EVIDENCE–BASED PRACTICE GUIDELINE

WHEELCHAIR BIKING FOR THE TREATMENT OF DEPRESSION

AUTHORS:

Suzanne Fitzsimmons, MS, ARNP

Linda Buettner, CTRS, PhD

Series Editor:

Marita G. Titler, PhD, RN, FAAN

WHEELCHAIR BIKING

This is a general evidence-based practice guideline. Patient care continues to require individualization based on patient needs and requests.

Wheelchair Biking for the Treatment of Depression

Gerontological Nursing Interventions Research Center
Research Translation and Dissemination Core (RDC)

The University of Iowa
Iowa City, Iowa

Table of Contents

The University of Iowa Gerontological Nursing Interventions Research Center
Research Translation and Dissemination Core
Scheme for Grading the Strength and Consistency of Evidence in the Guideline

Evidence-based practice guidelines are developed from several sources of evidence, such as research findings, case reports and expert opinion. The practice recommendations are assigned an evidence grade based upon the type and strength of evidence from research and other literature.

The grading schema used to make recommendations in this evidence-based practice guideline is:

A = Evidence from well-designed meta-analysis.

B = Evidence from well-designed controlled trials, both randomized and nonrandomized, with results that consistently support a specific action (e.g. assessment, intervention or treatment).

C = Evidence from observational studies (e.g. correlational descriptive studies) or controlled trials with inconsistent results.

D = Evidence from expert opinion or multiple case reports.

For example, in this guideline on page 4 under the Introduction, a sentence is written as **"**Depression is associated with functional decline and excess mortality and therefore should be treated vigorously (Covinsky et al., 1997; Furlanetto et al., 2000; Gallo et al., 1997; Hays et al., 1995; Penninx et al., 1998; Rover, 1993. Evidence Grade = B)". This means that the practice recommendation is based upon the evidence from well-designed controlled trials, both randomized and nonrandomized, with results that consistently support a specific action (e.g. assessment, intervention or treatment).

Wheelchair Biking for the Treatment of Depression Evidence-Based Guideline
© The University of Iowa Gerontological Nursing Interventions Research Center
Research Translation and Dissemination Core
Written 02/03
Distribution or Copying of this Guideline is prohibited without authorized permission from the RTDC of the GNIRC Property of: Research Translation and Dissemination Core

INTRODUCTION

It is estimated that the incidence of depression in older adults living in long term care facilities can be as high as 50% (Ellen, 2001; Tueth, 1994) and is the most common mood disorder of late life (Butler & Lewis, 1995). Depression often goes undiagnosed and therefore untreated (Devanand et al., 1994; Teresi et al., 2001). Diagnosing depression in this group is often difficult as older persons may exhibit non-specific somatic complaints rather than DSM-IV classified symptoms of depressed mood (Gallo & Rabins, 1999; Waintraub, 1998). Minor depression often becomes a chronic illness in this group but is not a part of normal aging (Lammer & Ham, 1997). Depression may be associated with side effects of medications or compounded by medical conditions such as a cerebral vascular accident, Parkinson's or heart diseases. It may be caused by a multitude of psychological conditions such as coping with chronic illness and frequent pain, gloomy institutionalized environments, and an assortment of losses including function, independence, social roles, friends and relatives, and past leisure activities. Depression is associated with functional decline and excess mortality and therefore should be treated vigorously (Covinsky et al., 1997; Furlanetto et al., 2000; Gallo et al., 1997; Hays et al., 1995; Penninx et al., 1998; Rover, 1993. Evidence Grade = B). Depression is associated with increased falls (Arthur, Matthews, Jagger, & Lindesay, 2002; Cwikel, Fried, & Galinsky, 1989; Granek et al., 1987; Mossey, 1985; Nevitt, Cumings, Kidd, & Black, 1989; Thapa, Gideon, Fought, & Ray, 1995; Tinetti et al., 1986. Evidence Grade = B) and poorer recoveries following fractures (Craik, 1994; Mutran, Reitzes, Mossey, & Fernandez, 1995; Sheperd & Prescott, 1996). It has also been demonstrated that depression can be spread from one person to another in a phenomenon known as emotional contagion (Joiner & Katz, 1999; Lammer & Ham, 1997. Evidence Grade = A).

Social interactions and pleasurable experiences are ways of providing the elderly with opportunities to attain happiness, purpose and quality of life. The ability to reach this mood state level is often out of reach to those elderly residing in long term facilities with depressive diseases. This group frequently has compounding constraints to leisure in the form of multiple chronic conditions such as cognitive and mobility impairments and numerous medical diagnoses (Buettner & Martin, 1995). Recreational therapists are specifically trained to help individuals with disabilities overcome such complex constraints. Recreational therapy is an important, yet often overlooked treatment option for long term care residents with depression. Research examining the link between the body and mind has repeatedly demonstrated that a person's mood and attitude affects not only their immune system but other body systems as depression increases the parasympathetic nervous system leading to a vast assortment of medical illnesses (Carlin, 1998; Cole-King et al, 2001; Ferketich et al., 2000; Haroutune et al., 1998; Lammer & Ham, 1997; Penninx et al., 1998. Evidence Grade = B).

Depression is best treated using a combination of medication and therapy including life-style changes (Reynolds et al., 1999). Unfortunately many long term care facilities only offer medication as a treatment for depression. None of the antidepressant medications are 100% effective in treating depression and the risks of their usage are a multitude of adverse side effects. The most costly of these side effects, in terms of quality of life and dollars, is falls. Association between antidepressant medication usage and falls has been repeatedly demonstrated

(Cummings, Nevitt, & Kidd, 1988; Ebly, Hogan, & Fung, 1997; Lord, Anstey, Williams, & Ward, 1995. Evidence Grade = B). Because of the serious side effects of these medications and sensitivity of older persons to these effects the safest intervention may be a non-pharmaceutical one.

Research shows that for mild depression, non-drug therapies are as effective as antidepressant medications (National Institutes of Health, 1998. Evidence Grade = B). Psychotherapy interventions for persons in long term care are not frequently offered and its usage is questionable given its high cost and poor efficacy rate in persons with dementia, who comprise 60 - 80% of long-term care residents (German, Rover, Burton, Brandt, & Clark, 1992). Psychosocial interventions may provide a feasible, safe alternative or complementary intervention to the current treatment modality for this population. Care to residents of long-term care facilities is best delivered, and even mandated by state and federal regulations, in an interdisciplinary manner (Drinka & Clark, 2000; National Institutes of Health, 1991). The expertise of nursing and recreation therapy professionals combined, make development of psychosocial interventions for depression feasible.

Fitzsimmons (2001. Evidence Grade = B) was the first to investigate the use of a wheelchair biking program for the treatment of depression for older adults in a long-term care setting. During this study the program was conducted in an interdisciplinary manner by both recreational therapists and nursing staff members working as a team. Findings from this pilot study, a classical experimental design with randomization, identified a clinically and statistically significant reduction in depression after a two-week program of wheelchair biking. These findings were supported by Fitzsimmons & Buettner, (2002. Evidence Grade = B) when they replicated the study using only subjects with cognitive impairment. This study incorporated a 3-month maintenance biking period after a two-week intense intervention period. The findings from this showed statistically significant improvements in depression for the experimental group after the two-week period and depression scores continued to decline through the 3-month maintenance period. A third study by Benson, a recreational therapist, and Tatham (2001. Evidence Grade = B), replicated the pilot study again and supported the significant findings.

The conceptual framework for this intervention is the Roy Adaptation Model, in which the person is conceptualized as an open adaptive system engaging in interactions with environmental stimuli (Roy, 1991). The individual, as an open system, is in constant change with the environment. Treatment of the older adult with depression is aimed at manipulating the environment with a psychosocial intervention, a therapy biking program. The objective of this intervention is to increase positive coping mechanisms through social interactions and to provide enjoyable experiences to minimize, reduce or eliminate depressive moods. The Roy Adaptive Model is a systems model that focuses on outcomes. The adaptive response to the therapy biking program intervention is a decrease in the level of depression. When people are in an adaptive state they have more energy to respond to other stimuli. "This freeing of energy links the concept of adaptation to the concept of health" (McQuiston & Webb, 1995).

"Depression is a behavior that is learned and maintained through a series of positive and negative reinforcement contingencies. Therefore, depression

can be reduced or eliminated by altering the contingencies that maintain
depressive behaviors and by introducing new contingencies to stimulate
and maintain nondepressive behaviors. Both of these theories suggest a
cycle of depression that, once interrupted, can lead to remission." (Teri &
Gallagher-Thompson, 1991, p. 413).

Depression, in the long-term care setting, is maintained by a series of person-environmental
interactions that include an excess of negative experiences and a deficit of positive experiences.
The introduction of this powerful intervention, wheelchair biking, provides a positive
experience and may interrupt the cycle of depression.

PURPOSE

The purpose of this evidence-based guideline is to describe a specific recreation therapy
program, wheelchair biking, for the treatment of depression in older adults, with and without
cognitive impairments. The goal of this guideline is to reduce depressive mood in older adults
and to provide a complimentary or alternative treatment to medications.

DEFINITION OF KEY TERMS

- Recreation Therapy: The American Therapeutic Recreation Association (ATRA) defines
therapeutic recreation as "the provision of Treatment Services and the provision of
Recreation Services to persons with illnesses or disabling conditions. The primary purposes
of Treatment Services, which are often referred to as Recreational Therapy, are to restore,
remediate or rehabilitate in order to improve functioning and independence as well as reduce
or eliminate the effects of illness or disability. The primary purposes of Recreational
Services are to provide recreation resources and opportunities in order to improve health and
well-being. Therapeutic recreation is provided by professionals who are trained and
certified, registered and/or licensed to provide therapeutic recreation" (ATRA, 2002).

- Certified Therapeutic Recreation Specialist (CTRS™): The National Council for Therapeutic
Recreation Certification states that a Recreational Therapist is "an individual who, at a
minimum, is a graduate of a Baccalaureate degree program in recreational therapy accredited
by a nationally recognized accreditation body; is currently a CTRS™ by the National
Council for Therapeutic Recreation Certification (NCTRC); meets any current legal
requirement of licensure, registration, or certification; or has the documented equivalent in
education, training and experience and is currently competent in the field. In order to obtain
CTRS certification, candidates must first meet minimum educational and experiential
requirements and then pass a computer-based examination. The examination is administered
by an independent, experienced, national testing organization. CTRS™s are also required to
become recertified after five years. CTRSs may become recertified by accumulating a
combination of work experience, continuing education, and/or retesting. This recertification
program was established to ensure the continued and current competence of therapeutic
recreation specialists" (National Council for Therapeutic Recreation Certification, 2002).

