was developed to assess the needs of the elderly and the handicapped with regard to functional ability. The SMAF consists of 29 items which are each scored on a four-point scale to indicate level of disability, from complete autonomy (0) to total dependence (-3). Scores range between 0 and -87, with lower scores indicating greater dependence. The measure covers five areas of functional ability: Activities of daily living (ADL, 7 items), mobility (6 items), communication (3 items), mental functions (5 items), and instrumental activities of daily living (IADL, 8 items). Resources available to

compensate for the disability are also evaluated for each item, thus producing a handicap score. The handicap score also has scoring ranging from 0 to -87. Both validity and inter-observer reliability are high (Hebert et al., 1988). A copy of the SMAF can be found in Appendix F.

Mini-Mental Status Examination (MMSE). The MMSE (Folstein, Folstein, & McHugh, 1975) is a popular structured mental status examination that focuses on cognitive impairment. The MMSE includes 11 items that assess orientation, registration, attention, calculation, and language. Scores range from 0 to 30, with lower scores indicating greater impairment. This instrument has excellent inter-rater and test-retest reliabilities, and correlates with Wechsler Adult Intelligence Scale IQs (Rogers, 1995; Tombaugh, McDowell, Kristjansson, & Hubley, 1996). The intent of employment of the MMSE in the present investigation was not as an exclusion criterion, but rather as a descriptive variable for the sample. A copy of the MMSE can be found in Appendix G.

Sociodemographic and Medical Information. Demographic information, (including gender and age), Mini-Mental Status Examination (MMSE), current medical problems, and medications were obtained from patients' medical charts. This information was used to describe the sample and also to see if these characteristics were related to the study's other measures. Both number and categories of medical problems were obtained. Categories of medical problems were adapted from Kriegsman, Pennix, van Eijk, Boeke, & Deeg (1996) and included lung disease, cardiac disease, peripheral atherosclerosis, stroke, diabetes, malignancies, and locomotor problems (e.g., osteoarthritis, rheumatoid arthritis). Total number and categories of medications were also noted. Categories of

medications included antidepressants, opioid analgesics, benzodiazepines, and antipsychotics, and were adapted from Ebly, Hogan, & Fung (1997).

Procedure

Data was collected from 62 patients over the course of a five month period. All new patients to the GARP program were visited by a staff nurse who briefly described the project and who asked the patients if they would like to hear more about the project from the researcher. Through speaking with the patient, the nurse determined subjectively whether the patient had sufficient mastery of the English language and cognitive capabilities to be able to participate in an interview with the researcher. If the patient met these criteria and agreed to meet with the researcher, the researcher or a research assistant then met with the older adult on up to two occasions. The first visit allowed the investigator and patient to become acquainted, and enabled the investigator to explain the nature of study to the patient and to obtain informed consent if the patient intended to participate in the study. The first meeting lasted anywhere from 10 to 30 minutes. The second visit consisted of administration of the DQ, the BAI, and the SF-36. These questionnaires were read out loud by the researcher and then patients' answers were recorded by the researcher. Because elderly individuals often tire more easily than younger adults, the entire second interview was designed to last only about 30 to 60 minutes. As stated above, all other relevant information, including the GDS-SF, the SMAF, and demographic and medical information, was collected via forms that are routinely administered and are part of each patient's medical file, and thus did not require more time of participants than is standard for the GARP program.

Results

SPSS for Windows, version 6.1, was used to conduct all statistical analyses. Numerous planned analyses were conducted. First, basic descriptive statistics, including frequency and distribution, were run on sociodemographic information (including gender and age), medical information (including number and categories of medical diagnoses and medications), as well as information from the DQ. In order to assess the relationship between gender and dizziness, a chi-square (χ^2) test of independence was conducted. To look at the relationship between age and dizziness, a t-test of group difference was performed. Basic descriptive statistics on the MMSE, BAI, GDS-SF, SF-36, and SMAF were also calculated.

Reliability of the DQ and BAI was determined using kappa and Cronbach's alpha. McNemar's Test and Wilcoxon's Matched-Pairs Signed-Ranks Test were used to determine any time effects. Both t-tests of group difference and ANCOVAs controlling for number of medical diagnoses and medications consumed were run to assess the relationships between dizziness and each of the following: total anxiety scores as measured by the BAI, anxiety subscale scores from the BAI, depression scores as measured by the GDS-SF, functional independence scores as measured by the SMAF, and perceived mental and physical health as measured by the SF-36. A significance level of $p < .05$ was used for all tests, with one-tailed tests being employed for all directional hypotheses (e.g., tests of dizzy and non-dizzy groups), and two-tailed tests being employed for all non-directional hypotheses (e.g., tests of gender differences).

Participants

One-hundred and fifty-two older adult medical inpatients from two rehabilitation units were approached to participate in this study over the course of a five month period. Ninety individuals either declined to be interviewed, could not be contacted, or were too physically ill or cognitively impaired to be interviewed. As such, the study sample consisted of 62 individuals.

Gender

There were 47 females and 15 males in this study, therefore 75.8% of the entire sample were female and 24.2% were male. For females, 42.6% were in the dizzy group and 57.4% were in the non-dizzy group. For males, 60.0% were in the dizzy group and 40.0% were in the non-dizzy group. A chi-square test showed no statistically significant difference in gender distribution for the dizzy and non-dizzy groups, $\chi^2(1) = 1.39$, $p = .238$.

Age

The mean age of the entire sample was 81.44 (SD = 7.89). See Table 5 for more information. There was no significant age difference between males and females, $t(60) = -.13$, $p = .898$. The mean age of the dizzy group was 79.69 (SD = 8.22) and of the non-dizzy group was 82.97 (SD = 7.38). A t-test of group difference showed that there was no statistically significant age difference between the dizzy and non-dizzy groups, $t(60) = -1.66$, $p = .103$.

Mini-Mental Status Examination

Although the MMSE is meant to be routinely administered to patients in the GARP program, some patients were not administered this instrument, making the sample

size 53 for analyses involving the MMSE. The mean MMSE score for the entire sample was 26.76 (SD = 3.26; see Table 5). There was no significant difference in MMSE scores between males and females, $t(51) = 1.61$, $p = .114$. The mean MMSE score for the dizzy group was 26.67 (3.77) and for the non-dizzy group was 26.83 (SD = 2.83). A t-test of group difference showed that there was no statistically significant difference in MMSE scores for the two groups, $t(51) = -.18$, $p = .860$.

Correlations

Correlation coefficients for the main variables in this study were analyzed to determine general relationships between variables (please see Table 4). A significant relationship was found between age and BAI total scores, with anxiety scores decreasing as age increases. GDS-SF was significantly correlated with SF-36 physical scores, with perceived physical health dropping as depression increases. GDS-SF was also significantly correlated with SF-36 mental scores, with perceived mental health decreasing as depression rises. BAI total scores and SF-36 mental scores were significantly correlated, indicating that as perceived mental health drops anxiety increases. SMAF disabilities scores were significantly related to SMAF handicap scores, with disabilities increasing as handicap rises. A significant correlation was found between SMAF handicap scores and SF-36 physical scores, with handicap increasing as perceived physical health increases.

Medical Diagnoses

Number of medical diagnoses. The mean number of medical diagnoses for the entire sample was 5.27 (SD = 2.47). See Table 5 for further information. There was no

significant difference in number of medical diagnoses between males and females, $t(60) = -.95$, $p = .348$. The mean number of medical diagnoses for the dizzy and non-dizzy groups were 5.62 (SD = 2.41) and 4.97 (SD = 2.52), respectively. A t-test of group difference revealed no statistically significant difference in number of medical diagnoses for the dizzy and non-dizzy groups, $t(60) = 1.04$, $p = .304$.

Categories of medical diagnoses. See Table 6 for the frequency and percent of major medical diagnoses for the entire sample. Locomotor problems were the most frequent, followed by lung problems, cardiac problems, strokes, diabetes, other problems, and peripheral atherosclerosis. No participants had malignancy as their major diagnosis. Fisher's exact two-tailed test and the chi-square test were used to assess differences in major medical diagnoses between the dizzy and non-dizzy groups and in females and males (Table 7). Dizzy individuals were found to have significantly more lung problems and diabetes than were non-dizzy individuals. Males had significantly more lung problems and diabetes than did females. Females were more likely to have locomotor problems than were males. No other statistically significant differences in medical categories were observed.

Medications

Number of medications. The mean number of medications taken for the entire sample was 9.39 (SD = 4.44). See Table 5 for more information. There was no significant difference in number of medications taken between males and females, $t(60) = .99$, $p = .327$. The mean number of medications taken by the dizzy and non-dizzy groups were 10.76 (SD = 5.01) and 8.18 (SD = 3.52), respectively. A t-test of group difference

Table 4

Correlations Between Age, MMSE, GDS-SF, BAI Total, SMAF Disabilities, SMAF Handicap, SF-36 Physical Health, and SF-36 Mental Health for the Entire Sample

Variable	Correlation
Age with MMSE	-.16
Age with GDS-SF	.13
Age with BAI total	-.36**
Age with SMAF disabilities	-.02
Age with SMAF handicap	-.26
Age with SF-36 physical health	-.05
Age with SF-36 mental health	.17
MMSE with GDS-SF	-.07
MMSE with BAI total	-.26
MMSE with SMAF disabilities	-.27
MMSE with SMAF handicap	-.04
MMSE with SF-36 physical health	-.12
MMSE with SF-36 mental health	.19
GDS-SF with BAI total	.22
GDS-SF with SMAF disabilities	.12
GDS-SF with SMAF handicap	-.03
GDS-SF with SF-36 physical health	-.38**
GDS-SF with SF-36 mental health	-.29*
BAI total with SMAF disabilities	.13
BAI total with SMAF handicap	.16
BAI total with SF-36 physical health	-.21
BAI total with SF-36 mental health	-.26*
SMAF disabilities with SMAF handicap	.63***
SMAF disabilities with SF-36 physical health	.13
SMAF disabilities with SF-36 mental health	.02
SMAF handicap with SF-36 physical health	.31*
SMAF handicap with SF-36 mental health	-.12
SF-36 physical health with SF-36 mental health	-.00

Note. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 5

Mean, Standard Deviation, Maximum, and Minimum for Age, MMSE, GDS-SF, Number of Medical Diagnoses, and Number of Medications for the Entire Sample

Variable	Mean	Standard deviation	Minimum	Maximum
Age	81.44	7.89	62.00	97.00
MMSE	26.76	3.26	14.00	30.00
GDS-SF	4.47	3.11	0.00	12.00
Number of medical diagnoses	5.27	2.47	1.00	12.00
Number of medications	9.39	4.44	3.00	24.00

Table 6

Frequency and Percent of Major Medical Diagnoses in the Entire Sample

Diagnosis	Frequency	Percent
Locomotor	37	59.7%
Lung	7	11.3%
Cardiac	5	8.1%
Stroke	4	6.5%
Diabetes	4	6.5%
Other	4	6.5%
Peripheral atherosclerosis	1	1.6%
Malignancy	0	0%

Table 7

Significance Levels for Differences in Categories of Major Medical Diagnoses for Dizziness and Gender, and Percentages of Dizzy, Non-dizzy, Females, and Males with Medical Category Diagnoses

Diagnosis	Dizzy versus nondizzy group			Females versus males		
	significance	percent dizzy with diagnosis	percent non-dizzy with diagnosis	significance	percent females with diagnosis	percent males with diagnosis
Lung problems	.044*	20.7%	3.0%	.007*	4.3%	33.3%
Cardiac problems	.658	10.3%	6.1%	.323	10.6%	0
Peripheral atherosclerosis	1.000	0	3.0%	1.000	2.1%	0
Strokes	.116	0	12.1%	1.000	6.4%	6.7%
Diabetes	.043*	13.8%	0	.041*	2.1%	20.0%
Locomotor problems	.086	48.3%	69.7%	.003*	70.2%	26.7%
Other medical problems	1.000	6.9%	6.1%	.244	4.3%	13.3%

Note. *$p < .05$.

