8-1997

The Differential Effects of Residential Placement and Exercise Activity of Aging Persons with Mental Retardation

Sandra K. Wise
Lindenwood College

THE DIFFERENTIAL EFFECTS OF RESIDENTIAL PLACEMENT AND EXERCISE ACTIVITY OF AGING PERSONS WITH MENTAL RETARDATION

A Project/Thesis presented to the
Faculty of
Lindenwood University

In partial fulfillment of the requirements
for the degree of Master of Science
in Human Services Agency Management

BY

Sandra K. Wise

August 1997

ACKNOWLEDGEMENT

It is with deep gratitude and a strong sense of commitment that the author wishes to acknowledge the tremendous amount of support received from her husband. First, for the encouragement to begin this course of study and second, for the willingness to make sacrifices without complaint in order for this project to be completed. The author also wishes to acknowledge the employees of Central Missouri Regional Center for their pioneering efforts to improving the quality of life for people with developmental disabilities.

TABLE OF CONTENTS

LIST OF APPENDICES

Chapter 1

Project/Thesis Proposal

Purpose

Research in general has shown that regular exercise has a measurable, positive effect on the physiological functioning of older adults. Older adults in a regular exercise program of light intensity may reduce their risk for chronic disease and realize an increase in independent functioning (Ruuskanen and Parkatti 987). The researcher found very few studies that focused on individuals with mental retardation and their exercise habits.

The purpose of this study was to determine if there was a difference between the walking activity of aging individuals with mental retardation who reside in more restrictive types of residential facilities than those who reside in less restrictive residential placements. In this study, more restrictive is defined as facilities in which six or more individuals reside. Less restrictive is described as three or less individuals living together.

According to Emery (379), walking activity is a relevant aspect of exercise activity to evaluate for several reasons. First, regular walking is important for good health. Second, walking is an exercise activity readily accessible to people of all ages. Unfortunately, previous studies have not evaluated the association of walking activity and residential setting among aging individuals with mental retardation.

The benefits of physical activity have been extolled throughout western history, but it was not until the second half of this century that scientific evidence supporting these beliefs began to accumulate (Emery et al. 380; Surgeon General). By the 1970s enough information was available about the beneficial effects of vigorous exercise on cardiorespiratory fitness that national organizations, such as the American Heart Association, began issuing physical activity recommendations to the public. These recommendations generally focused on cardiorespiratory endurance and specified sustained periods of vigorous physical activity lasting twenty minutes or more, three days per week. As understanding of the benefits of less vigorous activity grew, these national organizations began recommending exercise of moderate intensity as an option for those who get little or no exercise. The *Healthy People 2000* goals and the 1995 *Dietary Guidelines for Americans* recommend 30 minutes or more of moderate-intensity physical activity on all or most days of the week. Recent findings show that 20 to 30 minutes per day of physical activity which occurs in several short sessions (i.e. 10 minutes may be similar to one longer session (i.e. 30 minutes) in producing cardiorespiratory fitness gains (Emery et al. 380; Surgeon General).

It is believed that individuals with more significant levels of mental retardation age at a rate of about ten years faster than the general population. This may be due to the greater use of medications, less stimuli in institutional and/or other

residential settings as well as the body's ability to deal with the disability.

After the age of 40, individuals in the general population experience skeletal changes and muscle deterioration. Persons with developmental disabilities, especially cerebral palsy, may suffer reduced mobility at a younger age than the general population (Rinck 3 Physical Changes).

Experience has shown that the gastrointestinal system is especially vulnerable in an elderly person with a developmental disability. Medications often dry out the system which in turn requires the use of more medications for digestion and constipation. Individuals with cerebral palsy are often vulnerable to gastrointestinal problems due to swallowing difficulties.

It is believed that changes in the cardiovascular system are often hard to distinguish from normal changes from disease in this population. Individuals with Down's Syndrome often experience heart problems at an early age (Rinck 3 Down Syndrome).