- Depression: Depression may be major, minor (dysthymic), or atypical as defined by DSM-IV criteria. Minor depression is more frequent than major depression, with 8 to 20 percent of older community residents displaying symptoms (Alexopoulos et al., 1997; Gallo & Lebowitz, 1999), and 17 to 35 percent of older primary care patients having symptoms (Gurland et al., 1996). For a diagnosis of major depressive disorder, symptoms must be present most of the day, nearly daily for two weeks. At least five of the following symptoms must be present during the same period with at least one of the first two symptoms: (1) depressed mood most of the day, nearly every day, (2) markedly diminished interest or pleasure in almost all activities most of the day, nearly every day, (3) significant weight loss/gain, (4) insomnia/hypersomnia, (5) psychomotor agitation/retardation, (6) fatigue (loss of energy), (7) feelings of worthlessness (guilt), (8) impaired concentration (indecisiveness), and (9) recurrent thoughts of death or suicide. The essential feature of dysthymic disorder, also known as minor depression, is a chronic mood disturbance present most of the day, more days than not, for at least 2 years. While depressed, at least two of the following must be present: (1) poor appetite/overeating, (2) insomnia or hypersomnia, (3) low energy/fatigue, (4) low self-esteem, (5) poor concentration or difficulty making decisions, and (6) feelings of hopelessness. In addition, during the 2-year period of the disturbance, the client is never without symptoms for more than 2 months at a time. There must also be no evidence of a major depressive episode during the first 2 years, never had a manic or hypomanic episode, not superimposed on a chronic psychotic disorder, such as schizophrenia or delusional disorder and cannot be established that an organic factor initiated and maintained the disturbance (American Psychiatric Association, 1994).

- Wheelchair Biking: Wheelchair Biking is a type of recreational intervention designed for use with older adults in order to extend their mobility and recreational options. The intervention uses a Duet bike, which is a modified tandem bicycle, also called the Rollfiets, manufactured in Germany by Robert Hoening Spezialfahrzeuge (Hoening, 2002). The front of this system is a detachable wheelchair that acts as the front wheel of the bike. This rugged wheelchair is attached to a half bicycle, and which is unusable on its own. The specially designed chair, shaped from fiberglass-reinforced plastic, has padding and adjustable foot and headrests. When fixed to the cycle the chair tilts back, lifting the small front guide wheels off the ground. This gives a relaxed, stable seating position and makes conversation between resident and rider easier. This system enables the resident, at all functioning levels, even with severe disabilities, to ride in the wheelchair while the caregiver pedals and steers from the back.

- Dementia is a clinical state characterized by loss of function in multiple cognitive domains. The most commonly used criteria for diagnoses of dementia is the DSM-IV (American Psychiatric Association, 1994). Diagnostic features include: memory impairment and at least one of the following: aphasia, apraxia, agnosia, and disturbances in executive functioning. In addition, the cognitive impairments must be severe enough to cause impairment in social and occupational functioning. Importantly, the decline must represent a decline from a previously higher level of functioning. Finally, the diagnosis of dementia should NOT be made if the cognitive deficits occur exclusively during the course of a delirium.

INDIVIDUALS/PATIENTS AT RISK FOR DEPRESSION

This wheelchair biking guideline is designed to treat older adults who are depressed or at risk for depression. Clinical and research findings have identified the following as risk factors for depression in the older adult:

- Medication Usage: Some antihypertensive, hormonal and neuroleptics agents, Carbidopa/levodopa, Beta blockers, Clonidine, Benzodiazepines, Barbiturates, Anticonvulsants, Histamine-2 blockers, Calcium channel blockers, Thiazide diuretics, Digoxin, and narcotics (Bender, 1998; U.S. Dept. of Health, 1999. Evidence Grade = A). Polypharmacy, defined as three or more medications per day, was also found to place patients at high risk (Garcia & Tobias, 2001. Evidence Grade = B).

- Medical Causes:
    - Chronic illness: Late-life mental disorders are often detected in association with somatic illness (Reynolds et al., 1999. Evidence Grade = B). The prevalence of clinically significant depression in later life is estimated to be highest, approximately 25 percent, among those with chronic illness, especially with ischemic heart disease, stroke, cancer, chronic lung disease, arthritis, Alzheimer's Disease, and Parkinson's Disease (U.S. Dept. of Health, 1999. Evidence Grade = B).
    - Cardiovascular accidents: Six prospective evaluations of depressive symptoms/syndromes using various criteria revealed the prevalence of major depressive disorder to be between 10 and 27 percent in post-stroke patients, with an additional 15 to 40 percent showing less severe forms of illness within 2 months of the stroke (U.S. Dept. of Health, 1999. Evidence Grade = B).
    - Dementia: Approximately 30 to 40 percent of Alzheimer's disease patients demonstrate formal depressive mood syndromes and/or psychotic symptoms sometime during their illness (Reichman & Coyne, 1995; U.S. Dept. of Health, 1999. Evidence Grade = B).
    - Parkinson's disease: Approximately 50 percent of Parkinson's patients with dementing symptoms have major depressive disorder sometime during the course of the illness (U.S. Dept. of Health, 1999. Evidence Grade = A).
    - Diabetes: Numerous recent studies that have estimated the prevalence of depression in treated samples of diabetic adults suggest that major depressive syndrome is a approximately three times more common in patients with diabetes than in the general population (U.S. Dept. of Health, 1999. Evidence Grade = A).
    - Coronary Artery Disease: The relationship between depression and increased morbidity and mortality is well documented in both post-myocardial infarction patients and in coronary artery disease patients without myocardial infarction (U.S. Dept. of Health, 1999. Evidence Grade = A).
    - Persistent insomnia, occurring in 5 to 10 percent of older adults, is a risk factor for the subsequent onset of new cases of major depression in older persons (U.S. Dept. of Health, 1999. Evidence Grade = B).

- Impaired Vision: The rate of depression among nursing home residents with visual impairments exceeds 45% (Ip, Leung, & Mak, 2000. Evidence Grade = B).
- Hearing Impairment: Older adults with hearing impairments have significantly more depressive symptoms than normal hearing older adults (Kramer, Kapteyn, Kuik, & Degg, 2002. Evidence Grade = B).
- Posttraumatic Stress Disorder: PTSD studies have found high levels of comorbid major depressive disorders (Franklin & Zimmerman, 2001. Evidence Grade = B).
- Pain: Correlates with depression and more severe if the depression is unrecognized (Horgas & Dunn, 2001. Evidence Grade = B).
- Urinary Incontinence: There is an association between depression and patients with urinary incontinence (Brown, McGhan & Chekroverty, 2000; Engberg et al., 2001; Steers & Lee, 2001; Zorn et al., 1999. Evidence Grade = B).

- Psychological Conditions:
  - Risk factors for late-onset depression, based on results of prospective studies, include educational attainment less than high school (Garcia & Tobias, 2001. Evidence Grade = B), female gender, (Garcia & Tobias, 2001. Evidence Grade = B), impaired physical functioning status (Garcia & Tobias, 2001; Jaffe, Froom, & Galambos, 1994. Evidence Grade = B), and heavy alcohol consumption (U.S. Dept. of Health, 1999. Evidence Grade = A).
  - Social Isolation: Social isolation correlates with depression among community dwelling elders (Solomon & Zinke, 1991. Evidence Grade = B) and for nursing home residents lack of social relationships with other residents is a strong predictor of depression (Fessman, & Lester, 2000; Garcia & Tobias, 2001. Evidence Grade = B).
  - Bereavement: At least 10 to 20 percent of widows and widowers develop clinically significant depression during the first year of bereavement (Carr, House, Wortman, Nesse & Kessler, 2001; U.S. Dept. of Health, 1999. Evidence Grade = B).
  - Losses: Correlations have been found between depression and a variety of losses including loss of family home, friends, social activities, volunteering, financial security, and marital harmony (Bellino et al., 2001; Kivela et al., 1996; Maciejewski, Prigerson, & Mazure, 2002; Piper et al., 2001; Wang, 2001. Evidence Grade = B).

ASSESSMENT CRITERIA

The Wheelchair Biking program is indicated for older adults with mild to moderate depression, with or without cognitive impairments. Clients should be selected for screening based on a diagnosis or history of depression, use of an antidepressant medication without a depression diagnosis, or signs and symptoms of depression noticed by staff, family or friends (Fitzsimmons, 2001. Evidence Grade = B). Frequently depression in the elderly has atypical presentation and thus is not diagnosed and therefore not treated and not in their medical records (Devanand et al., 1994). Signs of depression include sadness, weepiness, apathy, passivity, sleep disturbance, agitation, anxiety, decreased socialization, decreased verbalization, weight loss, mobility problems and frequent unspecific somatic complaints (U.S. Dept. of Health, 1999) (For further information, see the Evidence-Based Guideline: Detection of Depression in the Cognitively

Intact Older Adult by Piven, 1998). Depression is common in the elderly, but unless a mood assessment is performed, the diagnosis may be missed. Although mood assessment can be performed upon admission to a residential setting home, many patients may need time to adjust to their new surroundings. Allow one to two weeks to adjust to the new environment before screening for depression. Several formal assessment tools (listed below) are available to assess patients with depression. These tools and their descriptions can be found in Appendix A.

- Geriatric Depression Scale - Short Form (Sheikh & Yesavage, 1986)
- Geriatric Depression Scale - Long Form (Yesavage et al., 1983)
- Cornell Scale for Depression in Dementia (Alexopoulos, Abrams, Young, & Shamoian, 1988).

ASSESSMENT TOOLS

Keep in mind there are few older adults that can not participate in the Wheelchair Biking program. After identifying residents with depression the next step is to determine if the resident is able to safely participate (See Appendix B: **Wheelchair Biking Resident Selection Checklist**) and if the resident has an interest in participating. As it is difficult to describe the wheelchair bike, it is best to show the bike to the resident and ask them if they would like to take a ride on it sometime. If they are uncertain, ask them if they would like to watch others riding. Residents that **CAN** participate include those with and without dementia, those requiring assistance to transfer or a Hoyer lift to transfer, individuals with urinary drainage devices, portable oxygen and portable tube feedings (Fitzsimmons, 2001. Evidence Grade = B). Residents that **CANNOT** participate are individuals who have postural or other conditions, such as a decubitus ulcer, that prohibit them from sitting upright, those with extreme, unpredictable behaviors, and those with acute illnesses. If you are uncertain, ask the patient's physician or nurse practitioner.
A sample physician order for the therapy would be:
Recreational Therapy: Wheelchair biking qday X 2 weeks for depressive symptoms

DESCRIPTION OF THE PRACTICE

This program uses a specialized piece of therapy equipment called the Duet wheelchair bike. The Duet™ wheelchair bike is an innovative intervention as it can be used with the majority of nursing home residents (See Figure 1). This psychosocial treatment links two familiar items—a wheelchair and a bike, using the Duet™ wheelchair bicycle. The bike consists of a rugged wheelchair which attaches to a half a bicycle, and which is unusable on its own. The specially designed chair, orthopedically shaped from fiberglass, reinforced plastic, has padding and adjustable foot and headrest. When fixed to the cycle the chair tilts back, lifting the small front guide wheels off the floor. This gives a relaxed, stable seating position and makes conversation between resident and rider easier. The chair has good suspension and light handling, and it's off road tires are excellent on gravel and dirt tracks. There are twin drum brakes on the chair's wheel, and a back-pedal brake on the cycle wheel. Standard on the bike is a three-speed hub gear allowing easier pedaling up inclines. The bike comes with many additional safety features

including a chest harness seat belt and wheel-spoke covers. This system enables residents, at all levels of functioning, especially those individuals with severe disabilities, to ride in the wheelchair while the therapist pedals and steers from the back. This provides the older adult with an opportunity to enjoy extended mobility and a sense of freedom, an opportunity to be outdoors, to feel the wind and the sun, to socialize with others, and to bring back familiar childhood memories. The therapy biking program combines the approaches of small group socialization, reminiscing, and exercise therapies without the required mobility or advanced cognitive skills thereby making this treatment available to a wide range of older adults.