Table 8

Frequency and Percent of Benzodiazepine, Antidepressant, Antipsychotic, and Opioid Medications Taken in the Entire Sample

Medication	Frequency	Percent
Antidepressants	19	30.6%
Opioids	10	16.1%
Benzodiazepines	7	11.3%
Antipsychotics	6	9.7%

revealed a statistically significant difference between the two groups, $t(60) = 2.36$, $p = .021$, indicating that individuals in the dizzy group were taking significantly more medications than those in the non-dizzy group on average.

Categories of medications. Table 8 shows the frequency and percent of medications taken by the entire sample. The most frequently consumed medication was antidepressants, followed by opioid analgesics, benzodiazepines, and finally antipsychotics. Fisher's exact two-tailed test and the chi-square test were used to assess differences in medications consumed in the dizzy and non-dizzy groups and in females and males (Table 9). No significant differences in categories of medications were observed for either dizziness or gender.

Dizziness Questionnaire

Reliability of the Dizziness Questionnaire. To assess reliability of the DQ, a chart question routinely asked of patients was compared to the DQ for all available patients ($N = 27$). When comparing whether individuals were assessed as dizzy or not from the DQ and from the medical chart question, moderate agreement between the two questions was found. Please see Table 10 for the reliability of DQ items. To determine the re-test reliability of the DQ, 15 participants were administered the DQ at two different times. Perfect agreement was found comparing time one administration of the DQ question about experiencing feelings of dizziness with time two. A McNemar's test examining differences in feelings of dizziness between times one and two found that there was no significant time effect. Overall, reliability of the DQ question addressing presence of dizziness appears to be fairly strong. Alpha tests were conducted to assess the reliability

of frequency of dizziness, duration of dizzy spells, and total duration of dizziness. Test-retest reliability for frequency of dizziness was moderate, $\underline{\alpha} = .59$. Reliability for duration of dizzy spells was fairly poor, $\underline{\alpha} = .45$. Total duration of dizziness was very reliable, $\underline{\alpha} = .92$. Wilcoxon's Matched-Pairs Signed-Ranks Test was also used to assess the time effect of these three variables, and found that frequency of dizziness was not consistent across testing periods, duration of dizzy spells was not consistent, and total duration was consistent. Overall, total duration appears to be more reliable than frequency and duration of dizzy spells.

The DQ items addressing specific symptoms of dizziness were also assessed for re-test reliability (Table 10). Lightheadedness was found in all individuals assessed at both time one and time two, and thus can be considered completely reliable. Perfect agreement was noted for blacking out and moderate agreement was found for fear of falling. Weak reliability was found for the following symptoms of dizziness: a swimming sensation in the head, loss of consciousness, feeling at risk for falling, tendency to fall, objects spinning or turning, sensation of turning or spinning inside, and loss of balance when walking. A McNemar's test examining differences in the above-mentioned symptoms between times one and two found that there were no significant time effects for any of these variables. The re-test reliability for the DQ items concerning associated symptoms was determined (Table 10). Tinnitus showed strong test-retest agreement Headache and nausea or vomiting revealed weak agreement between testing periods. McNemar's tests examining time effects for the associated symptoms were not significant for any of these variables. The DQ items addressing provoking factors in

Table 9

Significance Levels for Differences in Medications for Dizziness and Gender, and Percentages of Dizzy, Non-dizzy, Females, and Males Taking Medications

Medication category	Dizzy versus non-dizzy group			Females versus males		
	significance	percent dizzy taking drug	percent non-dizzy taking drug	significance	percent females taking drug	percent males taking drug
Antidepressants	.950	31.0%	30.3%	.356	34.0%	20.0%
Opioid analgesics	1.000	17.2%	15.2%	.427	19.1%	6.7%
Benzodiazepines	1.000	10.3%	12.1%	.180	14.9%	0
Antipsychotics	.405	13.8%	6.1%	.626	8.5%	13.3%

Table 10

Reliability of Dizziness Questionnaire Items

Item	Kappa value
Presence of dizziness	
with chart question, test-retest	0.70, 1.00
Symptoms of dizziness	
Lightheadedness test-retest	(100% endorsement)
Swimming sensation in the head test-retest	.09
Blacking out test-retest	1.00
Loss of consciousness test-retest	.59
Feeling at risk for falling test-retest	.46
Fear of falling test-retest	.67
Tendency to fall test-retest	.59
Objects spinning or turning test-retest	.59
Sensation of turning or spinning inside test-retest	.30
Loss of balance when walking test-retest	.46
Associated symptoms	
Headache test-retest	-.17
Nausea or vomiting test-retest	.25
Tinnitus test-retest	1.00
Pressure in the head test-retest	(non-endorsement at time 2)
Chest pain test-retest	(100% non-endorsement)
Breathlessness test-retest	(non-endorsement at time 2)

dizziness were analyzed for re-test reliability. McNemar's tests showed no significant time effects for provoking factors, including bending over, rising from lying to standing, turning one's head, looking up, and walking.

Prevalence and nature of dizziness. Twenty-nine participants, or 46.8% reported having experienced feelings of dizziness whereas 33 individuals (53.2%) reported no symptoms of dizziness. When asked how often they experienced dizziness, participants gave a range of answers from once or twice a year to constantly. Whereas many individuals experienced dizziness only once or twice a year, the rest of the dizzy group was split fairly evenly into groupings of less than monthly, monthly, weekly, daily, and constantly. Table 11 shows the frequency and percent of frequency of dizzy symptoms. The duration of dizzy spells also varied among respondents. Most experienced symptoms for a few seconds, followed by less participants experiencing dizziness for several minutes, more than an hour at a time, a minute, or an hour (see Table 12). A range of answers was also given when participants were asked when the dizziness first occurred. Many individuals had experienced symptoms for 2 to 10 years, followed by experiencing symptoms for more than 10 years, for the last six months to two years, less than a month, and finally for the last one to six months. Table 13 reveals the frequency and percent of total duration of dizziness.

All four categories of dizziness discussed in the literature were found in the group of dizzy patients. Symptoms of dysequilibrium were experienced most often, followed by lightheadedness, vertigo, and finally presyncope. Please see Table 14 for the frequency and percent of types of dizziness. Lightheadedness was the most common

Table 11

Frequency and Percent of Frequency of Dizzy Symptoms in Dizzy Group

Frequency of Dizzy Symptoms	Frequency	Percent
Constant	2	7.1%
Daily	3	10.7%
Weekly	5	17.9%
Monthly	4	14.3%
Less than monthly	4	14.3%
Once or twice a year	10	35.7%

Table 12

Frequency and Percent of Duration of Dizzy Spells in Dizzy Group

Duration of dizzy spells	Frequency	Percent
A few seconds	15	51.7%
Up to a minute	1	3.4%
Several minutes	7	24.1%
Up to an hour	1	3.4%
More than an hour	5	17.2%

Table 13

Frequency and Percent of Total Duration of Dizziness in Dizzy Group

Total Duration of Dizziness	Frequency	Percent
Less than 1 month	4	14.3%
1 to 6 months	2	7.1%
6 months to 2 years	5	17.9%
2 to 10 years	11	39.3%
More than 10 years	6	21.4%

specific symptom of dizziness, experienced by the majority of dizzy individuals. Feeling at risk for falling, fear of falling followed, and loss of balance when walking were experienced by half of dizzy individuals. A swimming sensation in the head, a tendency to fall, and a sensation of a turning or spinning inside one's self were felt by almost half of dizzy persons. Somewhat fewer individuals endorsed feelings of objects spinning or turning around the self, loss of consciousness, and blacking out. Table 15 shows the frequency and percent of specific symptoms of dizziness.

Various factors provoking dizziness were endorsed to varying degrees (Table 16). Rising from lying to standing provoked dizziness in the majority of individuals. Bending over caused dizziness in about half of participants. Turning one's head, walking, and looking up caused sensations in slightly less individuals. Finally, there were many symptoms found associated with dizziness. Nausea or vomiting was most frequent, followed by headache, breathlessness, tinnitus, pressure in the head, and chest pain (Table 17).

Beck Anxiety Inventory

Reliability of the Beck Anxiety Inventory. The internal consistency reliability of the BAI items was assessed for both the entire scale and the individual subscales. For all 21 items, the reliability was moderately high, with a Cronbach's alpha of .76. Cronbach's alpha for the cognitive subscale was .40, indicating fairly moderate reliability. For the autonomic subscale Cronbach's alpha was .66, indicating moderate reliability for this subscale. The neuromotor subscale showed even better reliability, with a Cronbach's alpha of .72. For the panic subscale, Cronbach's alpha was moderate at .64. Overall, the

Table 14

Frequency and Percent of Types of Dizziness in Dizzy Group

Type of dizziness	Frequency	Percent
Dysequilibrium	23	79.3%
Lightheadedness	22	75.9%
Vertigo	20	69.0%
Presyncope	6	20.7%

Table 15

Frequency and Percent of Symptoms of Dizziness in Dizzy Group

Symptom	Frequency	Percent
Lightheadedness	22	75.9%
Feel at risk for falling	17	58.6%
Fear of falling	16	57.1%
Loss of balance when walking	15	53.6%
Swimming sensation in the head	13	44.8%
Tendency to fall	13	44.8%
Sensation of self turning or spinning inside	12	42.9%
Objects spinning or turning	7	25.0%
Loss of consciousness	6	20.7%
Blacking out	5	17.2%

Table 16

Frequency and Percent of Provoking Factors in Dizzy Group

Provoking factor	Frequency	Percent
Rising from lying to standing	19	67.9%
Bending over	14	50.0%
Turning one's head	11	39.3%
Walking	9	32.1%
Looking up	5	17.9%

Table 17

Frequency and Percent of Associated Symptoms in Dizzy Group

Associated symptom	Frequency	Percent
Nausea or vomiting	9	32.1%
Headache	6	21.4%
Breathlessness	6	21.4%
Tinnitus	6	21.4%
Pressure in the head	5	17.9%
Chest pain	2	7.1%

BAI appears to be a fairly reliable instrument for use with this sample of older medical inpatients.

BAI total score. The mean BAI total score for the entire sample was 7.84 (SD = 6.30), indicating an average normal level of anxiety for the sample as a whole (see Table 15). There was no statistically significant difference in total BAI scores for gender, $t(59) = -1.33$, $p = .190$. The mean BAI total scores for the dizzy and non-dizzy groups were 10.21 (SD = 7.24) and 5.82 (SD = 4.60), respectively. A one-tailed t-test was employed to determine if dizzy individuals were significantly more anxious than non-dizzy individuals. This t-test was found to be statistically significant, $t(59) = 2.87$, $p = .003$, indicating that dizzy individuals were significantly more anxious than were non-dizzy individuals. An ANCOVA was run to determine if the dizzy group was significantly more anxious than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was found to be statistically significant, $F(1,57) = 5.99$, $p = .009$, indicating that dizzy individuals were still significantly more anxious than were non-dizzy individuals even after factoring out number of medical diagnoses and number of medications. The adjusted mean BAI total scores for the dizzy and non-dizzy groups were 9.99 (SE = 1.17) and 6.01 (SE = 1.07), respectively.