It is difficult to separate disease from the normal aging process for individuals with cerebral palsy. Lack of exercise and stimulation often lead to problems within the respiratory system. Respiratory problems are believed to be the primary cause of death in institutions for these individuals (Walz, Harper, and Wilson 624).

Underpinning the recommendations of many national health organizations is a growing understanding of how physical activity

affects physical functioning. The body responds to physical activity in ways that have important positive effects on musculoskeletal, cardiovascular, respiratory, and endocrine systems. Regular participation in physical activity appears to reduce health risks, and enhances the person's ability to perform tasks of daily living (Surgeon General).

Especially relevant to the studies of aging of individuals with mental retardation is the receiving of state services, such as residential placement. These individuals have had different life experiences and treatment because of various philosophical changes throughout history. If the current aging consumers would have been born at a later time and experienced the current philosophy of deinstitutionalization and community living they might never have entered the service system. According to Chornoboy and Harvey (147), service providers and funding bodies must provide facilities with the appropriate physical and human supports in order that individuals may have the opportunities for and exposure to activities they like and want to do. Motivation to participate in activities is generally lacking in individuals with mental retardation.

Statement of Problem

It was hypothesized that individuals with mental retardation, 40 years and older, would report a greater amount of walking activity and have a better health rating when residing in residential facilities that are less restrictive. It was further predicted that females would participate in more walking activity than males, and older individuals (57-75 years) would spend less

time in walking activity. It was anticipated that there would be no differences in reported walking activity among the levels of mental retardation.

Several studies of physiological effects of exercise in older adults within the general population have been reported. Emes (185) found that both elderly males and females demonstrated significant physiological improvements in fitness as a result of exercise training.

Persons with mental retardation, as a group, are significantly less fit than the general population, principally because they are more likely to lack the skills and opportunities for physical activity. As these individuals age, health risks are compounded by the adverse changes of the aging process as well as loss of function from disuse (Neef et al.135-36).

The aging person with mental retardation is often thought to be less able to participate in exercise activity than the general population. Some of this perception comes from the fact that most of them live in some form of protective residential setting. Other misperceptions are; the disability itself does not allow for exercise, or the person has a "right to dependency" or a "sedentary lifestyle". Other factors such as the staff's inability to recognize the need for exercise activity, and feeling that an exercise regimen is outside of their responsibility as caretakers, are likely causes for lack of exercise activity (Neef et al. 137).

Brummel-Smith (Aging and Disability) reports that elderly individuals have a slower learning pace, and may require more

frequent repetitions than a younger person. It appears that there are no significant differences in the acquisition of new functional skills simply based upon age. More frequent repetitions would demand a great deal of staff attention to persons with mental retardation. Few caregivers are willing or able to put forth the time and effort.

Getting individuals with mental retardation to participate in exercise activities may be problematic because the immediate consequences are unpleasant and may initially be difficult due to prolonged inactivity (Neef et al.137). Therefore, it requires caregivers to be especially creative in encouraging participation in exercise activity.

Personal experience has shown that in the past several years a greater interest has been demonstrated by those who coordinate services for individuals with mental retardation in being more fitness conscious. Individuals with the ability to walk even short distances will benefit.

A review of the Individual Plans of the targeted subjects for this research project indicated that few objectives have been written to address the lack of exercise activity. In the few plans in which exercise activity was mentioned as a need it was due to the person being overweight. The exercise activity most often used was riding a stationery bicycle. No specific training time limits were set or initiated by the direct care givers. Monthly reports indicate that sporadic amounts of time are spent on the activity and the intensity is usually determined by the individual. Generally, individuals with mental retardation have

not been educated on the need for exercise activity, nor reinforced for participating in exercise programs to the degree that attendance to training would be maintained over time.

Project Title, Location and Duration

The title of this project is: The Differential Effects of Residential Placement and Exercise Activity of Aging Persons with Mental Retardation.