The cost of a Duet™ wheelchair bike and helmets is under $4000. The Duet™ is very well built and should last indefinitely and has the advantage that it can be used by persons other than facility staff members. It is an ideal intervention for family members to use as they are often at a loss of what to do while visiting. Facility staff members who use the bike enjoy riding residents and have commented that it makes the residents less depressed (Fitzsimmons, 2001). It provides the staff members with something meaningful and "fun" to do with their residents besides the daily bathing, dressing, feeding and toileting.

Figure 1: The Duet™ Wheelchair Bike

(Printed with permission)

Steps to Take to Set Up a Wheelchair Biking Program

Step 1: Determine the feasibility of a biking program. Is there safe space to ride outdoors? Minor hills are not a problem but a paved area with little traffic is important. A large facility

with wide halls and good turn-around spots can also use the bike indoors. If there is an interest in this program by facility management, staff, residents and family members, all disciplines, family members and even volunteers can be taught how to assist with the program.

Step 2: Determine who will be responsible for training the riders, as no one should ride a resident without understanding all functions of the bike. Make certain that everyone who is to ride residents is properly trained and rides another staff member **before** riding any residents (See Appendix C: **Wheelchair Bike Staff and Volunteer Training**, and Appendix D: **Wheelchair Biking Training Record**). Although the bike is easy to pedal, the steering is different from a conventional bicycle and takes some practice.

Step 3: Determine a safe bike route or course. This will be specific to your location but try to include areas of interest on your campus such as a pond or gardens. Consider having walkie-talkies available, one for the bike rider and one to remain with a staff member in the facility. Or use a cellular telephone. Have sunglasses available for residents on bright days. Other items you may want to have is a squeeze-type horn for your resident to use, bread to throw to fish, nuts for the squirrels along the way, and binoculars. Taking pictures of the resident on the bike allows residents to show their friends and family when they visit.

Step 4: Other things to consider include: 1) set up a designated space to house the bike when not in use, and 2) select a maintenance crew for minor repairs, and tire inflation (They also make wonderful bike peddlers).

Sep 5: Ordering the equipment: The Duet™ Tandem Wheelchair Bicycle is made in Germany and distributed in the United States by:

Frank Mobility Systems, Inc.
1003 International Drive
Oakdale, PA 15071

Toll Free (888) 426-8581
Phone (724) 695-7822
Fax (724) 695-3710
Email: info@frankmobility.com
http://www.frankmobility.com

The basic model bike, called the economy Duet™, has 3 speeds and is adequate for most settings. Optional equipment recommendations are based on past equipment used in research with older adults and is recommended for safety purposes (Benson & Tatham, 2002; Fitzsimmons, 2001; Fitzsimmons & Buettner, 2002). Contact authors for assistance and advise on purchasing the Duet. The recommended optional equipment includes:

- An adjustable headrest: which is helpful for patients with poor neck control.

- Swing away brackets for the footrest: making transferring on and off easier and safer.

- "H" style harness: which is helpful for patients who are post-stroke or have difficulty maintaining an upright position. The bike does come with a seatbelt that is adequate for most riders.

- Wheelchair spoke protectors: these prevent hands and fingers from injury from the wheelchair spokes when riding.

The Program

Optimal effectiveness is achieved by implementing the intervention for a two-week period, five days per week (Fitzsimmons, 2001; Fitzsimmons & Buettner, 2002). As it is not feasible to provide recreational therapy indefinitely to an individual resident, this two week intensive is followed by a maintenance period where the patient rides 2 days per week and encouraged to attend other facility activities the remaining days of the week. This one-hour program is designed for groups of three to five participants for each session and has two components (See Appendix E: **Therapy Biking Protocol for Older Adults in Residential Settings**). The residents should be grouped based on similar cognitive functioning levels with consideration given to the personalities of the individual residents. For example, you may not want to place two residents in the same group that has a known dislike for each other. Consideration must also be given to the physical functioning levels of the participants. For example, you may not wish to include, in the same group, four residents that require lifting devices to transfer to the wheelchair bike, unless you have the staff end equipment available during your program time to complete all of the transfers. Once the group is assembled the first rider is assisted into the wheelchair portion of the bike. The rest of the group sits with a second staff member and discusses biking and other activities from the past. One-by-one each rider is encouraged to put his or her safety helmet and H-harness on independently and take a ride. When he or she returns to the group a discussion is held about things seen during the ride. Ask the participant how he or she enjoyed his or her ride and record it on their ride record (See Appendix F: **Wheelchair Biking Ride Record**). This continues until all participants have had the opportunity to ride. This daily intervention may be best viewed as an intense two-week therapy period with the objective of initiating a change in symptoms of depression. It is then followed up with a maintenance biking therapy period of eight to ten weeks, with rides given two times a week in addition to encouragement and opportunity to participate in routine facility activities (Buettner & Fitzsimmons, 2002). During the maintenance period, staff informs residents of other facility activities that are available and assists, or arranges assistance, to transport the resident to the facility activities that interest the resident. These activities are unique to each facility but may include music, entertainment, art & crafts, intergenerational programs, pet visits, church and other on-going facility activities. Staff may also consider using the wheelchair bike to transport residents to these activities.

Using the Duet™ Wheelchair Bicycle

The Duet™ bike has two parts to it: the wheelchair, which is usable on its own and the bike portion, which is unusable on its own. The wheelchair, by itself, may be brought on a unit or into a residents' room for loading (See steps 4, 5, 6 next page). Or residents may be brought

outdoor and loaded onto the chair while it is attached to the bike. The two pieces of the wheelchair bike clip together with a u-bar, shackle and locking clip. Always check the tires of the bike and wheelchair, refill when they feel soft according the manufacturer recommendation. Caution should be taken on wet, slanting, uneven and slippery road surfaces.

Loading Riders:

1. Lock the front brakes of the wheelchair by pulling up on the parking brake bar on the back of the wheelchair and pushing the bar into the parking brake clip.
2. Align the back of the bike frame with the wheelchair and slip the u-bar into the catch on the back of the wheelchair.
3. Push the shackle forward into the catch. All four wheels of the wheelchair are still on the ground and you will want to seat your rider before proceeding (See Figure 2).
4. Unclip one side of the footrest by pulling out the slip pin and swing the footrest away prior to loading rider. Keep one side of the footrest attached. If using a lifting device to load a resident on the bike, you do not need to unclip the footrest.
5. Transfer rider to seat making certain s/he is sitting back in the chair. The chair angle may be adjusted using the directions from the manufacturer. This should be done prior to loading your passenger (See Figure 3).
6. Latch seat belt around rider and adjust to a comfortable tightness. Like with all seat belts they should be worn low around the hips rather than the waist.
7. Adjust the footrest height to a comfortable level by loosening the bolts and sliding the rest up or down. Tool for this adjustment is mounted on the back of the wheelchair. Then swing the footrest back into riding position and replace the slip pin. The headrest may also be raised up or down by loosening the bolts and sliding the headrest up or down. Be sure to tighten all bolts before proceeding.
8. Offer helmet and sunglasses and hat if sunny. If cool outdoor, offer a lap blanket or a sweater.
9. Tell your passenger that s/he will be lifted up a short distance, then push down on shackle locking clip. This will elevate the front wheels of the wheelchair approximately 2" off of the ground.
10. The pedaler should then mount the bike, unlock the front brake, and then start riding.

Figure 2: Step 3 shackle

Figure 3: Step 5 transfer

Unloading riders:

1. Stop bike and lock the parking brakes by pulling up on the brake bar and slipping it into the parking brake clip (See Figure 4).
2. Inform rider that her/his chair will lower a short distance. Push up on shackle locking clip and the front wheels of the wheelchair will touch the ground (See Figure 4).
3. If you wish to bring the rider back to the unit in the wheelchair, pull up on the bike frame near the shackle and the two parts will separate. Unlock the parking brake and return the passenger to the unit. Otherwise,
4. Unclip one side of footrest by pulling out the slip pin on one side and swing the footrest to one side.
5. Unfasten seat belt (See Figure 5).
6. Assist passenger out of wheelchair.

Cautions:
Never load or unload patients without the front brake on.
Never ride the bike without a passenger as this causes a load imbalance and can ruin the wheelchair inner tire tubes. The wheelchair bike is also less stable to ride without a passenger.
Never allow anyone to ride a patient without receiving training first.
Wheelchair bike should be locked when not in use by trained staff to prevent both the thief of the bike and by use of untrained personnel.

Figure 4: Step 1 & 2 parking break   Figure 5: Step 5 unfasten

Parking Brake

EVALUATION OF PROCESS AND OUTCOMES INDICATORS

Process Indicators

Process indicators are those interpersonal and environmental factors that can facilitate the use of a guideline.

One process factor that can be assessed with a sample of staff is knowledge about Wheelchair Biking for Depression. The **Wheelchair Biking for Depression Knowledge Assessment Test** (See Appendix G) should be assessed before and following the education of staff regarding use of this guideline.

The same sample of staff for whom the Knowledge Assessment test was given should also be given the **Process Evaluation Monitor** (See Appendix H) approximately one month following his/her use of the guideline. The purpose of this monitor is to determine his/her understanding of the guideline and to assess the support for carrying out the guideline.

Outcome Indicators

Outcome indicators are those expected to change or improve from consistent use of the guideline. The major outcome indicators that should be monitored over time are:

- Decrease in depressive symptoms: This will be individualized and specific for each patient and may include:

  - Sadness/weepiness

  - Loss of interest/apathy

  - Decreased socialization/ verbalization

  - Weight gain or loss

  - Low energy/fatigue

  - Unspecific complaints

For this guideline, direct observation, patient record audit or standardized formal assessment instruments (see below) may be used to evaluate whether depression has decreased:

Geriatric Depression Scale - Short Form (See Appendix A.1) (Sheikh & Yesavage, 1986).
Geriatric Depression Scale - Long Form (See Appendix A.2) (Yesavage et al., 1983).
Cornell Scale for Depression in Dementia (See Appendix A.3) (Alexopoulos et al., 1988).

Activity participation may be obtained from activity records. It is important to use the same method of evaluating depression before and after implementing the Wheelchair Biking intervention. It is recommended that post testing with an assessment instrument be performed after 2 weeks of intervention and monthly thereafter.
The Wheelchair Biking Outcomes monitor described in Appendix I is to be used for monitoring and evaluating the usefulness of the Wheelchair Biking guideline in improving outcomes of patients with depression. Please adapt this outcome monitor to your organization or unit and add outcomes you believe are important.

APPENDIX A
DEPRESSION ASSESSMENT TOOLS

Appendix A contains examples of assessment tools, instruments, and forms to use in patient assessment of depression. The purpose of the tool and instruction for use accompany each instrument or form. Tools, instruments and forms in Appendix A are:

- Appendix A.1 Geriatric Depression Scale – Short Form
- Appendix A.2 Geriatric Depression Scale – Long Form
- Appendix A.3 Cornell Scale for Depression

When assessing patients for depression, it is suggested to target patients for the Wheelchair Biking intervention whose score on the 1) Short form GDS is 5 or greater, or 2) Long form GDS is 9 or greater, or 3) Cornell score is 6 or greater, or 4) patient exhibits signs and symptoms of depression but does not score in the depression range on any scale.