BAI subscale scores. The mean cognitive subscale score for the entire sample was 2.46 (SD = 2.88; see Table 18). There was no statistically significant difference in cognitive subscale scores between males and females, $t(59) = -1.01$, $p = .316$. For the dizzy and non-dizzy groups the mean cognitive subscale scores were 3.00 (SD = 3.20) and 2.00 (SD = 2.55), respectively. A one-tailed t-test was used to determine if dizzy

Table 18

Mean, Standard Deviation, Maximum, and Minimum for BAI Total, Cognitive Subscale, Autonomic Subscale, Neuromotor Subscale, and Panic Subscale for the Entire Sample

Variable	Mean	Standard deviation	Minimum	Maximum
BAI total	7.84	6.30	0.00	38.00
Cognitive subscale	2.46	2.88	0.00	11.00
Autonomic subscale	1.08	1.57	0.00	8.00
Neuromotor subscale	3.72	3.48	0.00	17.00
Panic subscale	0.57	1.30	0.00	8.00

individuals were significantly more anxious than their non-dizzy peers for this subscale. This test was not statistically significant, $t(59) = 1.36$, $p = .090$. An ANCOVA was run to determine if the dizzy group was significantly more anxious than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,57) = .77$, $p = .192$. The adjusted mean cognitive subscale scores for the dizzy and non-dizzy groups were 2.83 (SE = 0.55) and 2.15 (SE = 0.51), respectively.

The mean autonomic subscale score for the entire sample was 1.08 (SD = 1.57; see Table 18). There was no statistically significant difference in autonomic subscale scores between males and females, $t(59) = 1.39$, $p = .169$. For the dizzy and non-dizzy groups the mean autonomic subscale scores were 1.46 (SD = 1.95) and 0.76 (SD = 1.09), respectively. A one-tailed t-test was employed to determine if dizzy individuals were significantly more anxious than non-dizzy individuals for this subscale. This test was statistically significant, $t(59) = 1.78$, $p = .040$, indicating that dizzy persons had statistically significantly higher autonomic subscale scores than non-dizzy individuals. An ANCOVA was run to determine if the dizzy group was significantly more anxious than the non-dizzy group after controlling for number of medical diagnoses and number of medications. However, this ANCOVA could not be used because an assumption of this test was violated by a significant interaction between dizziness group and number of medications.

The mean neuromotor subscale score for the entire sample was 3.72 (SD = 3.48; see Table 18). There was no statistically significant difference in neuromotor subscale

scores for gender, $t(59) = -1.87$, $p = .067$. For the dizzy and non-dizzy groups the mean neuromotor subscale scores were 4.82 (SD = 4.27) and 2.79 (SD = 2.32), respectively. A one-tailed t-test was employed to determine if the dizzy group was significantly more anxious than the non-dizzy group for this subscale. This test was statistically significant, $t(40.05) = 2.25$, $p = .015$, indicating that dizzy individuals had significantly higher neuromotor subscale scores than did non-dizzy individuals. An ANCOVA was run to determine if the dizzy group was significantly more anxious than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was found to be statistically significant, $F(1,57) = 4.84$, $p = .016$, indicating that dizzy individuals had significantly higher neuromotor subscale scores than did non-dizzy individuals. The adjusted mean neuromotor subscale scores for the dizzy and non-dizzy groups were 4.82 (SE = .66) and 2.79 (SE = .61), respectively.

The mean panic subscale score for the entire sample was 0.57 (SD = 1.30; see Table 18). There was no statistically significant difference in panic subscale scores between males and females, $t(59) = -.61$, $p = .553$. For the dizzy and non-dizzy groups the mean panic subscale scores were 0.93 (SD = 1.68) and 0.27 (SD = .76), respectively. A one-tailed t-test was used to determine if dizzy individuals were significantly more anxious than their non-dizzy peers for the panic subscale. This test was statistically significant, $t(36.34) = 1.91$, $p = .064$, indicating that dizzy individuals had statistically significantly higher panic subscale scores than did non-dizzy individuals. An ANCOVA was run to determine if the dizzy group was significantly more anxious than the non-dizzy group after controlling for number of medical diagnoses and number of

medications. This one-tailed test was found to be statistically significant, $F(1,57) = 3.82$, $p = .028$. The adjusted mean panic subscale scores for the dizzy and non-dizzy groups were .94 (SE = .25) and .26 (SE = .23), respectively.

In summary, once number of medical diagnoses and medications were controlled for, total BAI scores, and neuromotor, autonomic, and panic subscale scores differentiated the dizzy and non-dizzy individuals. Those suffering from dizziness had significantly higher levels of anxiety in general and neuromotor, autonomic, and panic symptoms in particular. There is no statistically significant relationship between dizziness and cognitive anxiety symptoms for this group of patients.

Geriatric Depression Scale - Short Form

Although the GDS-SF is meant to be routinely administered to patients in the GARP program, some patients were not administered this instrument, making the sample size 55 for analyses involving the GDS-SF. The mean GDS-SF score for the entire sample was 4.47 (SD = 3.11; Table 5). There was no statistically significant difference in GDS-SF scores between males and females, $t(53) = .38$, $p = .703$. The mean GDS-SF score for the dizzy group was 5.00 (SD = 2.88) and for the non-dizzy group was 4.00 (SD = 3.27). A one-tailed t-test was used to determine if dizzy individuals were significantly more depressed than non-dizzy individuals. This test was not statistically significant, $t(53) = 1.20$, $p = .119$. An ANCOVA was run to determine if the dizzy group was significantly more depressed than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,51) = 1.05$, $p = .155$. The adjusted mean GDS-SF scores for

the dizzy and non-dizzy groups were 4.97 (SE = .64) and 4.03 (SE = .60), respectively. Depression is not statistically significantly related to dizziness for this sample.

Functional Autonomy Measurement System

Disabilities scores. As with other instruments mentioned above, although the SMAF is meant to be routinely administered to patients in the rehabilitation program, some patients were not assessed with this instrument, making the sample size 52 for analyses involving the SMAF. The entire sample had an average SMAF disabilities score of -32.15 (SD = 8.44). See Table 19 for further information. There was no statistically significant difference in SMAF disabilities scores between males and females, $t(50) = -.04$, $p = .970$. The mean SMAF disabilities scores were -31.00 (SD = 10.61) and -33.07 (SD = 6.26) for the dizzy and non-dizzy groups, respectively. A one-tailed t-test was used to determine if dizzy persons were significantly more disabled than non-dizzy persons, and was not statistically significant, $t(33.81) = -.83$, $p = .207$. An ANCOVA was run to determine if the dizzy group was significantly more disabled than the non-dizzy group after controlling for number of medical diagnoses and number of medications. However, this one-tailed test could not be employed because an assumption of this test was violated by a significant interaction between dizziness group and number of medications.

The average activities of daily living (ADL) disabilities subscale score for all participants was -7.21 (SD = 3.66; see Table 19). There was no statistically significant difference in ADL disabilities subscale scores for gender, $t(51) = .76$, $p = .453$. For the dizzy and non-dizzy groups the mean ADL disabilities subscale scores were -6.38 (SD = 4.19) and -7.90 (SD = 3.06), respectively. A one-tailed t-test was used to determine if

Table 19

Mean, Standard Deviation, Maximum, and Minimum for SMAF Disabilities Total Scores, SMAF Handicap Total Scores, and Subscale Scores for the Entire Sample

Variable	Mean	Standard deviation	Minimum	Maximum
SMAF disabilities	-32.15	8.44	-55.00	-17.00
ADL	-7.21	3.66	-15.00	0.00
Mobility	-7.37	3.42	-13.00	0.00
Communication	-0.21	0.49	-2.00	0.00
Mental Functions	-1.42	1.86	-8.00	0.00
Instrumental ADL	-15.57	2.87	-23.00	-8.00
SMAF handicap	-19.64	9.64	-43.00	-1.00
ADL	-6.28	3.83	-15.00	0.00
Mobility	-5.94	3.88	-13.00	0.00
Communication	-0.19	0.48	-2.00	0.00
Mental Functions	-1.29	1.84	-8.00	0.00
Instrumental ADL	-5.60	5.35	-22.00	0.00

dizzy people were significantly more disabled than non-dizzy individuals, and was not statistically significant, $t(51) = -1.53$, $p = .067$. An ANCOVA was run to determine if the dizzy group was significantly more disabled than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1, 49) = 1.88$, $p = .088$. The adjusted mean ADL disabilities subscale scores for dizzy persons was -6.41 (SE = .77) and for non-dizzy individuals was -7.87 (SE = .70).

The mean mobility disabilities subscale score for the entire sample was -7.37 (SD = 3.42; see Table 19). There was no statistically significant difference in mobility disabilities subscale scores between males and females, $t(52) = .35$, $p = .726$. For the dizzy and non-dizzy groups the mean mobility disabilities subscale scores were -6.88 (SD = 3.24) and -7.79 (SD = 3.56), respectively. A one-tailed t-test was employed to determine if dizzy individuals were significantly more disabled than their non-dizzy peers, and was not statistically significant, $t(52) = -.98$, $p = .166$. An ANCOVA was run to determine if the dizzy group was significantly more disabled than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,50) = 2.19$, $p = .073$. The adjusted average mobility disabilities subscale scores were -6.60 (SE = .70) and -8.04 (SE = .64) for dizzy and non-dizzy individuals, respectively.

The mean communication disabilities subscale score for all patients was -0.21 (SD = 0.49). See table 19 for more information. There was no statistically significant difference in communication disabilities subscale scores for gender, $t(51) = -1.50$, $p =$

.139. The dizzy group had a mean communication disabilities subscale score of -0.17 (SD = 0.38) and the non-dizzy group had a mean score of -0.24 (SD = 0.58). A one-tailed t-test was used to determine if dizzy individuals were significantly more disabled than non-dizzy individuals, and was not statistically significant, $t(51) = -.54$, $p = .295$. An ANCOVA was run to determine if the dizzy group was significantly more disabled than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,49) = .29$, $p = .297$. The adjusted average communication disabilities subscale scores for the dizzy and non-dizzy groups were -.17 (SE = .11) and -.24 (SE = .10), respectively.

The average mental functions disabilities subscale score for the entire sample was -1.42 (SD = 1.86; see Table 19). There was no statistically significant difference in mental functions disabilities subscale scores between males and females, $t(50) = -.77$, $p = .444$. The mean mental functions disabilities subscale scores were -1.61 (SD = 2.21) and -1.28 (SD = 1.56) for the dizzy and non-dizzy groups, respectively. A one-tailed t-test was used to determine if the dizzy group was significantly more disabled than the non-dizzy group, and was not statistically significant, $t(50) = .64$, $p = .264$. An ANCOVA was run to determine if the dizzy group was significantly more disabled than the non-dizzy group after controlling for number of medical diagnoses and number of medications. However, this one-tailed test could not be used because an assumption of this test was violated by a significant interaction between dizziness group and number of medications.

The mean instrumental activities of daily living (IADL) disabilities subscale score

for the whole group of patients was -15.57 (SD = 2.87). Table 19 shows more information. There was no statistically significant difference in IADL disabilities subscale scores for gender, $t(51) = -1.30$, $p = .199$. The dizzy group had a mean IADL disabilities subscale score of -15.21 (SD = 3.62) and the non-dizzy group had a mean score of -15.86 (SD = 2.08). A one-tailed t-test was used to determine if dizzy persons were significantly more disabled than their non-dizzy peers, and was not statistically significant, $t(35.14) = -.78$, $p = .220$. An ANCOVA was run to determine if the dizzy group was significantly more disabled than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,49) = 1.20$, $p = .140$. The adjusted mean IADL disabilities subscale score for the dizzy group was -15.06 (SE = .61) and for their non-dizzy peers was -15.98 (SE = .55).

Handicap scores. The average SMAF handicap score for the entire sample was -19.64 (SD = 9.64). Table 19 details more information. There was no statistically significant difference in SMAF handicap scores for gender, $t(50) = -.09$, $p = .928$. The mean SMAF handicap score for the dizzy group was -18.00 (SD = 9.61) and for their non-dizzy peers was -20.93 (SD = 9.63). A one-tailed t-test was used to determine if dizzy individuals were significantly more handicapped than their non-dizzy counterparts, and was not statistically significant, $t(50) = -1.09$, $p = .140$. An ANCOVA was run to determine if the dizzy group was significantly more handicapped than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,48) = 1.77$, $p = .095$.