The data for this project was obtained from subjects residing within the Central Missouri Regional Center (CMRC) catchment area. This area encompasses 13 counties in central Missouri. The length of this project was seventeen months. The project began in February 1996 and ran through July 1997.

Researcher and Participants

The researcher has a Bachelors Degree in Psychology and Rehabilitation. Within this curriculum, much was learned about the characteristics, mannerisms and idiosyncrasies of individuals with mental retardation and/or developmental disabilities. CMRC has provided the researcher with many other educational opportunities to learn about this population and the various residential options.

The researcher has worked for the Department of Mental Health, specifically within the regional centers, as a casemanager and casemangement supervisor for approximately eight years. Prior to that time, experience and knowledge about this population was gained in working directly with these individuals as a support person within a vocational setting.

Twenty-one males and 22 females were randomly selected from the census of Central Missouri Regional Center. These individuals, between the ages of 40 and 75, volunteered to participate in this research project. All subjects were Caucasian. All subjects had a developmental disability, such as cerebral palsy or a learning disorder, and/or mental retardation. The levels of mental retardation were severe, moderate, or mild. Many of the subjects had psychiatric diagnoses. All subjects were independently ambulatory without assistive devices or major orthopedic conditions. Direct care staff attested to the medical condition of the person. Current physicals from the participant's physician were used to determine blood pressure, weight, diseases or chronic conditions, and any prescribed medications, the subjects were taking.

In order to control for intervening factors, a preliminary analysis was done to determine any significant differences between subjects. Each individual's weight and height were compared to Metropolitan Life Insurance Company Height-Weight Data standards. These standards are based on a weight-height mortality study conducted by the Society of Actuaries and the Association of Life Insurance Medical Directors of American Metropolitan Life Insurance Company. Blood pressure data was compared to the American Heart Association standards. These comparisons were made to determine if the subjects' stats fell within normal limits for the general population and did not deter their participation in physical activity.

All subjects were of the same basis economic status with limited resources to participate in organized exercise activity, (e.g. health club), outside of their living environment. Subjects received benefits from the Social Security Administration either in the form of Social Security Disability benefits or Supplemental Security Income benefits. The subjects who are employed, are required to contribute to their cost of care based on the amount of wages earned. Those who do not work have many of the same advantages due to Department of Mental Health funding.

All subjects resided in five types of residential placements funded and managed by the Department of Mental Health, and specifically by Central Missouri Regional Center's licensed providers. Residential care facilities were also licensed by the Division of Aging, and The Department of Social Services.

Two categories of residential placement were used. More restrictive environments included group homes licensed for six or more residents, and residential care facilities licensed for 14 or more residents. Both types of residential placements provided 24 hour support staff. Lesser restrictive environments included individual supported living (ISL) arrangements with three or less persons, foster homes where families provide the care for one to three persons, and independent apartments which had two or less persons. Some ISLs had 24 hour support staff, and independent apartments had a support person who provided 20 hours or less of support to the resident(s) per month.

Walking activity was assessed with two questions. The amount of time spent walking (work, shopping, pleasure, etc.) during the weekdays and the amount of time spent walking on weekends. The two measures were added together and divided by seven to determine the average amount of time walked per day.

A Health and Exercise Survey was developed to collect data. Personal interviews were conducted with either the subject or the support staff who worked directly with the person to obtain the information. A number of individuals assisted the researcher. All are either employed by Central Missouri Regional Center as casemanagers or by a provider agency, Center for Human Services (CHS), as service coordinators. The duties of both casemanagers and service coordinators are virtually the same--to coordinate, advocate, and monitor service needs of this population. These individuals are required to have a Bachelors Degree in a Human Service field, and at least one year of professional experience working with individuals with mental retardation and/or developmental disabilities.

The mean, standard deviation, and distribution of the sample was determined. Because the data was nominal and of the ordinal variety for independent samples, the Whitney Mann U-test was used for statistical analysis. The F-test was used when data was ordinal and testing was between more than two groups.

Objectives

Objective 1: By December 1, 1996, a representative sample of subjects had been selected, and their participation in the research project was solicited.