APPENDIX A.1 & A.2
GERIATRIC DEPRESSION SCALE

Purpose: The short-form Geriatric Depression Scale (GDS) (Sheikh & Yesavage, 1986) is a widely used screening tool for assessment of depression in persons over the age of 55. It is especially useful in clinical settings to facilitate assessment of depression in older adults, especially when baseline measurements are compared to subsequent scores. The GDS may be used with healthy, medically ill, and mild to moderately cognitively impaired older adults. It has been extensively used in community, acute and long-term care settings. This instrument is a simple 15-item Yes/No answer interview that takes relatively few minutes to complete. The questions fall into the following domains: somatic concerns, lowered affect, impaired motivation, lack of self-esteem and lack of future orientation. **A score of five or above is strongly associated with depression (Sheikh & Yesavage, 1986)**. Research into the validity of this scale reported that the scale was as effective, in identifying depression, as the Philadelphia Geriatric Depression Scale or the 30-item Geriatric Depression Scale. The GDS has been tested and used extensively with the older population and was found to have a 92% sensitivity and an 89% specificity when evaluated against diagnostic criteria (Spitzer, Endicott, & Robins, 1978). The validity and reliability of the tool have been supported through both clinical practice and research (Salamero & Marcos, 1992). The original GDS was a 30-item questionnaire - time consuming and challenging for some patients (and staff). The later 15-item version retains only the most discriminating questions; with its validity approaches that of the original form (Sheikh & Yesavage, 1986). For the patient who is aphasic, it is suggested to use a point-board, or a board with the scale and yes/no next to the items and have patient point out correct answer. The strengths of the GDS are the ease in administration, short testing time and the ability to correctly discriminate between mild, moderate and severe depression (Kavan, Pace, Ponterotto, & Barone, 1990). The test is simple enough not to be distorted by low education levels. Drawbacks include that it covers only six of the nine DSM-III-R symptom categories for major depressive syndrome and ignores others such as appetite and weight loss. When given to elderly persons with dementia the sensitivity of this exam dropped to 65% (Gallo, Reichel, & Anderson, 1995). However, evidence that the GDS is as accurate a screening test for depression in cognitively impaired as in intact patients is reported (Burke et al., 1992; Feher et al., 1992).

Instructions: Ask patients if they prefer to read and self-administer the questions, or if they prefer, the nurse may read each question to them. If patients prefer to self-administer, ask if they require glasses. If they do, ask if they have their glasses with them.

Scoring:
For Short Form GDS: Score 1 point for a "yes" response for questions 2-4, 6, 8-10, 12, and 14-15. Score 1 point for a "no" response for questions 1, 5, 7, 11, and 13. Scores can range from 0 -15. The higher the score the more likely the individual is experiencing depression. **Although differing sensitivities and specificities have been obtained across studies, for clinical purposes a score of >5 points is suggestive of depression and should warrant a follow-up interview. Score of >10 are almost always depression.**

For Long Form GDS: Score 1 point for a "yes" response for questions 2-4, 6, 8,10-14, 16-18, 20, 22-26, and 28. Score 1 point for a "no" response to questions 1, 5, 7, 9, 15, 19, 21, 27, and 29-30.

- Normal---> Scored from 0 to 9
- Mild Depressives---> Scored from 10 to 19
- Severe Depressives---> Scored from 20 to 30

A score of 10 or above suggests depression and scores 23 or over almost always indicates depression.

PLEASE COPY THIS SCALE and place it in the charts of patients receiving the Wheelchair Biking guideline.

GERIATRIC DEPRESSION SCALE-SHORT FORM
(Sheik & Yesavage, 1986)

Date:_____

Patient:_____

Completed by: _____

*Tell patient to respond to questions based on how s/he has felt **over the past week**.*

	Circle the answer that best describes how you have felt <u>over the past week</u>.		
1.	Are you basically satisfied with your life?	Yes	No
2.	Have you dropped many of your activities and interests?	Yes	No
3.	Do you feel that your life is empty?	Yes	No
4.	Do you often get bored?	Yes	No
5.	Are you in good spirits most of the time?	Yes	No
6.	Are you afraid that something bad is going to happen to you?	Yes	No
7.	Do you feel happy most of the time?	Yes	No
8.	Do you often feel helpless?	Yes	No
9.	Do you prefer to stay at home, rather than going out and doing new things?	Yes	No
10.	Do you feel you have more problems with memory than most?	Yes	No
11.	Do you think it is wonderful to be alive now?	Yes	No
12.	Do you feel pretty worthless the way you are now?	Yes	No
13.	Do you feel full of energy?	Yes	No
14.	Do you feel your situation is hopeless?	Yes	No
15.	Do you think that most people are better off than you are?	Yes	No

Total Score: _____

GERIATRIC DEPRESSION SCALE- LONG FORM
(Yesavage et al., 1983)

Date:_____

Patient:_____

Completed by: _____

Choose the best answer for how you felt <u>over the past week</u> **Please Circle One**

1.	Are you basically satisfied with your life?	Yes	No
2.	Have you dropped many of your activities and interests?	Yes	No
3.	Do you feel that your life is empty?	Yes	No
4.	Do you often get bored?	Yes	No
5.	Are you hopeful about the future?	Yes	No
6.	Are you bothered by thoughts you can't get out of your head?	Yes	No
7.	Are you in good spirits most of the time?	Yes	No
8.	Are you afraid that something bad is going to happen to you?	Yes	No
9.	Do you feel happy most of the time?	Yes	No
10.	Do you often feel helpless?	Yes	No
11.	Do you often get restless and fidgety?	Yes	No
12.	Do you prefer to stay at home, rather than going out and doing new things?	Yes	No
13.	Do you frequently worry about the future?	Yes	No
14.	Do you feel you have more problems with memory than most?	Yes	No
15.	Do you think it is wonderful to be alive now?	Yes	No
16.	Do you often feel downhearted and blue?	Yes	No
17.	Do you feel pretty worthless the way you are now?	Yes	No
18.	Do you worry a lot about the past?	Yes	No
19.	Do you find life very exciting?	Yes	No
20.	Is it hard for you to get started on new projects?	Yes	No
21.	Do you feel full of energy	Yes	No
22.	Do you feel that your situation is hopeless?	Yes	No
23.	Do you think that most people are better off than you are?	Yes	No
24.	Do you frequently get upset over little things?	Yes	No
25.	Do you frequently feel like crying?	Yes	No
26.	Do you have trouble concentrating?	Yes	No
27.	Do you enjoy getting up in the morning?	Yes	No
28.	Do you prefer to avoid social gatherings?	Yes	No
29.	Is it easy for you to make decisions?	Yes	No
30.	Is your mind as clear as it used to be?	Yes	No

Total Score: _____

APPENDIX A.3
CORNELL SCALE FOR DEPRESSION
(Alexopoulos et al., 1988)

Purpose: This is a 19-item clinician-administered instrument that uses information from interviews with both the patient and a nursing staff member, a method suitable for patients with dementia (Alexopoulos et al., 1988) and provides a quantitative estimate of depressive severity. The scale was designed for rating of depression in demented patients with the goal of creating an instrument sensitive to changes in symptomatology during the progression of the disease and sensitive to pharmacologic treatment. The ratings are based on information obtained by a clinician after interviewing the patient's caregiver as well as the patient. The Cornell Scale has 19 items or five broad categories: (1) mood-related signs, (2) behavioral disturbance, (3) physical signs, (4) cyclic functions, and (5) ideational disturbance. Each of the items is rated according to three explicitly defined grades: (1) absent, (2) mild or intermediate, and (3) severe. Items on the scale emphasized observable signs of depression such as sadness, agitation, sleep difficulties and lack of energy. The scale has high interrater reliability (Cohen's kappa = 0.67), internal consistency (coefficient alpha=0.84), and sensitivity. Total Cornell Scale scores correlate (0.83) with depressive subtypes of various intensity classified according to Research Diagnostic Criteria (Alexopoulos et al., 1988).

SCORING OF CORNELL DEPRESSION SCALE

1. Clinician interviews the patient using this scale.
2. Family member/caregiver observes the patient for approximately seven days. Based on observations, caregiver rates the various categories.
3. Scores are reviewed by clinician. Any discrepancy, clinician interviews both patient and caregiver for various categories.

Note: In rating the score of the Cornell Depression Scale, there is no real cut off point for depression. However, guidelines for suspected depression that are used are as follows:

- For persons with suspected dementia, a score below 6 suggests the person is likely NOT depressed.

- For person with suspected dementia, a score of 6-9 is suggestive of minor depression.

- For person with suspected dementia, a score of 18-20 is suggestive of moderate to severe depression.

- For person not suspected of having dementia, a score of 16 or above is suggestive of depression.

CORNELL SCALE FOR DEPRESSION
(Alexopoulos,et al., 1988. Reprinted with Permission)

NAME_____ AGE_____ SEX_____ DATE_____

WING_____ ROOM_____ PHYSICIAN_____ ASSESSOR_____

Ratings should be based on symptoms and signs occurring during the week before interview. No score should be given if symptoms result from physical disability or illness.

SCORING SYSTEM
A = Unable to evaluate   0 = Absent   1 = Mild to intermittent   2 = Severe

a 0 1 2   A. MOOD-RELATED SIGNS
1. Anxiety: anxious expression, rumination, worrying
2. Sadness: sad expression, sad voice, tearfulness
3. Lack of reaction to present events
4. Irritability: annoyed, short tempered

a 0 1 2   B. BEHAVIORAL DISTURBANCE
5. Agitation: restlessness, hand wringing, hair pulling
6. Retardation: slow movements, slow speech, slow reactions
7. Multiple physical complaints (score 0 if gastrointestinal symptoms only)
8. Loss of interest: less involved in usual activities (score only if change occurred acutely, i.e., in less than one month)

a 0 1 2   C. PHYSICAL SIGNS
9. Appetite loss: eating less than usual
10. Weight loss (score 2 if greater than 5 pounds in one month)
11. Lack of energy: fatigues easily, unable to sustain activities

a 0 1 2   D. CYCLIC FUNCTIONS
12. Diurnal variation of mood symptoms worse in the morning
13. Difficulty falling asleep: later than usual for this individual
14. Multiple awakening during sleep
15. Early morning awakening: earlier than usual for this individual

a 0 1 2   E. IDEATIONAL DISTURBANCE
16. Suicidal: feels life is not worth living
17. Poor self-esteem: self-blame, self-depreciation, feelings of failure
18. Pessimism: anticipation of the worst
19. Mood congruent delusions: delusions of poverty, illness or loss

Notes/Current Medications: _____

_____

_____

APPENDIX B
WHEELCHAIR BIKING RESIDENT SELECTION CHECKLIST
(Suzanne Fitzsimmons, 2002)

Purpose: The Wheelchair Biking Resident Selection Checklist is used to insure that all areas of consideration for selection and safety of the patient is considered.

Instructions: Answer questions on checklist with either yes or no. In order to be considered for the Wheelchair Biking program, all of the questions must be answered "yes".