The adjusted mean SMAF handicap scores for the dizzy and non-dizzy groups were -17.51 (SE = 2.09) and -21.32 (SE = 1.85), respectively.

The average activities of daily living (ADL) handicap subscale score for the entire sample was -6.28 (SD = 3.83). See Table 19 for further information. There was no statistically significant difference in ADL handicap subscale scores between males and females, $t(15.88) = .12$, $p = .910$. The mean ADL handicap subscale scores for dizzy and non-dizzy groups were -5.79 (SD = 4.05) and -6.69 (SD = 3.66), respectively. A one-tailed t-test was used to determine if the dizzy group was significantly more handicapped than the non-dizzy group, and was not statistically significant, $t(51) = -.85$, $p = .201$. An ANCOVA was run to determine if the dizzy group was significantly more handicapped than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,49) = .49$, $p = .244$. The adjusted mean ADL handicap subscale score for the dizzy group was -5.85 (SE = .82) and for their non-dizzy peers was -6.64 (SE = .74).

The average mobility handicap subscale score for the entire sample was -5.94 (SD = 3.88; see Table 19). There was no statistically significant difference in mobility handicap subscale scores for gender, $t(52) = .19$, $p = .854$. Dizzy individuals had a mean mobility handicap subscale score of -5.32 (SD = 3.79) and non-dizzy persons had a average of -6.48 (SD = 3.93). A one-tailed t-test was employed to determine if dizzy persons were significantly more handicapped than their non-dizzy counterparts, and was not statistically significant, $t(52) = -1.10$, $p = .138$. An ANCOVA was run to determine if the dizzy group was significantly more handicapped than the non-dizzy group after

controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,50) = 2.11$, $p = .077$. The adjusted mean mobility handicap subscale scores for the dizzy and non-dizzy groups were -5.09 (SE = .78) and -6.68 (SE = .72), respectively.

The mean communication handicap subscale score for all participants was -0.19 (SD = 0.48). Table 19 reveals more information. There was no statistically significant difference in communication handicap subscale scores for gender, $t(18.99) = -1.64$, $p = .118$. The mean communication handicap subscale scores were -0.17 (SD = 0.38) and -0.21 (SD = 0.56) for dizzy and non-dizzy individuals, respectively. A one-tailed t-test was used to determine if dizzy individuals were significantly more handicapped than non-dizzy persons, and was not statistically significant, $t(51) = -.30$, $p = .383$. An ANCOVA was run to determine if the dizzy group was significantly more handicapped than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,49) = .06$, $p = .402$. The dizzy individuals had an adjusted average communication handicap subscale score of -.17 (SE = .10) and the non-dizzy group had a mean of -.21 (SE = .09).

The mean mental functions handicap subscale score for the entire sample was -1.29 (SD = 1.84; see Table 19). There was no statistically significant difference in mental functions handicap subscale scores between males and females, $t(50) = -1.09$, $p = .281$. For the dizzy and non-dizzy groups the mean mental functions handicap subscale scores were -1.61 (SD = 2.21) and -1.03 (SD = 1.48), respectively. A one-tailed t-test was employed o determine if dizzy individuals were significantly more handicapped than

non-dizzy individuals, and was not statistically significant, $t(50) = 1.12$, $p = .134$. An ANCOVA was run to determine if the dizzy group was significantly more handicapped than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,48) = 1.72$, $p = .098$. The adjusted average mental functions handicap subscale scores for the dizzy and non-dizzy groups were -1.69 (SE = .40) and -.97 (SE = .35), respectively.

The mean instrumental activities of daily living (IADL) handicap subscale score for all patients was -5.60 (SD = 5.35). See Table 19 for further information. There was no statistically significant difference in IADL handicap subscale scores for gender, $t(51) = -.13$, $p = .899$. The dizzy group had a mean IADL handicap subscale score of -4.50 (SD = 5.98) and their non-dizzy counterparts had an average of -6.52 (SD = 4.67). A one-tailed t-test was used to determine if the dizzy group was significantly more handicapped than the non-dizzy group, and was not statistically significant, $t(51) = -1.38$, $p = .087$. An ANCOVA was run to determine if the dizzy group was significantly more handicapped than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,49) = 2.60$, $p = .057$. The adjusted mean IADL handicap subscale scores for the dizzy and non-dizzy groups were -4.22 (SE = 1.13) and -6.75 (SE = 1.02), respectively.

Overall, both dizzy and non-dizzy individuals were found to need varying degrees of help with all types of functional tasks. Differences between the dizzy and non-dizzy patients on functional ability were not observed for either disability scores or handicap

Table 20

Mean, Standard Deviation, Maximum, and Minimum for SF-36 Physical Health Scores, SF-36 Mental Health Scores, and Subscale Scores for the Entire Sample

Variable	Mean	Standard deviation	Minimum	Maximum
SF-36 physical	29.28	9.46	16.47	56.98
Physical functioning	26.13	25.65	0.00	100.00
Role-physical	29.84	38.90	0.00	100.00
Bodily pain	43.69	32.45	0.00	100.00
General health	65.39	22.13	20.00	100.00
SF-36 mental	51.83	9.20	25.05	66.94
Vitality	37.02	22.91	0.00	95.00
Social functioning	60.48	33.28	0.00	100.00
Role-emotional	82.80	39.46	0.00	200.00
Mental health	67.48	17.79	28.00	100.00

scores.

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Physical health scores. The entire sample had an average SF-36 physical health score of 29.28 (SD = 9.46). Table 20 details more information. There was no statistically significant difference in SF-36 physical health scores for gender, $t(60) = -.87$, $p = .390$. The mean SF-36 physical health scores for the dizzy and non-dizzy groups were 28.08 (SD = 7.87) and 30.33 (SD = 10.68), respectively. A one-tailed t-test was employed to determine if dizzy individuals had significantly lower perceived physical health than their non-dizzy peers, and was not statistically significant, $t(60) = -.93$, $p = .178$. An ANCOVA was run to determine if the dizzy group had significantly worse perceived physical health than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,58) = .05$, $p = .819$. The adjusted mean SF-36 physical health scores for the dizzy and non-dizzy groups were 28.98 (SE = 1.75) and 29.54 (SE = 1.63), respectively.

The average physical functioning subscale score for the entire sample was 26.13 (SD = 25.65; see Table 20). There was no statistically significant difference in physical functioning subscale scores between males and females, $t(18.33) = -1.13$, $p = .273$. The mean physical functioning subscale scores were 30.86 (SD = 25.53) for the dizzy group and 21.97 (SD = 25.40) for non-dizzy individuals. A one-tailed t-test was used to determine if dizzy persons had significantly worse perceived physical functioning than their non-dizzy peers. This test was not statistically significant, $t(60) = 1.37$, $p = .088$.

An ANCOVA was run to determine if the dizzy group had significantly worse perceived physical functioning than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was found to be statistically significant, $F(1,58) = 4.54$, $p = .019$, indicating that the dizzy group had significantly better perceived physical functioning than the non-dizzy group. The dizzy group had an adjusted average physical functioning subscale score of 33.52 (SE = 4.64) and their non-dizzy peers had a score of 19.63 (SE = 4.34).

The entire sample had a mean role-physical subscale score of 29.84 (SD = 38.90; see Table 20). There was no statistically significant difference in role-physical subscale scores for gender, $t(60) = .74$, $p = .461$. For the dizzy and non-dizzy groups the mean role-physical subscale scores were 23.28 (SD = 32.00) and 35.61 (SD = 43.76), respectively. A one-tailed t-test was used to determine if dizzy persons had significantly worse role-physical scores than did non-dizzy individuals. This test was not statistically significant, $t(58.17) = -1.28$, $p = .104$. An ANCOVA was run to determine if the dizzy group had significantly worse role-physical scores than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,58) = 1.45$, $p = .117$. The adjusted average role-physical subscale score for the dizzy group was 23.10 (SE = 7.50) and for the non-dizzy group was 35.76 (SE = 7.00).

The average bodily pain subscale score for all participants was 43.69 (SD = 32.45). Table 20 reveals further information. There was no statistically significant difference in bodily pain subscale scores between males and females, $t(60) = -.25$, $p =$

.803. The mean bodily pain subscale score was 34.24 (SD = 32.13) for dizzy individuals and 52.00 (SD = 30.86) for non-dizzy persons. A one-tailed t-test was run to determine if dizzy individuals had significantly worse perceived bodily pain than non-dizzy individuals, and was statistically significant, $t(60) = -2.22$, $p = .015$, indicating that on average non-dizzy individuals perceived themselves to have significantly lower bodily pain than their dizzy counterparts. An ANCOVA was run to determine if the dizzy group had significantly worse perceived bodily pain than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,58) = 2.47$, $p = .061$. The adjusted average bodily pain subscale scores for the dizzy and non-dizzy groups were 36.72 (SE = 5.94) and 49.83 (SE = 5.54), respectively.

On average participants had a general health subscale score of 65.39 (SD = 22.13; see Table 20). There was no statistically significant difference in general health subscale scores for gender, $t(60) = 1.89$, $p = .064$. For the dizzy and non-dizzy groups the mean general health subscale scores were 59.07 (SD = 22.11) and 70.94 (SD = 20.93), respectively. A one-tailed t-test was used to determine if dizzy individuals had significantly worse general health scores than non-dizzy persons, and was statistically significant, $t(60) = -2.17$, $p = .034$, indicating that on average non-dizzy individuals perceived themselves as having significantly better general health than did dizzy persons. An ANCOVA was run to determine if the dizzy group had significantly worse general health than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant,

$F(1,58) = 2.50$, $p = .060$. The adjusted mean general health subscale score for the dizzy group was 60.56 (SE = 4.09) and for their non-dizzy peers was 69.63 (SE = 3.82).

Mental health scores. The mean SF-36 mental health score for the entire sample was 51.83 (SD = 9.20; see Table 20). There was no statistically significant difference in SF-36 mental health scores between males and females, $t(17.71) = 1.83$, $p = .085$. The dizzy group had an average SF-36 mental health score of 49.45 (SD = 9.85) and the non-dizzy group had a score of 53.92 (SD = 8. 17). A one-tailed t-test was employed to determine if the dizzy group had significantly worse perceived mental health than the non-dizzy group, and was statistically significant, $t(60) = -1.95$, $p = .028$, indicating that dizzy individuals perceived their mental health to be statistically significantly worse than did the non-dizzy group. An ANCOVA was run to determine if the dizzy group had significantly worse perceived mental health than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,58) = 2.81$, $p = .050$. The adjusted mean SF-36 mental health scores for the dizzy and non-dizzy groups were 49.67 (SE = 1.73) and 53.73 (SE = 1.61), respectively.

The whole sample had an average vitality subscale score of 37.02 (SD = 22.91). See Table 20 for more information. There was no statistically significant difference in vitality subscale scores for gender, $t(60) = .26$, $p = .796$. For the dizzy and non-dizzy groups the mean vitality subscale scores were 32.41 (SD = 19.67) and 41.06 (SD = 25.02), respectively. A one-tailed t-test was run to determine if the dizzy group had significantly worse perceived vitality than their non-dizzy counterparts, and was not

statistically significant, $t(60) = -1.50$, $p = .070$. An ANCOVA was run to determine if the dizzy group had significantly worse perceived vitality than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,58) = .37$, $p = .273$. The adjusted average vitality subscale scores were 35.14 (SE = 4.13) for the dizzy group and 38.67 (SE = 3.85) for the non-dizzy group.

The mean social functioning subscale score for patients was 60.48 (SD = 33.28; see Table 20). Social functioning subscale scores were not statistically significantly different for males and females, $t(60) = -.60$, $p = 550$. Dizzy individuals had an average social functioning subscale score of 56.47 (SD = 31.63) and their non-dizzy counterparts had a score of 64.02 (SD = 34.76). A one-tailed t-test was used to determine if dizzy persons had significantly worse perceived social functioning than non-dizzy individuals, and was not statistically significant, $t(60) = -.89$, $p = .189$. An ANCOVA was run to determine if the dizzy group had significantly worse perceived social functioning than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,58) = .81$, $p = .187$. The adjusted mean social functioning subscale scores for the dizzy and non-dizzy groups were 56.35 (SE = 6.16) and 64.12 (SE = 5.75), respectively.