Objective 2: By December 15, 1996, a viable survey instrument had been developed.

Objective 3: By January 1, 1997, releases had been obtained to interview subjects.

Objective 4: By January 1, 1997, Personal interviews with the subjects were conducted using the survey instrument. In some instances, other personnel employed as casemanagers by Central Missouri Regional Center assisted in gathering survey data.

Objective 5: By January 1, 1997, chapter two of the thesis project had been completed.

Objective 6: By June 15, 1997, data from the surveys had been compiled and statistical calculations completed.

Objective 7: By June 30, 1997, chapter three of the thesis project was completed.

Objective 8: By July 10, 1997, chapter four of the thesis project was completed.

Objective 9: By August 1, 1997, chapter one of the thesis project was rewritten.

Project Limitations

The research may have been skewed by the perception of the individual with a disability or the perception of the support staff as to the actual amount of walking activity that the subject had done on a consistent basis. Reporting of information might be inaccurate because staff consistency is unlikely over time with the subject except in the case of subjects who reside in private family foster homes. The person with mental retardation residing in individual supported living arrangements

with support staff less than 20 hours per month might not cognitively be able to give accurate information regarding their walking activity.

The attitude of the support staff managing the residential facility toward exercise activities might influence the individual, especially if there is good rapport between the staff and the individual with the disability. People with mental retardation often complete tasks more readily for persons whom they like and who interact with them on a consistent basis.

The project might be limited by the differences in staffing ratios in some of the residential settings. Those homes with a greater staff to client ratio might be more inclined to engage subjects in exercise activity.

The project might be limited by the small sample size and the specific geographical location of the project. The geographical location for this project had a limited number of residential options available. This was particularly true of ISLs and foster homes.

Definition of Terms

Developmental Disability: A mental or physical condition manifested before the age of twenty-two (22) years that is likely to continue indefinitely and results in substantial functional limitation in the areas of self care, learning, mobility, receptive and expressive communication, economic self-sufficiently or self direction.

Mental retardation: a general term for those who have significant subaverage intellectual functioning (an IQ of

approximately 70 or below) with concurrent impairments in adaptive functioning.

Levels of Mental Retardation and corresponding Intelligent Quotient:

Level of Retardation	I.Q.Score
Borderline	70 - 85
Mild	55 - 69
Moderate	40 - 54
Severe	25 - 39
Profound	below 24

Elderly or Aging: refers to individuals age 40 to 75 years for the purposes of this project.

General Population: any person who has not been diagnosed with a developmental disability or mental retardation.

Protected Environment: refers to residential facilities in which the residents have twenty-four (24) hours supervision.

Individual Plans: The agreement, written by the casemanager, as to the services and intervention needed by the client. This document, containing assessment and evaluation information is required by the Department of Mental Health for the purpose of ensuring that services and programs are compatible with the client's needs. This document is the primary mechanism for planning, monitoring and evaluating how well the needs of the person with developmental disabilities and/or mental retardation are met.

Monthly Report: A report that is required by the Department of Mental Health as a continuing assurance that the needs of the individual, as prescribed in the Individual Plan, are being met.

Down's Syndrome: A genetic condition in which an additional chromosome or parts of an extra chromosome become attached to or broken off from the 21st chromosome.

Department of Mental Health (DMH): The primary agency within the State of Missouri whose responsibility it is to provide services for persons with developmental disability and mental retardation through the administration of the Division of Mental Retardation/Developmental Disabilities.

Central Missouri Regional Center: The point of contact within the central region of the State of Missouri whose function it is to determine eligibility and coordinate services for individuals with mental retardation and developmental disability.

Casemanager or Service Coordinator: Individuals who posses a minimum of a Bachelor's Degree in a human service field and have at least one year of experience working with individuals with developmental disabilities/mental retardation. These individuals assist in determining client needs, advocate for services, and monitor service quality

Center for Human Services (CHS): A not-for-profit organization, contracting with DMH to provide services for individuals with mental retardation and developmental disabilities.