WHEELCHAIR BIKING RESIDENT SELECTION CHECKLIST
(© Suzanne Fitzsimmons, 2002. Reprinted with Permission)

Does patient have depression signs and symptoms?   **YES**   **NO**
(Based on assessment instrument or observed behavior)

Is patient able to sit in an upright position?   **YES**   **NO**
(Conditions that might prevent this are contracture, postural
considerations, decubitus ulcer, or order for leg elevation at all times)

Is patient medically stable?   **YES**   **NO**
(Febrile conditions, infections, and other acute conditions
that would prevent patient from leaving unit and going outdoors)

Is patient's behavior predictable and controllable?   **YES**   **NO**
(Severe physical agitation or anxiety or other behaviors that might
be exacerbated by leaving unit and going outdoors)

Has patient agreed to take a ride?   **YES**   **NO**
(Show patient the bike, demonstrate how it is used, ask if
they would like to ride. If no, ask if they would like to watch
 someone else ride, then offer a ride again)

Note: You must answer yes to all of these questions for patient to be considered for the
wheelchair biking program.

Wheelchair Biking for the Treatment of Depression Evidence-Based Guideline
© The University of Iowa Gerontological Nursing Interventions Research Center
Research Translation and Dissemination Core
Written 02/03

**Distribution or Copying of this Guideline is prohibited without authorized permission from the RTDC of the
GNIRC Property of: Research Translation and Dissemination Core**

APPENDIX C
WHEELCHAIR BIKE STAFF AND VOLUNTEER TRAINING
(Linda Buettner, 1999)

Purpose: The Wheelchair Bike Staff and Volunteer Training form is used to insure that all personnel who will be riding has had training and is able to complete each skill as it pertains to operating the wheelchair bike. No person should ever ride the wheelchair bike without receiving training (Fitzsimmons, 2001; Buettner & Fitzsimmons, 2002).

Instructions: The wheelchair bike staff training reviews all parts of operating the bike, using the checklist to insure all parts are covered. Verbal instructions should be followed by demonstration. In turn, each trainee should practice all functions of the bike and demonstrate them to the trainer. The trainer, checks off areas of training when he/she feels the trainee is competent. All trainees should practice riding each other until they feel conformable with the handling of the bike. When trainee has shown competence in all areas of the staff-training sheet, the sheet is signed and dated by the trainer and kept on file with the Recreation Department. This information is also placed on the Wheelchair Training Biking Record (See Appendix D: **Wheelchair Biking Training Record**).

WHEELCHAIR BIKE STAFF AND VOLUNTEER TRAINING
(© Linda Buettner, 1999. Reprinted with Permission)

Gear stuff (check off as rider completes each skill)

___   Gear shifter - 3 speed - keep pedaling without effort as you change gears

___   Gear will not engage immediately, stop pedaling for a moment

___   Change gears before you get to a hill

Brake (check off as rider completes each skill)

___   For normal conditions use the back pedal brakes

___   The front drum brake is similar to a cars parking brake. If you use it too much while in motion it can heating the drum brake and cause a loss of lubricant and damage to the brake.

___   Parking brake application and release. Always apply when loading/unloading.

___   Seat is adjustable - three positions for rider

___   Saddle is adjustable for the biker

Boarding the passenger

___   Push the parking brake to "on" position

___   Tilt seat forward by opening shackle

___   Remove one side of the footrest

___   Transfer the resident- use a transfer belt if you need to

___   Put the footrest back in place and tighten the bolts

___   Ask the passenger to put on the safety harness and helmet (Assist if needed)

___   Raise seat (inform rider) and re-shackle

Separating/Connecting the wheelchair from/to the bike

___   Pull parking brake

___   Open the shackle, lower the wheelchair and hang off bike unit

___   Pull up on bike and detach from chair

___   Re-attach bike to wheelchair

Safety check the overall bike before your ride

___   Seat and tires - especially inflation levels

___   Pedals

___   Straps/harness

___   Footrest

___   Shackle

Before riding any resident you must ride a recreation therapy staff member to prove your knowledge and skills on the DUET Bike.

Riding Tips:

1.   This is a 3-wheeled bike and handles differently than a 2-wheeled bike.
2.   The bike has a wide turning radius so plan ahead.
3.   Never ride the bike without a passenger - it is balanced for loaded operation only.
4.   Always practice with a staff member first, go slowly for your first few rides.

Date of In-Service:_____   Training given by: _____

Name: _____

APPENDIX D
WHEELCHAIR BIKING TRAINING RECORD
(Suzanne Fitzsimmons, 2002)

Purpose: The Wheelchair Biking Training Record builds an easily accessible list of all the persons who are eligible to ride the wheelchair bike (Buettner & Fitzsimmons, 2002; Fitzsimmons, 2001).

Instructions: After staff or other personnel has satisfactorily completed the wheelchair biking training that persons information, as it pertains to the training, should be filled in the following form. This form should be kept in the Recreation Department office and a copy posted where the bike is stored.

WHEELCHAIR BIKING TRAINING RECORD
(© Suzanne Fitzsimmons, 2002. Reprinted with Permission)

Name	*Dept. Or Other	Date of Training	Date Rode as Passenger	Date Rode Staff Member	Date of Written Test	Approved to Ride Residents	Approved By:

*List department staff member is from or if a friend/volunteer or family member.

Facility: _____

APPENDIX E
THERAPY BIKING PROTOCOL FOR OLDER ADULTS
IN RESIDENTIAL SETTINGS
(Linda Buettner, 1999)

Purpose: The following is a recreational therapy protocol to guide the therapist/staff member in implementing the wheelchair biking program. Following this format insures consistency for the program and replicates the program that was found to significantly reduce depression in three separate research studies (Benson & Tatham, 2001; Buettner & Fitzsimmons, 2002, Fitzsimmons, 2000: Fitzsimmons & Buettner, 2001).

Instructions: Review the Wheelchair Biking for the Treatment of Depression protocol prior to implementing the program. Use the protocol as a guide for equipment needed during the program and for possible outcomes to achieve.

**THERAPY BIKING PROTOCOL FOR OLDER ADULTS
IN RESIDENTIAL SETTINGS**
(© Linda Buettner, 1999. Reprinted with Permission)

Name of Program: Therapeutic biking group.

Staff requirements: One therapist or nurse plus one assistant for each session.

Equipment: Duet wheelchair bicycle and helmet for rider and bike driver. (Optional equipment:
Bike horn, two-way radios, sunglasses, clip-on sunglasses, sun screen, lap blanket, wide brim
hat, bread to feed birds, squirrels, fish, etc). Books on biking, transportation, bike parts.

Entrance criteria: Enjoyed biking in the past plus symptoms of mild to moderate depression (as
evidenced by 1) Short form GDS is 5 or greater, or 2) Long form GDS is 9 or greater, or 3)
Cornell score is 6 or greater, or 4) patient exhibits signs and symptoms of depression but does
not score in the depression range on any scale).

Exit criteria: No longer enjoys biking program and/or free of symptoms of minor depression.

Group size: Therapeutic biking program will be completed in groups of three to five residents.

Duration: Each resident will receive 15 minutes of riding time for a total session of one-hour (4
residents at 15 minutes each) five times per week for two weeks. At the end of the two-week
period, residents will receive 2 rides per week and encouragement to participate in facility
activities on the other three days of the week.

Safety considerations: Each participant should have medical clearance to participate in the
therapeutic biking program. Participant will wear a safety helmet and seat belt while on the Duet
bike. Ensure resident is dressed appropriately for the weather. Provide sunscreen or cover for
those with sun sensitivity. Participants will be assisted on and off the wheelchair bike when
boarding and de-boarding the bike.

Methods: The program has two components. In part one, participants will have a small group
discussion program about bike riding. In part two, each resident will take a 15 minute ride with
his or her therapist.

Part I: The aide will sit with those residents who are waiting for their turn to ride. During this
time the small group will discuss bike riding in the past. Discussion questions will tap into long
term memory and might be: "Do you remember your first bike? What color was it? What was it
like?" "How old were you when you learned to ride a two-wheeler?" "Did you ever ride a
bicycle built for two?" "Where did you ride your bike when you were young?" "Did you ever
get hurt riding your bike?" "Did you ever teach anyone else to ride a bike?" "What was the best
thing about bike riding?" Discussion may also include photographs of bicycles and other forms
of transportation, plus bicycle parts such as bells, pumps, mirrors, etc.

Part II: Lock bike parking brakes. The Duet wheelchair will be lowered for boarding and the foot rest will be swung away. Each resident will be assisted to board the wheelchair bike. Each resident will put on the helmet and attach the seat belt for comfort. The therapist will double check the harness and helmet before raising the chair to biking position and beginning the ride. The ride will take place on the flat driveway areas surrounding the nursing facility for 10-15 minutes. When ride ends the resident will remove harness, helmet, and footrest. After the ride, staff is to debrief the resident about the quality and satisfaction of their ride and then discuss with the group what things they observed during their ride. From this information a group discussion would follow about what was observed. For example, if the resident described a bird he or she saw the discussion would lead to bird watching, bird feeding, birds as pets. If fish were seen a discussion about fishing would then take place. If flowers and plants were seen a discussion about gardening would follow. These discussions would lead to other leisure program options for the resident after the two-week intensive biking program. Questions to be asked about the ride should provide the information for filling out the **Wheelchair Biking Ride Record** (see Appendix F). This includes asking if they enjoyed their ride, and would they do it again in addition to how it made them feel, would they recommend it to others, and was the ride too slow or too fast, bumpy or smooth.

Maintenance Period: During this period residents receive the wheelchair bike program as described above but for two days per week only. During the other days of the week, staff informs residents of other facility activities that are available and assists, or arranges assistance, to transport the resident to the facility activities. These activities are unique to each facility but may include music, entertainment, art & crafts, gardening, intergenerational programs, pet visits, church and other on-going facility activities. Staff may also consider using the wheelchair bike to transport residents to these activities.

Possible Objectives:
- To improve small group socialization as evidenced by verbalizing with at least one other person in the group during each session.
- To improve mood as evidenced by positive comments about riding and by a happy expression.
- To increase appetite as evidenced by improved nutritional intake.
- To improve sleep as evidenced by reducing nighttime rising.
- To improve concentration as evidenced by staying in the group and remaining on topic during discussions.
- To improve self-esteem as evidenced by positive descriptions of experience on bike.
- Reduce feelings of apathy as evidenced by an expression of looking forward to another ride in the future.

APPENDIX F
WHEELCHAIR BIKING RIDE RECORD
(Suzanne Fitzsimmons, 2001)

Purpose: The Wheelchair Biking Ride Record is designed to be a method of documenting the residents' response to the wheelchair biking program and the number of times the resident participated in the program.

Instructions and Scoring: This record should be kept in a notebook for all the current participants of the biking program. Transfer assistance should be filled in to insure safe transfer of all participants. The therapist, or other staff member, implementing the program should fill out this form by checking all that applies under the Participation, Socialization and Behavior/Mood sections of the form. Record should be filled out at the end of each program and the completed forms should be reviewed weekly, or more often, to determine if any participants are not appropriate for the program. This would include residents that regularly refuse to ride, show fear, agitation or weepiness. At the end of each week these forms are placed in the residents chart in the Recreation Therapy section.