The average role-emotional subscale score for all participants was 82.80 (SD = 39.46; see Table 20). There was no statistically significant difference in role-emotional subscale scores for gender, $t(20.07) = 1.65$, $p = .114$. The mean role-emotional subscale score for dizzy individuals was 80.46 (SD = 45.88) and for non-dizzy persons was 84.85

(SD = 33.43). A one-tailed t-test was run to determine if dizzy individuals had significantly worse perceived role-emotional scores than their non-dizzy peers. This test was not statistically significant, $t(60) = -.43$, $p = .333$. An ANCOVA was run to determine if the dizzy group had significantly worse perceived role-emotional scores than the non-dizzy group after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,58) = .06$, $p = .403$. The adjusted average role-emotional subscale score for the dizzy group was 81.37 (SE = 7.71) and for the non-dizzy group was 84.05 (SE = 7.20).

Finally, the average mental health subscale score for the patients was 67.48 (SD = 17.79; see Table 20). There was a statistically significant difference in mental health subscale scores between males and females, $t(60) = 2.20$, $p = .031$, indicating that on average females perceived their mental health to be better than males perceived their own mental health to be. For the dizzy and non-dizzy groups the mean mental health subscale scores were 62.76 (SD = 17.86) and 71.64 (SD = 16.92), respectively. A one-tailed t-test was employed to determine if dizzy individuals had significantly worse perceived mental health subscale scores than non-dizzy persons. This test was statistically significant, $t(60) = -2.01$, $p = .025$, indicating that on average non-dizzy individuals perceived themselves as having significantly better mental health than did dizzy persons. An ANCOVA was run to determine if the dizzy group had significantly worse perceived mental health than did non-dizzy individuals after controlling for number of medical diagnoses and number of medications. This one-tailed test was not found to be statistically significant, $F(1,58) = 2.69$, $p = .053$. The adjusted average mental health

subscale scores were 63.42 (SE = 3.32) for the dizzy group and 71.06 (SE = 3.10) for their non-dizzy peers.

In summary, the average physical health score for all participants was lower than that for an age-equivalent normative group (Ware, Kosinski, & Keller, 1994; see Figure 1). The average mental health score was comparable to the normative group. For perceived physical health, the dizzy group felt significantly worse than their peers regarding bodily pain and general health only before controlling for medical conditions and drugs. However, dizzy individuals perceived their physical functioning to be significantly better than their non-dizzy counterparts after controlling for the medical factors. The dizzy group perceived their mental health total to be lower than did the non-dizzy group only before controlling for medical diagnoses and medications. Dizzy individuals had lower mental health subscale scores than did non-dizzy persons, although this result was also not maintained after drugs and medical diagnoses were statistically controlled.

Discussion

Dizziness Prevalence and Characteristics

Dizziness is a complex, multifaceted phenomenon, consisting of various different and overlapping sensations. Patients often have difficulty describing these subjective feelings, and thus the measurement of dizziness is a difficult exercise for both the clinician and researcher (Baloh, 1984; Drachman & Hart, 1972; Reilly, 1991). The present study developed a pilot questionnaire, the DQ, in an attempt to measure this complicated problem. Items were selected to reflect what has been considered useful by

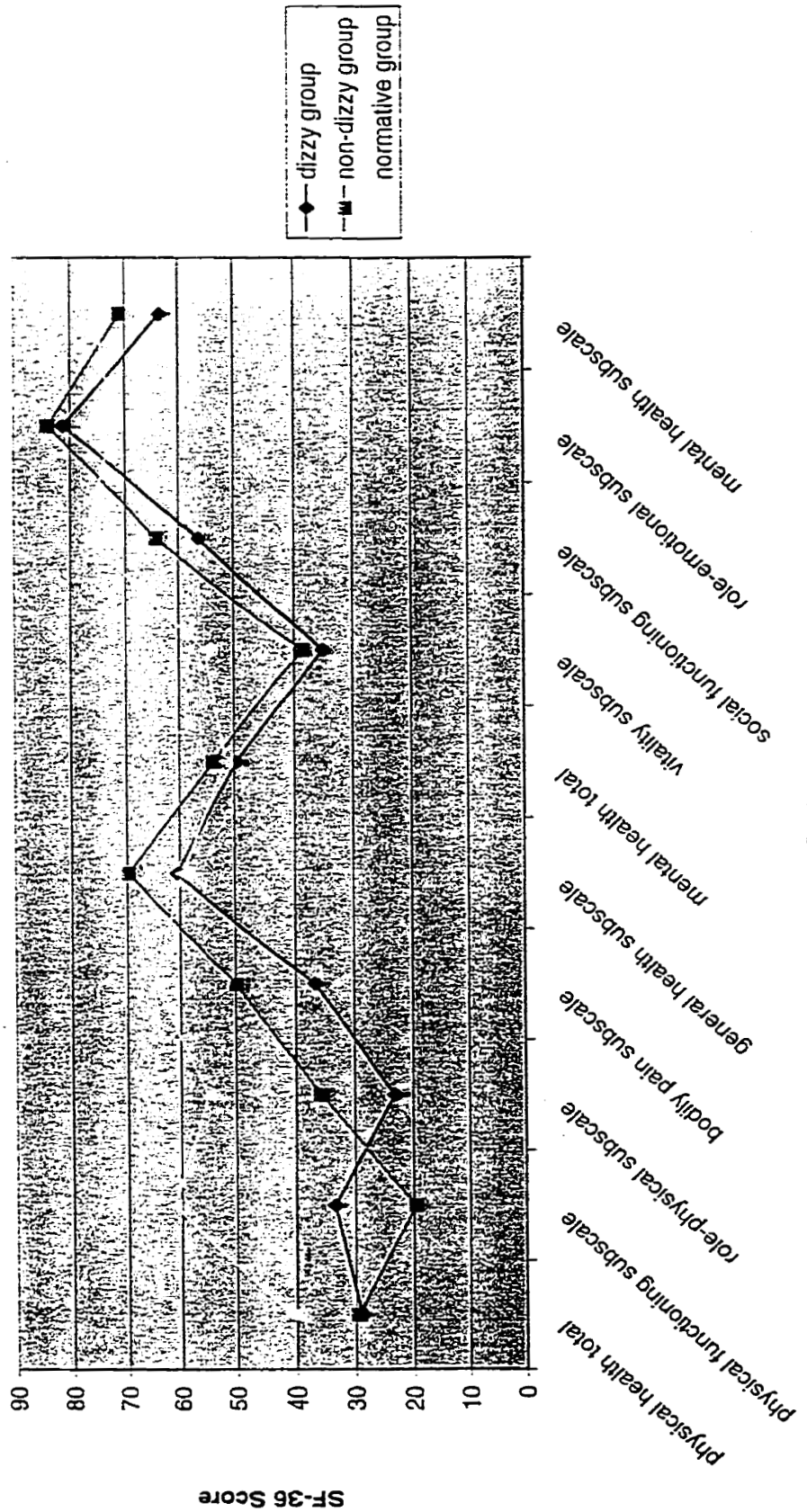

Figure 1. SF-36 Physical and Mental Health Total Scores and Subscale Scores for dizzy, non-dizzy, and age-matched normative groups.

other researchers working with the elderly and also to reflect what has been used by clinicians in local hospitals. Questions used in the present instrument were designed to investigate symptoms and characteristics of dizziness found to be prevalent in past studies (Colledge et al., 1994; Grimby & Rosenhall, 1995; Sixt & Landahl, 1987; Sloane et al., 1994; Sloane & Baloh, 1989).

Results of reliability analyses of the DQ were promising. The DQ question of presence of dizziness showed moderate agreement with a chart review question and strong test-retest reliability. Drachman & Hart (1972) found that some patients, although referred for dizziness evaluation, denied experiencing dizziness. A similar effect may have occurred in the present investigation, as nurses wrote "denial of dizziness" for some individuals answering "no" to the chart review question. In other words, some patients may have denied symptoms when answering the chart question but answered "yes" to the question on the DQ. As such, the true reliability of this question may be even higher than is shown in the present analyses. Overall, the DQ appears to do a very good job of detecting the presence of dizziness in older adult medical patients.

With regard to the reliability of specific symptoms of dizziness, blacking out showed strong test-retest agreement and fear of falling showed moderate agreement. Lightheadedness was noted by all patients tested at the two time periods, and therefore is the most consistent symptom found in this sample of dizzy elders. Due to their high reliability, all three of these items may be especially useful for researchers and clinicians in assessing whether or not a patient suffers from dizziness. Perhaps these symptoms are more easily remembered by patients from one time period to the next because they rightly

signify to the individual more potential for physical injury. All three symptoms can be related to falls, a prevalent problem in the elderly which can have numerous and serious consequences. Falls can lead to physical injury or even death, and often lead to loss of confidence and independence (Campbell et al., 1981; Nevitt et al., 1989; Prudham & Evans, 1981; Venna, 1986). An individual who has suffered a fall may well become highly anxious about the possibility of their dizziness symptoms (i.e., lightheadedness, blacking out) causing future falls.

Sixty-two older adult medical inpatients participated in this study. The results are generalizable to the population of frail geriatric persons that the hospital unit usually serves, as demographic variables of the present sample were similar to those typically observed (Calgary Regional Health Authority, 2000). The prevalence of dizziness was established to be 46.8%, indicating that this symptom is a prevalent and troubling concern for this sample of people. Prevalence rates for community-dwelling elderly are somewhat lower, ranging from approximately 30 to 40% (see Colledge et al., 1994; Grimby & Rosenhall, 1995; Sixt & Landahl, 1987; Sloane et al., 1989). As the present study examined the prevalence of dizziness in a group of medical inpatients, as opposed to community-dwelling outpatients as in previous studies, the results suggest that the seriousness of the physical problems of the current group contributes to the high prevalence of this problem. Indeed, research has found that the many medical conditions can be causal or contributing factors in cases of dizziness (Drachman, 1998).

Further pointing to the severity of dizziness found in this sample, 18% of individuals experienced dizziness at least daily, and about a third experienced symptoms

at least weekly or monthly. These results indicate that, not only is the prevalence of dizziness in this group extremely high, but the frequency of dizzy spells is also very high. Dizzy spells lasted either a few seconds or a few minutes for most patients, and thus appears to occur in attacks as opposed to in continuous form in this sample. Total duration of symptoms emphasized further the severity of this problem. Over half of the participants had experienced dizziness for at least two years or more, with many of these having suffered with symptoms for over 10 years. This is an extremely long period of time in which to endure any symptom. These results are all similar to those of previous studies (e.g., Colledge et al., 1994; Grimby & Rosenhall, 1995; Sixt & Landahl, 1987; Sloane et al., 1989, 1994; Sloane & Baloh, 1989), indicating that frequency and duration of dizzy spells and total duration of symptoms are consistently problematic across different populations of dizzy older adults. The severity of this problem in different groups of seniors suggests that dizziness be an integral component of not only non-routine examinations of medically ill elderly, but also of regular physical checkups.

A variety of symptoms were endorsed concerning the nature of the dizziness experienced by participants. Lightheadedness was the most frequently reported symptom, and was experienced in over three-quarters of dizzy patients. Since feelings of lightheadedness are usually thought to indicate psychogenic dizziness, the present results imply that many cases of dizziness in the sample have likely been caused at least in part by psychological factors. In addition, almost half of the dizzy group had a tendency to fall when experiencing symptoms of dizziness. As falls are the leading cause of death by injury in those 75 years and older (Baker et al., 1984), the extremely high prevalence of

falls in this study is clinically very significant. The high prevalence of falls in the current sample may well be the reason why many of these individuals were in this rehabilitiation program in the first place. This is supported by the finding that 60% of these elders have locomotor problems (usually fractured hips as a result of falls) as the primary diagnosis. Since the patients in this sample were rehabilitation inpatients, they were expected to perform exercises every day to re-build their muscular strength and the ability to perform independent activities such as walking. However, as the results also conclude, over half of these patients felt at risk for falling, felt a fear of falling, and experienced loss of balance when walking; the patients endorsed all three of these variables as being specifically associated with their dizziness. Therefore, health care professionals attempting rehabilitation with this group of individuals who are highly fearful of falling, and who experience tendencies to feel lightheaded and lose balance, must assess, acknowledge, and attempt to treat the dizziness associated with these fears and symptoms. Clinicians should ask specifically about dizziness, lightheadedness, falls, and negative cognitions about these symptoms. Nurses and rehabilitation professionals who are informed that a particular patient experiences dizziness and fear of falling should take such information into account when helping rehabilitate patients. For instance, patients with this cluster of dizzy symptoms and fears may need extra encouragement when practicing fear-arousing activities such as walking. Moreover, safety precautions such as guard rails or walking canes may be especially important for patients who suffer from dizziness. If the dizziness itself and the anxiety associated with the dizziness are not addressed, improvements to full or near-full recovery may be less likely. Future research

must investigate the merit of this possibility.

Medical Conditions and Medications

This study examined the total number of diagnoses in each patient as an index of general health. The mean number of medical diagnoses for the entire sample was 5.27. Although older adults are generally observed to have various health problems (Koch & Smith, 1985), the present sample had double the number of medical problems typically seen in the community (Grimby & Rosenhall, 1995). As stated above, the majority of patients had locomotor problems as their major medical diagnosis. Much smaller numbers of individuals had other medical problems as their main medical conditions, which included lung problems, cardiac problems, and other less frequent diagnoses. Locomotor problems, such as arthritis and falls leading to broken hips, are not typically considered to be major medical causes of dizziness (Drachman, 1994; Drachman & Hart, 1972). Therefore, the high prevalence of locomotor disorders in this sample does not appear to explain the frequent occurrence of dizziness. Although lung and cardiac problems are believed to sometimes cause dizziness (Drachman, 1998), relatively few individuals in this sample experienced these problems as major diagnoses. As such, lung and cardiac problems are unlikely to account for the majority of the cases of dizziness found in this study.

A significant difference in the average number of medications taken by individuals in the dizzy and non-dizzy groups was found, with individuals in the dizzy group taking significantly more medications (10.76) than those in the non-dizzy group (8.18). As may be expected from this medically frail sample, individuals were taking

many more drugs than is typical for their community-dwelling peers (Grimby & Rosenhall, 1995). With regard to types of drugs taken, there were no differences between the dizzy and non-dizzy groups in the present investigation. Moreover, drugs typically believed to be associated with dizziness, such as benzodiazepines, were not being taken by many participants, and thus possibly did not have an overwhelming influence on occurrence of dizziness in this sample as a whole. Overall, the idea that drugs are entirely causing the dizziness in this sample does not appear likely, although it is conceivable that drugs contribute to the problem. In order to account for any possible affects of total numbers of medical diagnoses and medications, the major analyses conducted in this investigation controlled for both of these factors. The results showed that other factors such as anxiety and perceived health were significantly associated with dizziness, even after factoring out medical variables; this implies that psychological factors are important components of cases of dizziness in this sample.

Anxiety and Depression

The primary hypothesis of this study was that dizzy individuals would be more anxious than non-dizzy persons. Whereas other studies with dizzy older adults have focused on existential components of anxiety such as nervousness and worry, the present focus was on somatic components of anxiety. The BAI was chosen in the current investigation because it measures somatic aspects of anxiety typically found in psychological problems (e.g., panic disorder, hyperventilation syndrome) which are frequently associated with dizziness (Drachman & Hart, 1972; Downton & Andrews, 1990; Hallam & Stephens, 1985; Yardley, Masson, et al., 1992; Yardley, Verschuur,

Masson, Luxon, & Haacke, 1992). Previous reports conducted with samples of all ages have consistently found high levels of internal consistency (Beck et al., 1988; Beck, Steer, Ball, Ciervo, & Kabat, 1997; Borden et al., 1991; Cox et al., 1996; Fydrich et al., 1992; Hewitt & Norton, 1993; Kabacoff et al., 1997; Kumar, Steer, & Beck, 1993; Osman et al., 1993; Steer, Beck, Brown, & Beck, 1993; Steer, Ranieri, et al., 1993; Steer, Rissmiller, et al., 1993; Wetherell & Arean, 1997). Present results indicate that the BAI is also quite reliable when used with older adult rehabilitation patients.

The overall level of anxiety reported indicated a normal level of anxiety for the entire sample. Confirming the hypothesis about the relationship between dizziness and anxiety, the results indicated that dizzy individuals were significantly more anxious than their non-dizzy counterparts, even after controlling for number of medical diagnoses and number of medications consumed. The dizzy group was found to have a mild to moderate level of anxiety, whereas the non-dizzy group was observed to have a normal level of anxiety. Of the four BAI anxiety subscales, the neuromotor, autonomic, and panic subscales significantly differentiated between the dizzy and non-dizzy groups, indicating that dizzy individuals had significantly higher neuromotor, autonomic, and panic subscale scores than did non-dizzy individuals. Other studies with older adults have found a strong relationship between dizziness and anxiety. Strong associations have been noted for dizziness and perception of one's self as a nervous person, worry, disturbing thoughts, and inability to relax (Grimby & Rosenhall, 1995; Sloane et al., 1989). The BAI measures both these more cognitive or existential types of anxiety as well as more somatic aspects of anxiety. Thus, the present research has expanded the

literature in observing that somatic aspects of anxiety are also highly related to dizziness.

The current results for anxiety might seem to imply that psychological factors in general are strongly related to dizziness. In order to determine whether psychological variables overall or anxiety in particular was related to dizziness in this sample, the other most common psychological factor found in the elderly, depression, was also assessed (Shamoian, 1991). As other types of psychological problems (e.g., psychosis) are relatively less frequent, assessment of anxiety and depression was believed to give a reasonable indication of psychological factors as a whole. The average level of depression in the present sample was slightly lower than the level considered to be indicative of depression in the literature (e.g., Herrmann et al., 1996; Lesher & Berryhill, 1994). As depression has been shown to be related to dizziness in past reports with seniors living in the community (Grimby & Rosenhall, 1995; Sloane et al., 1989, 1994), it was hypothesized that dizzy individuals would show significantly more depression than non-dizzy individuals in the current investigation. Contrary to this hypothesis, the two groups did not differ significantly in depression scores. This finding implies that, for medically frail elderly, any psychological influence on dizziness may be specific to anxiety.

Quality of Life: Functional Ability and Perceived Health

Although in clinical practice information from the SMAF is usually used on an item per item basis to determine if changes were being made in particular activities over time, the results from both the total scores and the subscale scores are important for this investigation. The SMAF disabilities score for the entire sample suggested that persons

in this study needed supervision in their activities as a whole. Individuals were on average fairly independent with regard to communication (e.g., vision, hearing) and mental functions (e.g., memory, comprehension). The older adults in this sample required more supervision in activities of daily living (e.g., eating, toiletting) and mobility (e.g., walking, negotiating stairs). On average, participants needed more help with instrumental activities of daily living (e.g., housekeeping, shopping).

The SMAF handicap score for the entire sample indicated that individuals in this study were fairly independent, but needed some supervision in their activities. As with the disabilities subscores, older adults in this study were quite independent in communication and mental functions. They required somewhat more supervision in instrumental activities of daily living. The reason this handicap subscore was better than its counterpart disabilities subscore is because resources are generally available to compensate for any disabilities in this area. Again, as with the disabilities subscores, the sample as a whole needed more supervision in activities of daily living and mobility. Overall, patients in this study required some supervision or assistance with many everyday activities. Lack of independence in performing daily activities has serious implications for these patients. For the purposes of the present study, functional ability at the time of admission onto the rehabilitation units was assessed. If improvements in functioning were not seen by the time of discharge, many of these patients may not have been able to move back to independent settings in the community.

The research hypothesis for functional ability predicted that those without dizziness would have higher levels of independence. Contrary to this hypothesis, the

dizzy and non-dizzy groups did not differ significantly in SMAF disabilities scores, SMAF handicap scores, or any of the subscores. Thus, dizziness does not appear to be related to functional ability in this sample of medical inpatients. A possible explanation for no relationship between dizziness and functional ability begins with acknowledging that all patients in this sample had multiple and severe medical problems unresponsive to conventional treatment and thus requiring rehabilitation. Patients had such serious and complicated medical conditions that perhaps the additional problem of dizziness did not make functional ability significantly worse than it already was.

The ability for these patients to continue living independently in the community may be influenced by factors other than objective functional ability. Perceptions of one's functioning may well affect one's motivation and hope for physical change. The average physical perceived health score for all participants was much worse than that for an age-equivalent normative group (Ware, Kosinski, & Keller, 1994). This result makes sense as the present study was concerned with medical inpatients. With the exception of the general health subscale, the average physical subscale scores for the entire sample were also much worse than for the normative group. These findings indicate that in general individuals in the present study perceive their physical health to be worse than is average for seniors. The average mental perceived health score for the entire sample was comparable to that of an age-equivalent normative group (Ware et al., 1994). Although the role-emotional subscale score was also comparable to those of the normative group, the three other mental health subscales were all worse than those of the normal population of seniors. These results suggest that persons in the present study perceive

their mental health to be about average for their age group in some areas but lower than average in other areas of mental health.

It was hypothesized that dizzy persons would have significantly worse perceived physical and mental health than would non-dizzy individuals. Supporting this prediction, dizzy individuals were found to experience more pain and worse general health than their non-dizzy counterparts. The results for bodily pain and general health were not upheld when drugs and medical diagnoses were statistically controlled for, pointing to the complicated biopsychosocial nature of dizziness. Alternately, after controlling for the medical factors, dizzy individuals actually perceived their physical functioning to be significantly better than did non-dizzy persons. Apparently, dizzy individuals perceive their physical functioning to be relatively higher but their bodily pain and general health to be relatively lower, as compared to their non-dizzy peers. Perhaps the dizzy patients have more distorted views of how good their physical functioning really is. Added to their relatively higher perceptions of bodily pain and general health, these patients conceivably may feel less incentive to work on their rehabilitation exercises. That is, their perceptions of relatively fair physical functioning may convince them that the exercises are not really needed, and their levels of pain and general health may further deter them from engaging in difficult exercises. Long-term follow-up research on possible differences in functional recovery of the dizzy and non-dizzy groups could provide a response for these hypothetical reasons for the differences in perceived physical health seen in the present investigation. Overall, both medical factors and perceived physical health appear to play a role in differentiating the dizzy from the non-dizzy

individuals in this sample.

Supporting the hypothesis for perceived mental health, the dizzy group scored lower on both the mental health total score and the mental health subscale, indicating perceived worse mental health on the whole as well as in areas such as nervousness and feeling sad or blue specifically. However, these results were not maintained after drugs and medical diagnoses were statistically controlled. Both medical factors and perceived mental health appear to increase the likelihood of dizziness in this sample, emphasizing the complicated nature of this frequent symptom.

Summary. In summary, this study found support for the importance of investigating dizziness in older adult rehabilitation inpatients. The results of this study are generalizable to the population of frail geriatric persons typically seen in the hospital rehabilitation program (Calgary Regional Health Authority, 2000). Dizziness was very prevalent in this sample, with many dizzy patients experiencing symptoms at least daily, and over half of participants having experienced dizziness for at least two years or longer in total. Symptoms of dizziness were most often experienced as lightheadedness, feeling at risk for falling, feeling a fear of falling, or loss of balance. Falls were very commonly associated with dizzy spells, occurring in almost half of individuals. Indeed, many individuals had locomotor problems, usually hip fractures due to falls, as their primary medical diagnosis. Clinicians working with rehabilitation patients could use this information - the fact that many falls may be due to dizziness - to re-focus their assessment and treatment techniques more adequately on dizziness and its correlates.