WHEELCHAIR BIKING RIDE RECORD
(© Suzanne Fitzsimmons, 2001. Reprinted with Permission)

Name: _____   **Room Number:** _____

Transfer Assistance: _____
_____

Date: _____   Check all that apply, add comments if needed

Participation
_____ Enjoyed
_____ Would do again
_____ Needed encouragement
_____ Participated to be polite
_____ Refused to participate

Socialization
_____ Interacted with staff & other participants
_____ Interacted with staff only
_____ No interaction with others

Behavior/Mood
_____ Appeared happy
_____ Restless/anxiety
_____ Showed fear/frustration
_____ Agitated
_____ Became weepy

How was your ride?

Comment:

_____

Date: _____   Check all that apply, add comments if needed

Participation
_____ Enjoyed
_____ Would do again
_____ Needed encouragement
_____ Participated to be polite
_____ Refused to participate

Socialization
_____ Interacted with staff & other participants
_____ Interacted with staff only
_____ No interaction with others

Behavior/Mood
_____ Appeared happy
_____ Restless/anxiety
_____ Showed fear/frustration
_____ Agitated
_____ Became weepy

How was your ride?

Comment:

APPENDIX G
WHEELCHAIR BIKING FOR DEPRESSION KNOWLEDGE ASSESSMENT TEST

The individual who will be managing use of this evidence-based guideline and coordinating education of staff, should be the only one who has access to this test key. Following proper education with regard to wheelchair biking, each rider should be given an opportunity to take this test. Use this test as a learning tool only. Please have each rider take this test without the key present, and once he/she is done, let him/her code how many questions he/she answered correctly and incorrectly. Guidance in determining why he/she answered as they did can also be part of the learning process.

WHEELCHAIR BIKING KNOWLEDGE ASSESSMENT TEST KEY

1. F
2. A
3. G
4. B
5. C
6. D
7. A
8. C
9. E
10. D

WHEELCHAIR BIKING KNOWLEDGE ASSESSMENT TEST

1.   Risk factors for depression may include:

   A. Dementia diagnoses
   B. Chronic illnesses
   C. Bereavement
   D. Certain medications
   E. All but D
   F. All of the above

2.   Depression often goes undiagnosed and therefore untreated

   A. True
   B. False

3.   Which of the following is related to older adults with depression:

   A. Depression is associated with functional decline
   B. Older persons may exhibit non-specific somatic complaints
   C. Depression is the most common mood disorder of late life
   D. Depression is a contagious condition
   E. Depression causes excess mortality
   F. All but D
   G. All of the above

4.   Patients that can **not** ride the wheelchair bike are those who:

   A. Have indwelling urinary catheters
   B. Have acute illness
   C. Need a lifting device for transfers
   D. Are over 100 years of age

5.   Persons who can **not** serve as bike peddlers are:

   A. Facility department heads
   B. Certified nurses aides
   C. Nurses who have not had the bike training
   D. Family members
   E. Volunteers

6.   The front disc brakes of the wheelchair bike should be used:

   A. Whenever you need to stop the wheelchair bike
   B. Whenever the bike is parked
   C. When loading and unloading patients
   D. B and C
   E. All of the above

7.   The wheelchair bike program is most effective for reducing depression when used as a daily, intense two-week intervention.

   A. True
   B. False

8.   The following clinical outcome factors are expected with consistent and appropriate use of wheelchair biking guideline:

   A. Decreased depression
   B. Increased socialization
   C. A and B

9.   Recreation Therapy:

   A. Is the provision of activities such as bingo and large group entertainment
   B. Restores, remediate or rehabilitates in order to improve functioning and independence as well as reduce or eliminate the effects of illness or disability
   C. Has a process similar to nursing: Assessment, goals and objectives, intervention, evaluation
   D. May be ordered by a physician
   E. All of the above except A
   F. B and C

10.   A Certified Recreation Therapist Specialist (CTRS):

   A. Has a minimum of 4 years of college
   B. Has passed a national standard minimal competency examination, similar to nursings' NCLEX
   C. Is required to obtain continuing education credits to remained certified
   D. All of the above

APPENDIX H
PROCESS EVALUATION MONITOR

The purpose of this monitor is to evaluate perceived understanding and support of each staff member in carrying out the guideline.

PLEASE COPY THE FORM ON THE NEXT PAGE and ask each staff member who uses the guideline to complete it approximately one month following his/her initial use of this guideline.

Once the staff members who are using the guideline complete this Process Evaluation Monitor, the individual in charge of implementing the guideline should provide feedback to each staff member who completed a form and offer further education or support as needed. For the 9 questions, please tally up the responses provided by adding up the numbers circled. For example, if Question 1 is answered '2' and Question 2 is answered '3' and Question 3 is answered '4' the nurse's score for those three questions (2+3+4) equals 9. The total score possible on this monitor is 36, while the lowest score possible is 9. Those who have higher scores on this monitor are indicating that they are well equipped to implement the guideline, and understand its use and purpose. On the other hand, those who have relatively low scores are in need of more education and support in the use of the guideline.

PROCESS EVALUATION MONITOR

Directions: Please circle the number that best communicates your perception about your use of the Wheelchair Biking guideline.

		Strongly Disagree	Disagree	Agree	Strongly Agree
1.	I feel knowledgeable to carry out the Wheelchair Biking guideline.	1	2	3	4
2.	Implementing the Wheelchair Biking guideline enhances the quality of care on the unit.	1	2	3	4
3.	I feel supported in my efforts to implement the Wheelchair Biking guideline.	1	2	3	4
4.	I feel comfortable riding the Wheelchair bike and well prepared to implement the social group portion of the guideline with the assistance of the Recreation Department.	1	2	3	4
5.	I am able to identify depressive symptoms.	1	2	3	4
6.	I am able to identify and carry out the essential activities of the Wheelchair Biking intervention.	1	2	3	4
7.	I had enough time to learn about the Wheelchair Biking guideline and practice riding before it was implemented.	1	2	3	4
8.	We are managing depression better with the use of the Wheelchair Biking guideline.	1	2	3	4
9.	Wheelchair Biking is one way that enables me to better meet the needs of most depressed patients.	1	2	3	4

APPENDIX I
WHEELCHAIR BIKING OUTCOMES MONITOR

For each patient receiving the Wheelchair Biking guideline, please complete the form on the following page. This form should be completed on at least a weekly basis. For each patient receiving the intervention, please keep a record of the changes observed in his or her patient records.

PLEASE MAKE A COPY OF THE FORM ON THE NEXT PAGE and place it in the medical record of each patient who is receiving the Wheelchair Biking guideline. The outcomes on this form should be assessed and recorded for each patient on a weekly basis.

TO USE THE FORM: Place the appropriate criteria key next to each separate outcome for each patient assessment. We have provided a total of 8 boxes, which represent the first eight-week.

EXAMPLE
The example below is for one outcome elicited from a patient interview, and displays the criteria keys:

Criteria Key
Y=Yes/met criteria
N=No/criteria not met
J=Justified Variation e.g. patient not included in the monitor; note *why* patient is not included

Please place the appropriate criteria key next to each outcome for each assessment period.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Outcome 1: Patient verbal and non-verbal responses reveals that patient is in a better mood as noted by the following indicators:								
Patient Interview reveals a decrease in weepiness/ sadness, apathy, and complaints.	N	N	Y	Y	Y	Y	Y	Y

WHEELCHAIR BIKING OUTCOMES MONITOR

Criteria Key
Y=Yes/met criteria **N=No**/criteria not met **J=Justified Variation;** e.g. patient not included in the monitor; note **why** patient is not included

Place the appropriate criteria key next to the outcome indicators for each monitoring period.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Outcome 1: Patient verbal and non-verbal responses reveals that patient is in a better mood as noted by the following indicators:								
Patient Interview reveals a decrease in weepiness/ sadness, apathy, and complaints.								
Patient Interview reveals an increase in energy, socialization, verbalization								
Patient GDS scores are or have declined or remained low.								
Patient has increased facility activity participation.								
Patient family member has expressed improvement in patients mood.								
Outcome 2: Patient weight/appetite to be within normal limits.								
Patient Interview reveals a good appetite.								
Patient Observation reveals he/she enjoys meals.								

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Outcome 3: Patient has adequate levels of sleep.								
Patient Reports sleeping well and with little daytime fatigue.								
Patient Records reveal increase in nighttime sleeping.								

Comments:

Week 1: _____

Week 2: _____

Week 3: _____

Week 4: _____

Week 5: _____

Week 6: _____

Week 7: _____

Week 8: _____

REFERENCES

Key: (R)=Research   (L)=Literature   (N)=National Guidelines

Alexopoulos, G.S., Meyers, B. S., Young, R. C., Campbell, S., Silbersweig, D., & Charlson, M. (1997). "Vascular depression" hypothesis. *Archives of General Psychiatry, 54*, 915–922. (R)

Alexopoulos, G.S., Abrams, R.C., Young, R.C., & Shamoian, C.A. (1988). Cornell Scale for depression in dementia. *Biology of Psychiatry, 23*(3), 271-84. (R)

American Psychiatric Association. (1994). Diagnostic and statistical manual of mental disorders. 4th ed. rev. Washington, DC: American Psychiatric Press. (N)

Arthur, A., Matthews, R., Jagger, C., & Lindesay, J. (2002). Factors associated with antidepressant treatment in residential care; changes between 1990 and 1997. International *Journal of Geriatric Psychiatry, 17*(1), 54-60. (R)

ATRA (2002). American Therapeutic Recreation Association. Definition Statement. Retrieved November 19, 2002, from http://www.atra-tr.org/definition.htm (N)

Beck, A.T., Rush, A. J., Shaw, B., & Emery, G. (1979). *Cognitive therapy of depression.* New York: Guilford Press. (L)

Bellino, S., Patria, L., Ziero, S., Rocca, G., & Bogetto, F. (2001). Clinical features of dysthymia and age: A clinical investigation. *Psychiatry Residency, 20,* 103(2-3), 219-28. (R)

Bender, K. J. (1998). New warning of depression with Accutane could apply to other medications. *Psychiatric Times, 15*(5). (R)

Benson, J., & Tatham, J. (2001). Just duet bike study. Pinnacles: Canadian Physiotherapy Association: *Gerontology Division Newsletter, (57)* Fall. (R)

Brown, J.S., McGhan, W.F., & Chokroverty, S. (2000). Comorbidity associated with overactive bladder. *American Journal of Managed Care, 6*(11S), S574-9. (L)

Buettner, L.L., & Martin, S.L. (1995). *Therapeutic Recreation in the Nursing Home.* State College, Pa: Venture Publishing, Inc. (L)

Buettner, L. & Fitzsimmons, S. (2002). AD-Venture Program: therapeutic biking for the treatment of depression in long term care residents with dementia. *American Journal of Alzheimer's Disease, 17*(2),121-127. (R)

Burke, W.J., Nitcher, R.L., Roccaforte, W.H., & Wengel, S.P. (1992). A prospective evaluation of the Geriatric Depression Scale in an outpatient geriatric assessment center. *Journal of the American Geriatrics Society, 40*(12), 1227-30. (R)

Butler, R.N., & Lewis, M.I. (1995). Late-life depression: When and how to intervene. *Geriatrics, 50*(8), 49-52. (L)

Carlin, P.A. (1998). Depressed mind, sick body. *Hippocrates, 12(12)*:36-42. (L)

Carr, D., House, J.S., Wortman, C., Nesse, R., & Kessler, R.C. (201). Psychological adjustment to sudden and anticipated spousal loss amoung older widowed persons. *Journal of Gerontolgy B Psychological Science, 56*(4), S237-48. (R)

Cole-King, A. & Harding, K.G. (2001). Psychological factors and delayed healing in chronic wounds. *Psychosomatic Medicine, 63,* 216-220. (R)

Covinsky, K.E., Fortinsky, R.H., Palmer, R.M., Kresevic, D.M., & Landefeld, C.S. (1997). Relation between symptoms of depression and health status outcomes in acutely ill hospitalized older persons. *Annals of Internal Medicine, 26,* 417-425. (R)

Craik, R.L. (1994). Disability following hip fracture. *Physical Therapist, 74,* 387-398. (R)

Cummings, S.R., Nevitt, M.C., & Kidd, S. (1988). Forgetting falls: the limited accuracy of recall of falls in the elderly. *Journal of American Geriatric Society, 36,* 613-616. (R)

Cwikel, J., Fried, A.V., & Galinsky, D. (1989). Falls and psychosocial factors among community-dwelling elderly persons: a review and integration of findings from Israel. *Public Health Review, 17*, 39-50. (R)

Devanand, D.P., Nobler, M.S., Singer, T., Kiersky, J.E., Turret, N., Roose, S.P., & Sackeim, H.A. (1994). Is dysthymia a different disorder in the elderly? *American Journal of Psychiatry, 151*(11), 1592-9. (R)

Devanand, D.P., Sano, M., Tang, M.X., Taylor, S., Gurland, B.J., Wilder, D., Stern, Y., & Mayeux, R. (1996). Depressed mood and the incidence of Alzheimer's disease in the elderly living in the community. *Archives of General Psychiatry, 53*(2), 175-82. (R)

Drinka, T.J., & Clark, P.G. (2000). *Health care teamwork: Interdisciplinary Practice and Teaching*. Westport, CT: Auburn House, 8-9. (L)

Ebly, E.M., Hogan, D.B., & Fung, T.S. (1997). Potential adverse outcomes of psychotropic and narcotic drug usage in Canadian seniors. *Journal of Clinical Epidemiology, 50,* (7), 857-863. (L)

Ellen, E.F. (2001). Detecting and treating geriatric depression. *Geriatric Times, 2*(3). (L)

Engberg, S., Sereika, S., Weber, E., Engber, R., McDowell, B.J., & Reynolds, C.F. (2001). Prevalence and recognition of depressive symptoms among homebound older adults with urinary incontinence. *Journal of Geriatric Neurology, 14*(3), 130-9. (R)

Feher, E.P., Larrabee, G.J., & Crook, T.H. (1992). Factors attenuating the validity of the geriatric depression scale in a dementia population. *Journal of American Geriatric Society, 40*, 906-909. (R)

Ferketich, A.K., Schwartzbaum, J.A., Frid, D. J., & Moeschberger, M.L., (2000). Depression as an antecedent to heart disease among women and men in the NHANES I study. *Archives of Internal Medicine,160*(9), 1261-8. (R)

Fessman, N., & Lester, D. (2000). Loneliness and depression among elderly nursing home patients. *International Aging and Human Development, 51*(2), 137-14. (R)

Fitzsimmons, S. (2001). Easy rider wheelchair biking: A nursing-recreation therapy clinical trial for the treatment of depression. *Journal of Gerontological Nursing, 27*(5), 14-23. (R)

Fitzsimmons, S., & Buettner, L. (2000). Easy rider wheelchair biking: A nursing-recreation therapy clinical trial for the treatment of depression. In Upstate Medical University Conference Proceedings Monograph: *Mental Health and Aging: Meeting New Challenges*, April 6, 2000. (R)

Fitzsimmons, S., & Buettner, L. (2001). Wheelchair biking program for nursing home residents with dementia and depression. *Activities Director Quarterly*. Fall, 31-40. (R)

Franklin, C.L., & Zimmerman, M. (2001). Posttraumatic stress disorder and major depressive disorder: investigating the role of overlapping symptoms in diagnostic comorbidity. *Journal of Nervous Mental Disorders, 189*(8), 548-51. (R)

Furlanetto, L.M., von Ammon Cavanaugh, S., Bueno, J.R., Creech, D.D., & Powell, L.H. (2000). Association between depressive symptoms and mortality in medical inpatients. *Psychosomatics, 41*(5), 426-32. (R)

Gallo, J.J., & Lebowitz, B.D. (1999). The epidemiology of common late-life mental disorders in the community: Themes for the new century. *Psychiatric Services, 50*(9), 1158-66. (R)

Gallo, J.J., & Rabins, P.V. (1999). Depression without sadness: Alternative presentations of depression in late life. *American Family Physicians, 1*(60), 820-6. (L)

Gallo, J.J., Rabins, P.V., Lyketsos, C.G., Tien, A.Y., & Anthony, J.C. (1997). Depression without sadness: functional outcomes of nondysphoric depression in later life. *Journal of American Geriatric Society, 45*, 570-578. (R)

Gallo, J.J., Reichel, W., & Anderson, L.M. (1995). *Handbook of Geriatric Assessment* (2nd Ed.). Gaithersburg, MD: Aspen Publication. (L)

Garcia, S.M.J., & Tobias, F.J. (2001). Prevalence of depression in patients over 65 years of age. Profile of the elderly at risk. *Atencion primaria / Sociedad Espanola de Medicina de Familia y Comunitaria.ten Primaria, 27*(7), 484-8. (R)

German, P., Rover, B., Burton, L., Brandt, L., & Clark, R. (1992). The role of mental morbidity in the nursing home experience. *The Gerontologist, 32*, (2), 152-163. (R)

Granek, E., Baker, S.P., Abbey, H., Robinson, E., Myers, A.H., Samkoff, J.S., & Klein, L.E. (1987). Medications and diagnoses in relation to falls in a long-term care facility. *Journal of American Geriatric Society, 35*, 503-511. (R)

Gurland, B.J., Cross, P.S., & Katz, S. (1996). Epidemiological perspectives on opportunities for treatment of depression. *American Journal of Geriatric Psychiatry, 4* (Suppl. l), S7-S13. (R)

Haroutune, K., Armenian, L.A., Pratt, J.G., & William, W.E. (1998). Psychopathology as a Predictor of Disability: A Population-based Follow-up Study in Baltimore, Maryland. *American Journal of Epidemiology,148*, 269-76. (R)

Hays, R.D., Wells, K.B., Sherbourne, C.D., Rogers, W., & Spritzer, K. (1995). Functioning and well-being outcomes of patients with depression compared with chronic general medical illnesses. *Archive's of General Psychiatry*, 52, 11-19. (R)

Hoening, R. (2002). The Duet bike is manufactured in Germany by: Robert Hoening Spezialfahrzeuge GmbH, Ulmer Str. 16/2, D-71229 Leonburg, Germany Tel: +49 7152 979490. Retrieved on November 19, 2002, from: http://www.hoening.com/ (L)

Horgas, A.L., & Dunn, K. (2001). Pain in nursing home residents. Comparisons of residents' self-report and nursing assistants' perceptions. *Journal of Gerontological Nursing, 27*(3), 44-53. (R)

Ip, S.P., Leung, Y.F., & Mak, W.P. (2000). Depression in institutionalized older people with impaired vision. *International Geriatric Psychiatry, 15*(12), 1120-4. (R)

Jaffe, A., Froom, J., & Galambos, N. (1994). Minor depression and functional impairment. *Archives of Family Medicine, 3*(12), 1081-6. (R)

Joiner, T. & Katz, J. (1999). Contagion of depressive symptoms and mood: Meta-analytic review and explanations from cognitive, behavioral, and interpersonal viewpoints. *Clinical Psychology: Science and Practice*, (6), 149-164. (R)

Kavan, M.G., Pace, T.M., Ponterotto, J.G, & Barone, E.J. (1990). Screening for depression: Use of patient questionnaires. *American Family Physician, 41*(3), 897-904. (L)

Kivela S.L., Kongas-Saviaro, P., Laippala, P., Pahkala, K., & Kesti, E. (1996). Social and psychosocial factors predicting depression in old age: A longitudinal study. *International Psychogeriatrics,8*(4), 635-44. (R)

Kramer, S.S., Kapteyn, T.S., Kuik, D.J., & Degg, D.L. (2002). The association of hearing impairments and chronic diseases with psychosocial health status in older age. *Journal of Aging health, 14*(1), 122-37. (R)

Lammers, J.G., & Ham, R.J. (1997). *Primary Care Geriatrics* (3rd Ed.), Chapter 18. St. Louis: Mosby. (L)

Lewinsohn, P.M., Antonuccio, D.O., Steinmetz, J.L., & Terri, L. (1984). *The Coping with Depression Course*. Eugene, OR: Castalia Publishing. (L)

Lord, S.R., Anstey, K.J., Williams, P., & Ward, J.A. (1995). Psychoactive medication use, sensori-motor function and falls in older women. *British Journal of Clinical Pharmacology, 39*(3), 227-234. (R)

Maciejewski, P.K., Prigerson, H.G., & Mazure, C.M. (2001). Sex differences in event-related risk for major depression. *Psychology of Medicine,31*(4), 593-604. (R)

McQuiston, C.M., & Webb, A.A. (1995). *Foundations of Nursing Theory: Contributions of 12 Key Theorists.* Thousand Oaks, CA: Sage Pub. (L)

Mossey, J.M. (1985). Social and psychologic factors related to falls among the elderly. *Clinical Geriatric Medicine, 1,* 541-553. (L)

Mutran, E.J., Reitzes, D.C., Mossey, J., & Fernandez, M.E. (1995). Social support, expression, and recovery of walking ability following hip fracture surgery. *Journals of Gerontology Series A Biology Sciences, 50*, S354-S361. (R)

National Council for Therapeutic Recreation Certification (2002). Verification and Value of certification. Retrieved on November 19, 2002, from: https://www.nctrc.org/about/vaca.html. (N)

National Institutes of Health. (1991). Consensus Statement Online: Diagnosis and Treatment of Depression in Late Life. Retrieved on November 19, 2002, from http://consensus.nih.gov/cons/086/086_statement.htm. (N)

National Institutes of Health. (1998). Non-Drug Therapies for Depression. Retrieved on November 19, 2002, from http://www.nimh.nih.gov/publicat/depression.cfm#ptdep5 . (N)

Nevitt, M.C., Cummings, S.R., Kidd, S., & Black, D. (1989). Risk factors for recurrent nonsyncopal falls: a prospective study. *JAMA, 261*, 2663-2668. (R)

Penninx, B.W., Guralnik, J.M., Mendes de Leon, C.F., Pahor, M., Visser, M., Corti, M.C., & Wallace, R.B. (1998). Cardiovascular events and mortality in newly and chronically depressed persons >70 years of age. *American Journal of Cardiology, 81*, 988-994. (R)