The medical and pharmacological data suggest that the average physical health of

individuals in this sample is quite poor compared to that of their community-dwelling age-matched peers (Ware et al., 1994). The already poor health of the participants likely explains the lack of differences found between the dizzy and non-dizzy groups with regard to functional ability. Poor functional ability may affect chances for improvement and long-term functional independence in the community. Dizziness made individuals feel significantly worse about their bodily pain and their general health. However, dizzy individuals perceived their physical functioning to be better than did their non-dizzy counterparts. This relatively higher perception of functioning in individuals who objectively have quite poor physical functioning may indicate some distorted or "unrealistic" thinking on the part of dizzy patients. Such thinking would correspond with the present finding of psychological factors being higher in dizzy individuals than in non-dizzy individuals. Further research would need to be conducted to support this suggestion of biased thinking.

The present results correspond with the literature that perceptions of health may be more important to consider when dealing with dizzy individuals than their objective health per se (Beyts, 1987; Hallam & Stephens, 1985; O'Connor et al., 1988). It could be conjectured that these dizzy persons may fail to improve as significantly as non-dizzy individuals on levels of independence, and thus may experience even poorer quality of life when moved back to a community setting. Future research examining possible differences in changes in functional ability between dizzy and non-dizzy groups would be very valuable for clinicians attempting to rehabilitate these seniors. Perceived mental health was linked to dizziness and anxiety. Anxiety may be an especially crucial

psychological factor to consider with dizzy older medical inpatients, since anxiety, but not depression, differentiated the dizzy from the non-dizzy individuals. In summary, non-medical variables, specifically perceived health and anxiety, appear to be the most important factors to consider when working with dizzy older adults with medical problems.

Strengths and Limitations of the Study and Directions for Future Research

Strengths. There were many strengths in the present study. Most previous work on dizziness has been conducted with outpatients, and the vast majority has been focused on younger adults. This is the first study to examine the prevalence and nature of dizziness a group of older adult medical inpatients, thus expanding the relatively scarce literature on this topic. Similarly, very little work on anxiety has been conducted with geriatric populations. The present study examined anxiety in a group that has not been well-studied in the past, and thus sheds more light on the nature and correlates of anxiety in geriatric inpatients.

Although the main focus of the present research was dizziness and its relationship with anxiety, other psychological and medical factors were also examined. Thus, not only was the nature and prevalence of dizziness in this population assessed, but the relationships between dizziness and other relevant factors were also addressed. The results of this study can help clinicians who work with geriatric medical inpatients focus on the variables that are most important in assessing dizziness in this group. This research can likewise point to future research directions with dizzy older adult populations.

Limitations. A limitation of this study was that the sample was not overly large, especially for conducting prevalence research. Also, few participants were retested with the DQ, thereby seriously limiting any conjecture about the reliability of the instrument. Future work using greater numbers of participants should be done to further test the reliability of the DQ. Such work would more clearly determine which questions are useful for clinicians to consider when working with patients. As this study was done with a particular group of seniors, those with substantial medical problems, the findings may not generalize to the older adult population as a whole and thus future research could attempt to replicate the current discoveries with other geriatric groups.

The primary focus of this research was to study the relationships between dizziness and other physical and mental variables. As such, although both numbers and categories of medical conditions and medications were examined in this study, analysis of the categories of both variables was somewhat limited. That is, only the primary diagnosis and four types of drugs were investigated. Future work could determine the categories of all diagnoses and medications in order to gain a deeper understanding of this understudied population of seniors.

Anxiety was found to be an important factor in cases of dizziness in this report. According to the literature, hyperventilation is often associated with anxiety in cases of dizziness. However, although the BAI was administered, and contains questions addressing many of the symptoms of hyperventilation syndrome, hyperventilation per se was not investigated. Future work could examine hyperventilation more specifically, perhaps examining physiological signs of hyperventilation.

Future directions. In addition to the suggestions made above, there are many directions for future study suggested by the current findings. Anxiety was particularly important in differentiating the dizzy and non-dizzy groups, with the dizzy individuals experiencing significantly more anxiety than their peers. The importance of psychological variables such as anxiety has implications for both research and clinical assessment and treatment of dizzy elderly medical patients. Psychological factors involved with dizziness are understudied in research and under-addressed in medical examinations. Typical clinical examinations of patients complaining of dizziness involve attempts to rule out the possible medical etiologies such as vestibular disease (Clark et al., 1993; Clark, Sullivan, et al., 1994; Sullivan et al., 1993). If no medical cause can be identified through the medical history, physical examination, and diagnostic testing then dizziness is usually presumed to be psychogenic (Sullivan et al., 1993). That is, psychological problems are only considered after medical disorders have been ruled out (Clark, Sullivan, et al., 1994). However, after deciding that the dizziness is psychogenic, physicians often reassure their patients that no pathological medical processes are present, and send patients home without further evaluation or treatment of possible psychological factors (Clark et al., 1993; Sullivan et al., 1993). There are many reasons that examinations of dizziness are often conducted in this manner, including the stigma associated with psychological issues and the focus of physicians on physical pathology. The result of such practice can be inaccurate or incomplete diagnosis and inadequate treatment of dizziness symptoms (Clark, Sullivan, et al., 1994).

The results of the present study concur with past research that psychological

variables should be a higher priority in assessment and treatment of dizziness. In fact, clinicians have observed that treatment of medical problems such as vestibular disorders is ineffective unless psychological problems are also addressed (Beyts, 1987; Levy & O'Leary, 1947). Patients seem to agree, with over half reporting standard medical treatment of their dizziness as not being helpful (Kroenke et al., 1990). It would be informative to conduct more research asking patients what their needs are in order to direct future attempts at treatment. For instance, a qualitative study to determine which components of the biopsychosocial nature of dizziness are most important to the patients themselves could be very revealing. As both the present and previous studies have shown, dizziness is a very prevalent problem in elderly populations. As such, physicians should begin by including the assessment of dizziness in regular medical screenings. Treatment of anxiety in dizzy patients could include cognitive-behavioral treatment techniques, since these methods have been found to have much success with anxious patients in the past (see Craske, 1999). However, other types of psychological treatments could also be proved effective upon future report. Much more work needs to be done in the future to determine the most effective treatments for anxiety in dizzy patients, dizzy older adults in particular.

Future research should likewise focus more on the relationship between anxiety and dizziness in seniors. A factor analysis of the BAI with dizzy older adults could be conducted to determine which aspects of anxiety are most important for this group. Psychiatric assessment in addition to self-report measures such as the BAI could be conducted with geriatric medical inpatients to determine if anxiety disorders replicate the

results that have been found for sub-clinical levels of anxiety. Although relationships between dizziness and other variables were examined in this study, etiology was not investigated. Research on the etiology of dizziness in geriatric samples would be additionally helpful in facilitating directions for future treatment efforts.

Along with anxiety, perceived physical health was an important variable in differentiating dizzy and non-dizzy groups in the current investigation. Future work, conducted either with a similar geriatric population or other groups of seniors, could employ a measure recently-developed by Prieto, Santed, Cobo, & Alonso (1999). The Vertigo, Dizziness, and Imbalance Questionnaire (VDI) is a self-completion instrument, specifically designed to assess health-related quality of life in dizzy patients. The VDI has been found to be reliable, valid, and sensitive to change, and might be found in future research to be useful in clinical work with dizzy seniors in order to assess their treatment needs more thoroughly.

In conclusion, the present investigation points to the value of conducting research in the area of geriatric dizziness. This work suggests that a cluster of symptoms involving lightheadedness, falls, fear of falling, imbalance, anxiety, and perceived health may be especially important. More research on the etiology of dizziness, perspectives of patients themselves, and more effective ways to assess and treat this frequent problem would greatly advance the body of literature on dizziness in the aged.

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Appendix A

UNIVERSITY OF CALGARY

Informed Consent Form

Research Project: Dizziness in the Elderly Patient

Investigators: C. E. Schnitzler, B.Sc., B.A.
Dr. D. Bakal
Department of Psychology, University of Calgary

This consent form, a copy of which has been given to you, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The purpose of this research is to examine the prevalence of dizziness in older adults in hospital rehabilitation units and to study the relationships among dizziness, anxiety, depression, well-being, and functional independence.

A researcher or research assistant will make an initial visit to you while on the unit in order to introduce herself and the purpose of the study. This initial meeting should take between 30 and 60 minutes. If you consent to participate in the study, the researcher or research assistant will arrange to meet with you on a second occasion, during which you will be asked to answer questions regarding dizziness, anxiety, and well-being. This second meeting should take approximately 45 to 60 minutes to complete.

All answers to the dizziness, anxiety, and well-being questions will be kept confidential and anonymous, and will not become part of your medical record. The investigators will be the only individuals who will have access to any information provided by participants. There should be no ill effects related directly to answering the questions.

This project will also require an examination of your medical chart in order to obtain information routinely collected by the hospital on depression, functional independence, and medical history.

(please see over)

The results of this study will provide information on the nature and significance of dizziness and its relationships to other areas of mental and physical health, in the hope that such information can subsequently lead to more effective treatments of dizziness for older adults.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time without jeopardizing your health care. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation. If you have further questions concerning matters related to this research, please contact:

Caroline E. Schnitzler, B.Sc., B.A. or Donald Bakal, Ph.D.
Phone: 220-4965 Phone: 541-3503

If you have any questions concerning your rights as a possible participant in this research, please contact the Office of Medical Bioethics, Faculty of Medicine, University of Calgary, at 220-7990.

_____ _____
Participant Date

_____ _____
Investigator Date

_____ _____
Witness Date

A copy of this consent form has been given to you to keep for your records and reference.

General findings and conclusions of this study will be mailed to all interested participants. Please initial the space if you wish to receive a copy of the results and conclusions from this research:

_____
(initial here)

Appendix B

Dizziness Questionnaire

I.
yes no 1. Do you ever experience feelings of dizziness?

II. When you are "dizzy" do you experience any of the following sensations? Please answer yes or no.
yes no 1. Lightheadedness.
yes no 2. Swimming sensation in the head.
yes no 3. Blacking out.
yes no 4. Loss of consciousness.
yes no 5. Do you feel at risk for falling?
yes no 6. Do you feel a fear of falling?
yes no 7. Tendency to fall: To the a. right b. left c. forward d. backward.
yes no 8. Objects spinning or turning around you.
yes no 9. Sensation that you are turning or spinning inside, with outside objects remaining stationary.
yes no 10. Loss of balance when walking: Veering to the a. right b. left.
yes no 11. Headache.
yes no 12. Nausea or vomiting.
yes no 13. Pressure in the head. If yes - where? _____
yes no 14. Chest pain.
yes no 15. Breathlessness.

III. Please answer yes or no to the following questions.
1. How often do you experience dizziness?
   a. constant b. daily c. weekly d. monthly e. less than monthly f. once or twice a year
2. How long do your dizzy spells last?
   a. a few seconds b. up to a minute c. several minutes d. up to an hour e. more than an hour
3. When did your dizziness first occur?
   a. less than 1 month ago b. 1-6 months ago c. 6 months-2 years ago d. 2-10 years ago e. more than 10 years ago
4. Are you completely free of dizziness between attacks?
5. Do any of the following actions provoke dizziness?
   a. bending over b. rising from lying to standing c. turning head d. looking up e. walking

yes no 6. Do you have trouble walking in the dark?
yes no 7. When you are dizzy, must you support yourself when standing? (expand)
_____
yes no 8. Do you know of any possible cause of your dizziness? What?
_____
9. Do you know of anything that will:
yes no Stop your dizziness or make it better? _____
yes no Make you dizziness worse? _____
yes no Precipitate an attack? _____
yes no 10. Do head movements or movement of objects in your visual field cause dizziness or imbalance?
yes no 11. Does coughing or straining bring on dizziness?
yes no 12. Were you exposed to any irritating fumes, paints, etc. at the onset of dizziness?
yes no 13. Do you have any allergies?
yes no 14. Have you ever injured your head? Were you unconscious? a. yes b. no
yes no 15. Do you use tobacco in any form? How much? _____
yes no 16. Do you use alcohol? How much? _____
yes no 17. Have you ever had ear surgery? _____
yes no 18. Do you have noise in your ears? a. both ears b. right c. left
Describe the noises _____
yes no Does noise change with dizziness? If so, how? _____
yes no Does anything stop the noise or make it better?

Appendix C

BAI®

NAME _____ DATE _____

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by each symptom during the PAST WEEK, INCLUDING TODAY, by placing an X in the corresponding space in the column next to each symptom.

	NOT AT ALL	MILDLY It did not bother me much.	MODERATELY It was very unpleasant, but I could stand it.	SEVERELY I could barely stand it.
1. Numbness or tingling.				
2. Feeling hot.				
3. Wobbliness in legs.				
4. Unable to relax.				
5. Fear of the worst happening.				
6. Dizzy or lightheaded.				
7. Heart pounding or racing.				
8. Unsteady.				
9. Terrified.				
10. Nervous.				
11. Feelings of choking.				
12. Hands trembling.				
13. Shaky.				
14. Fear of losing control.				
15. Difficulty breathing.				
16. Fear of dying.				
17. Scared.				
18. Indigestion or discomfort in abdomen.				
19. Faint.				
20. Face flushed.				
21. Sweating (not due to heat).				

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Appendix D

CHOOSE THE BEST ANSWER FOR HOW YOU FELT THE PAST WEEK	YES	NO
1. Are you basically satisfied with your life?	☐	☐
2. Have you dropped many of your activities and interests?	☐	☐
3. Do you feel that your life is empty?	☐	☐
4. Do you often get bored?	☐	☐
5. Are you in good spirits most of the time?	☐	☐
6. Are you afraid that something bad is going to happen to you?	☐	☐
7. Do you feel happy most of the time?	☐	☐
8. Do you often feel helpless?	☐	☐
9. Do you prefer to stay at home, rather than going out and doing new things?	☐	☐
10. Do you feel you have more problems with memory than most?	☐	☐
11. Do you think it is wonderful to be alive now?	☐	☐
12. Do you feel pretty worthless the way you are now?	☐	☐
13. Do you feel full of energy?	☐	☐
14. Do you feel that your situation is hopeless?	☐	☐
15. Do you think that most people are better off than you are?	☐	☐

SCORE _____ / 15

GERIATRIC DEPRESSION SCALE (G.D.S.)

(short version) – T.L. Brink - J.A. Yesavage

S.A.R.G.C.

Calgary District Hospital Group

☐ Rockyview Site ☐ Holy Cross Site ☐ Colonel Belcher Site

CDHG 0-3461 Jan 94

Appendix E

The SF-36™ Health Survey

Instructions for Completing the Questionnaire

Please answer every question. Some questions may look like others, but each one is different. Please take the time to read and answer each question carefully by filling in the bubble that best represents your response.

EXAMPLE

This is for your review. Do not answer this question. The questionnaire begins with the section ***Your Health in General*** below.

For each question you will be asked to fill in a bubble in each line:

1. How strongly do you agree or disagree with each of the following statements?

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
a) I enjoy listening to music.	○	●	○	○	○
b) I enjoy reading magazines.	●	○	○	○	○

Please begin answering the questions now.

Your Health in General

1. In general, would you say your health is:

Excellent	Very good	Good	Fair	Poor
○	○	○	○	○

2. **Compared to one year ago**, how would you rate your health in general now?

Much better now than one year ago	Somewhat better now than one year ago	About the same as one year ago	Somewhat worse now than one year ago	Much worse now than one year ago
○	○	○	○	○

Please turn the page and continue.

Patient name: _____ ***Age:*** _____

RGH ID #: _____

3. The following items are about activities you might do during a typical day. Does your **health now limit you** in these activities? If so, how much?

	Yes, Limited a lot	Yes, limited a little	No, not limited at all
a) **Vigorous activities**, such as running, lifting heavy objects, participating in strenuous sports	O	O	O
b) **Moderate activities**, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	O	O	O
c) Lifting or carrying groceries	O	O	O
d) Climbing **several** flights of stairs	O	O	O
e) Climbing **one** flight of stairs	O	O	O
f) Bending, kneeling, or stooping	O	O	O
g) Walking **more than a mile**	O	O	O
h) Walking **several blocks**	O	O	O
i) Walking **one block**	O	O	O
j) Bathing or dressing yourself	O	O	O

4. During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	Yes	No
a) Cut down on the **amount of time** you spent on work or other activities	O	O
b) **Accomplished less** than you would like	O	O
c) Were limited in the **kind** of work or other activities	O	O
d) Had **difficulty** performing the work or other activities (for example, it took extra time)	O	O

5. During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	Yes	No
a) Cut down on the **amount of time** you spent on work or other activities	O	O
b) **Accomplished less** than you would like	O	O
c) Didn't do work or other activities as **carefully** as usual	O	O

Please turn the page to continue.

6. During the **past 4 weeks**, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

Not at all	Slightly	Moderately	Quite a bit	Extremely
O	O	O	O	O

7. How much bodily pain have you had during the **past 4 weeks**?

None	Very mild	Mild	Moderate	Severe	Very severe
O	O	O	O	O	O

8. During the **past 4 weeks**, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	A little bit	Moderately	Quite a bit	Extremely
O	O	O	O	O

9. These questions are about how you feel and how things have been with you during the **past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the **past 4 weeks**...

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
a) did you feel full of pep?	O	O	O	O	O	O
b) have you been a very nervous person?	O	O	O	O	O	O
c) have you felt so down in the dumps nothing could cheer you up?	O	O	O	O	O	O
d) have you felt calm and peaceful?	O	O	O	O	O	O
e) did you have a lot of energy?	O	O	O	O	O	O
f) have you felt downhearted and blue?	O	O	O	O	O	O
g) did you feel worn out?	O	O	O	O	O	O
h) have you been a happy person?	O	O	O	O	O	O
i) did you feel tired?	O	O	O	O	O	O

10. During the **past 4 weeks**, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
O	O	O	O	O

11. How TRUE or FALSE is each of the following statements for you?

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
a) I seem to get sick a little easier than other people	O	O	O	O	O
b) I am as healthy as anybody I know	O	O	O	O	O
c) I expect my health to get worse	O	O	O	O	O
d) My health is excellent	O	O	O	O	O

***THANK YOU* FOR COMPLETING THIS QUESTIONNAIRE!**

Appendix F

FOR ADDRESSOGRAPH

ADMISSION: DAY HOSPITAL
SUMMARY SCORE

Site: _____ Date: _____

A. ADL	DISABILITIES (0,-1,-2,-3)	HANDICAP (0,-1,-2,-3)	EQUIPMENT	RESOURCE LIST
1. Eating				
2. Washing				
3. Dressing				
4. Grooming				
5. Urinary Function				
6. Bowel Function				
7. Toileting				
Sub-Score ADL /-21				
B. MOBILITY				
1. Transfers				
2. Walking Inside				
3. Walking Outside				
4. Donning Prosthesis/Orthosis				
5. Propelling wheelchair				
6. Negotiating Stairs				
Sub-Score -Mobility /-18				
C. COMMUNICATION				
1. Vision				
2. Hearing				
3. Speaking				
Sub-Score-Communication /-9				
D. MENTAL FUNCTIONS				
1. Memory				
2. Orientation				
3. Comprehension				
4. Judgment				
5. Behaviour				
Sub-Score-Mental Function /-15				
E. INSTRUMENTAL ADL				
1. Housekeeping				
2. Meal Preparation				
3. Shopping				
4. Laundry				
5. Telephone				
6. Transportation				
7. Medication Use				
8. Budgeting				
Sub-score-Instrumental ADL /-24				
TOTAL SCORE /-87				

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Appendix G

CRHA
Calgary Regional Health Authority

☐ FMC ☐ PLC
☐ CBVCC ☐ RGH

MINI-MENTAL STATE QUESTIONNAIRE

adapted from Marshall F. Folstein and Susan E. Folstein

INSTRUCTIONS:
Patient should be reassured about the nature of the screen. Ask questions in order listed. If visual impairment is present use large print cards or omit items 9, 10 and 11 and score out of 27. Interpret score with caution in individuals with little formal education, poor fluency in English or sensory impairments. Refer to Guide for Administration (Seniors' Health Acute Care) for details.

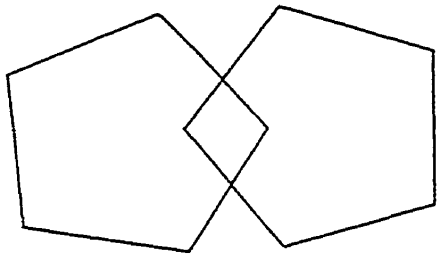
		Maximum Score	Patient's Score
ORIENTATION	1. What is the date? year, season, month, date, day?	5	
	2. Where are we? country, province, city, name of hospital or street, floor #	5	
REGISTRATION	3. Name 3 objects (*e.g.* apple, penny, table) or alternates (ball, chair, tree). Then ask patient to name them. Score one point for each correct answer. NOTE: You can repeat them up to 3 times until he/she registers perfectly all 3 but base the score on the first trial. Record number of trials:_____	3	
ATTENTION & CALCULATION	(*Administer both, count the higher score of the two.*) 4. a) Serial 7's. Count backwards by 7's from 100. Stop at five answers (*100 - 93 - 86 - 79 - 72 - 65*). One point for each correct answer. b) Ask him/her to spell "WORLD" backwards. One point for each letter in correct sequence ie: DLROW = 5, DLORW = 4 *(see Guide for scoring).*	5	
RECALL	5. Ask for names of 3 objects given above (question 3). Score one point for each correct answer.	3	
LANGUAGE TESTS	6. Point to two objects *e.g.* a pencil and a watch and ask for the name. Score one point for each correct answer.	2	
	7. Ask patient to repeat "NO IFS, ANDS OR BUTS". Score one point if correct (*must be exact and only one trial*).	1	
	8. Ask patient to follow a 3 stage command. "TAKE THE PAPER IN YOUR RIGHT HAND, FOLD THE PAPER IN HALF ONCE AND PUT THE PAPER DOWN ON THE FLOOR". Score one point for each correct action.	3	
	9. Ask patient to read (CLOSE YOUR EYES) and obey the instructions. Score one point for correct response.	1	
	10. Ask patient to write a sentence. Sentence must be sensible, must contain a subject and a verb and be written spontaneously. Ignore spelling errors.	1	
	11. Show patient a diagram of intersecting pentagons and ask him / her to copy intersecting pentagons. Score one point if all 10 angles are present and the overlap of pentagons is four-sides.	1	
	TOTAL SCORE →	30	

CCOSS (99/10)

Patient I.D. #

CLOSE YOUR EYES

WRITE A SENTENCE:



Level of Consciousness ☐ Alert ☐ Lethargic ☐ Fluctuating	Educational Attainment Highest grade/degree _____	Fluency in English ☐ YES ☐ NO
Note distractibility, frustration, exhaustion, and nature of cooperation. The patient's impression of his/her performance should also be noted.		
GENERAL COMMENTS: Note any known or observed motor, sensory, or perceptual deficits that may affect test performance (*e.g.* impaired vision or auditory acuity, tremor, apraxia, dysarthria) or translation into the patient's own language. Indicate first language if not English.		
Examiner's Signature	Date	Time