Piven, M.L.S. (1998). Detection of Depression in the Cognitively Intact Older Adult Evidence-Based Guideline. In M. Titler (Series Ed.), *Series on Evidence-Based Practice for Older Adults,* Iowa City, IA: The University of Iowa Gerontological Nursing Interventions Research Center, Research Translation and Dissemination Core. (R)

Reichman, W.E. & Coyne, A.C. (1995). Depressive symptoms in Alzheimer's disease and multi-infarct dementia. *Journal of Psychiatry and Neurology, 8*(2), 96-9. (R)

Reynolds III, C.F., Frank, E., Perel, J.M., Imber, S.D., Cornes, C., Miller, M.D., Mazumdar, S., Houck, P.R, Dew, M.A., Stack, J.A., Pollack, B.G., & Kupfer, D.J. (1999). Nortriptyline and interpersonal psychotherapy as maintenance therapies for recurrent major depression. *The Journal of the American Medical Association, 281*, 39-45, 83-84. (R)

Rovner, B. (1993). Depression and increased risk of mortality in the nursing home patient. *American Journal of Medicine,94*(5A), 19S-22S. (R)

Roy, C. (1991). *The Roy Adaptation Model: The Definitive Statement.* Norwalk, CT: Appleton & Lange. (L)

Salamero, M., & Marcos, T. (1992). Factor study of the Geriatric Depression Scale. *Acta Psychiatrica Scandinavica, 86*(4), 283-6. (R)

Sheikh, J.I., & Yesavage, J.A. (1986). Geriatric Depression Scale (GDS) recent evidence and development of a shorter version. *Clinical Gerontologist, 5,* 165-173. (R)

Shepherd, S.M., & Prescott, R.J. (1996). Use of standardized assessment scales in elderly hip fracture patients. *J. R. College of Physicians of London, 30,* 335-343. (R)

Solomon, K. & Zinke, M.A. (1991). Group Psychotherapy with the depressed elderly. *Journal of Gerontological Social Work, 17*(1-2), 47-57. (R)

Spitzer, R.L., Endicott, J., & Robins, E. (1978). Research diagnostic criteria: Rationale and reliability. *Archives of General Psychiatry, 35,* 773-782. (R)

Steers, W.D., & Lee, K.S. (2001). Depression and incontinence. *World Journal of Urology, 19*(5), 351-7. (R)

Teresi, J., Abrams, R., Holmes, D., Ramirez, M., & Eimicke, J. (2001). Prevelence of depression and depression recognition in nursing homes. *Social Psychiatry,36*(12), 613-20. (R)

Teri, L., & Gallagher-Thompson, D. (1991). Cognitive-Behavioral interventions for treatment of depression in Alzheimer's patients. *The Gerontologist,31*(3), 413-416. (L)

Thapa, P.B., Gideon, P., Fought, R.L., & Ray, W.A. (1995). Psychotropic drugs and risk of recurrent falls in ambulatory nursing home residents. *American Journal of Epidemiology, 142*, 202-211. (R)

Tinetti, M.E., Williams, T.F., & Mayewski, R. (1986). Fall risk index for elderly patients based on number of chronic disabilities. *American Journal of Medicine, 80*, 429-434. (R)

Tueth, M.J. (1994). Diagnosing psychiatric emergencies in the elderly. *American Journal of Emergency Medicine, 2*(3), 364-369. (R)

U.S. Department of Health and Human Services. (1999). Mental Health: A report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health. Retrieved November 19, 2002, from: http://www.surgeongeneral.gov/library/mentalhealth/home.html. (N)

Waintraub, L. (1998). Depression in the aged: diagnosis and treatment. *La Presse Medicale,27*(40), 2129-44. (R)

Wang, J.J. (2001). Prevalence and correlates of depressive symptoms in the elderly of rural communities in southern Taiwan. *Hu Li Yan Jiu,9*(3), 1-11. (R)

Yesavage, J.A., Brink, T.L., Rose, T.L., Lum, O., Huang, V., Adey, M.B., & Leirer, V.O., (1983). Development and validation of a geriatric depression screening scale: A preliminary report. *Journal of Psychiatric Research,17*, 37-49, 1983. (R)

Zorn, B.H., Montgomery, H., Pieper, K., Gray, M., & Steers, W.D. (1999). Urinary incontinence and depression. *Journal of Urology,162*(1), 82-4. (R)

ANNOTATED BIBLIOGRAPHY
WHEELCHAIR BIKING FOR THE TREATMENT OF DEPRESSION

Fitzsimmons, S. (2001). Easy rider wheelchair biking: A nursing-recreation therapy clinical trial for the treatment of depression. *Journal of Gerontological Nursing, 27*(5), 14-23.

The purpose of this study was to examine the use of a prescribed therapeutic recreation-nursing intervention, wheelchair biking, for the treatment of the symptoms of depression in older adults in a long-term care setting. The target population was residents with a diagnosis of, or symptoms of, depression residing in a long term care facility. A classical experimental design was used and was guided by the Roy Adaptation Model. After the initial screening with the short form GDS, fifty-five subjects were identified as being eligible for the study. Forty subjects were then randomly selected from the fifty-five eligible subjects and those forty were randomized into an equal number of participants in the experiment and control groups (Treatment = 20, Control = 20 for a total of 40 subjects). Comparisons made between the two groups determined that equality between groups in relationship to the extraneous variables had been achieved through random assignments. These subjects, average age 80.5, had a variety of mental and physical conditions. Thirty-one percent of the subjects were without a chart diagnosis of depression and fifty-one percent of the subjects were currently not receiving any treatment at all for depression. Within the subjects in the treatment group there were three who required lifting equipment to be transferred into the wheelchair bike. One subject required portable oxygen to be attached to the bike, one had an indwelling catheter and one had a continuous tube-feeding device that required continuous feeding during riding. Eleven of the twenty had a diagnosis of dementia, and of them, five resided on a special care unit. Four subjects were over the age of 92 and one would be turning 100 shortly after the study ended. A two-week trial of biking therapy was provided to the treatment group and all subjects were post-tested again with the GDS. The GDS scores were analyzed using a t-test for independent samples with a two-tailed significance at the α = .05 level. The control group pre-test GDS means of 7.95 increased slightly at the post-test to 8.65, indicating a slight increase (+0.70) in depression. The treatment group GDS pre-test means of 7.68 decreased to 4.21 (-3.47) at the post-test denoting a marked decrease in depression. The analysis of these variables determined that the difference in post-test GDS means for the treatment group was statistically significant at the p<.0001 level. With the exception of one subject, whose score remained the same, all depression scores improved for treatment group subjects.

Buettner, L., & Fitzsimmons, S. (2002). AD-Venture program: Therapeutic biking for the treatment of depression in long term care residents with dementia. *American Journal of Alzheimer's Disease, 17*(2), 121-127.

The purpose of this study was to assess the effectiveness of the wheelchair biking program on depression for older adults with dementia. The sample included 70 residents with dementia from the two participating facilities: long-term care (n=41) and assisted living (n=29) who screened positive for depression. The range of Mini-Mental State Examination Score for this study was 0-24. Of this sample, 43.9% did not have a diagnosis of depression and 53.7% were not receiving

any treatment for depression. The design for this study was a classical experimental design with randomization, a control and treatment group and testing at three time points: pre-test, post-test and follow-up. The interventions period were as follows: The treatment groups received a two-week intense biking period, followed by post-test data gathering, then followed by a ten week maintenance intervention period and then follow-up testing. During this maintenance period the subjects received wheelchair biking 2 times per week. The remaining three days per week the subject participated in other activity programs to connecting them with currently offered programs within the facility. This phase of the study ensured maintenance of the program and continued treatment of residents with depression when the research staff withdraws. The major variable examined was depression as determined by the short version of the GDS. At baseline, there were no significant differences between control and treatment groups in any demographic characteristics. The scores were analyzed using a t-test for independent samples with a two-tailed significance at the (α) =.05 level. The treatment groups' pre-test means of 8.00 decreased to 4.48 at the post-test and declined further to 3.14 at follow-up denoting a marked decrease in depression. The control groups' pretest means of 8.40 increased to 8.90 at the post-test and declined slightly to 8.37 at follow-up. The analyzes of these variables showed that the difference in both posttest and follow-up GDS means for the treatment group were statistically significant at the *p* < .001 level. A twenty minute professional made educational video-tape and training manual was produced by the research team as part of this project.

Benson, J., & Tatham, J. (2001). Just duet bike study. Pinnacles: Canadian Physiotherapy Association. *Gerontology Division Newsletter, (57)* **Fall.**

The purpose of this study, by Benson, a Certified Recreational Therapist Specialist, was to replicate the Fitzsimmons (2000) research pertaining to participation in a therapy biking program for depressive symptomatology in older adults living in long-term care facilities. For this study, the target population was residents with a diagnosis of depression. The study followed a classical experimental design. From four different sites in Canada, 32 participants identified through random sampling were separated into a control group and a treatment group. The 16 participants in the treatment group experienced a leisurely 15 minute bike ride once daily for two weeks. Data analysis consisted of pre and post testing using the Geriatric Depression Scale (Sheikh & Yesavage, 1986) and the Cornell Depression Scale for Dementia (Alexoupoulous et al., 1988) and Independent t-tests. The GDS and Cornell scores were analyzed using a t-test for independent samples with a 2-tailed significance at the α = .05 level. Applying this method, the differences between the pairs of observations for the repeated measurement on the matched pairs were used. This enabled the researchers to test the null hypothesis to determine whether there was a significant difference between subjects' pre and post-test scores on the GDS (1986) / Cornell (1988). The control groups' pre-test mean of 4.50 increased slightly at the post-test to 4.70, indicating a slight increase (0.20) in depression. The treatment groups pre-test mean of 5.80 decreased to 4.10 (-1.70) at the post-test indicating a significant decrease in depression at the p<.05 level.

CONTACT RESOURCES

If you have any questions regarding this guideline, please contact the authors:

Suzanne Fitzsimmons, MS, ARNP
Research Associate
College of Health Professions
Florida Gulf Coast University
10501 FGCU Boulevard South
Fort Myers, Florida 33965-6565
Phone: 941-235-9697
Fax: 941-235-9697
Email: sfitzsim@fgcu.edu

Linda Buettner, CTRS, PhD
Director, Center for Positive Aging
Florida Gulf Coast University
10501 FGCU Boulevard South
Fort Myers, Florida 33965-6565
Phone: 239-590-7852
Fax: 239-590-7474
Email: lbuettne@fgcu.edu
www.fgcu.edu/cfpa to view
wheelchair biking video

Or you may contact the series editor, Marita Titler, PhD, RN, FAAN, using the information below.

This guideline is one of a number of evidence-based guidelines made available by The University of Iowa Gerontological Nursing Interventions Research Center Research Translation and Dissemination Core.

For information on how to obtain additional evidence-based guidelines, you may contact the Research Translation and Dissemination Core.

In Writing:

Marita Titler, PhD, RN, FAAN
Director, Research Translation and
Dissemination Core
4118 Westlawn
Iowa City, Iowa 52242

By Phone:
(319) 384-4429

By FAX:
(319) 353-5843

By e-mail:
research-dissemination-core@uiowa.edu

Internet Access:
http://www.nursing.uiowa.edu/centers/gnirc/rtdcore.htm