Timelines

OBJECTIVES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1. Formulate Project											95'	95'
2. Concept Paper												95'
3. Complete Chap. 1			30th									
4. Solicit Participation of Subjects												1st 96'
5. Completion of DMH Forms				15th 96'								
6. Obtain Releases	1st 97'											
7. Complete Chap. 2	15th 97'											
8. Collect and Analysis Data						15th 97'						
9. Complete Chap. 3						30th 97'						
10. Complete Chap. 4							10th 97'					
11. Rewrite Chap. 1								1st 97'				

Budget

	Amount Needed
Travel Expense	$100.00
Office Supply	100.00
Telephone	50.00
Printing	50.00
Photo Copying	10.00
Total	$310.00

Summary

Exercise has been shown to have a positive effect on independent physical functioning and psychological well-being in the general population (Ruuskanen and Parkatti 987). Chapter one of this project/thesis addressed the need for individuals with

mental retardation to participate in exercise activities for the same purposes.

It was hypothesized that subjects who report a greater amount of walking exercise and a better health rating would reside in residential facilities that were less restrictive (3 or less residents). It was further hypothesized that females would spend more time in exercise activity than males, older individuals (57-75 years) would spend less time in activity, but there would be no differences in activity time across levels of retardation.

The subjects for this research project resided in five different residential types funded by the Department of Mental Health and managed by providers licensed by the Department. All of the housing types were either protected environments or restricted by management rules. The homes were located in the various counties of the region of Central Missouri Regional Center in central Missouri. A survey was developed to gather data for analysis. Definitions were provided for terms that may have been unfamiliar to the reader. A budget of expenses for the project and timelines for completion were established. The proposed limitations and summary of the project concluded the chapter.

Chapter two is a review of the literature primarily as it relates to the general population. In preparation for this project the researcher found few studies that explored residential settings and activities of aging individuals with mental retardation.

The effects of walking and exercise in general is presented as it relates to the physiological and psychological functioning of the older adult. Information is provided as to the effects of aging in general on older adults with mental retardation. Special attention was given to the impact aging has on the physiological functions of the elderly. A variety of housing options for aging persons with mental retardation are examined to determine the positive and negative impact each housing type had on these individuals. The limitations placed on these individuals by management and the effects of the extent of those limitations on the individuals were also examined.

Chapter three is a report of the data collected during the research project. The results of information gathered during the survey process were analyzed statistically to determine the relationship between the residential facility the individual lived in and the amount of walking exercise they participated in. Also, statistical analysis was used to determine if there was a relationship between walking activity and the person's health, age, gender, and level of retardation. Chapter three was concluded with a discussion on the results of the research.

In Chapter four the author reports the implications the research has for individuals with developmental disabilities and mental retardation. The author presents information gained from the project and the type of future research that would be of merit. The benefits of providing quality exercise activity to individuals with developmental disabilities and mental retardation, regardless of the residential setting, are detailed.

The limitations that might be experienced in research projects with this population are also described.

Included as appendices is the survey used to collect the data, the release of information that was signed by the guardian or the individual who participated as a subject, and the letter to those individuals outlining the project. This procedure is required by the Department of Mental Health. A copy of the letter from the Department of Mental Health approving the project is also included.

References used in developing this project and conducting a search of the literature are listed. Included in this listing are all articles, books, newspapers, and periodicals used with the appropriate source information provided. Additional information was obtained via the Internet.

Chapter 2

Introduction

A National Health Interview Survey estimated that 35% of the American population exercises regularly, with 10 to 20% engaging in exercise known to produce cardiorespiratory fitness (Altchiler and Motta 829). Exercise has often been recommended for the prevention of physical health problems in the general population (Sheldahl et al. 795; Emery 3; Stamford 451). Dr. William Evans (41), chief of the Human Physiology Laboratory at the USDA Human Nutrition Research Center on Aging at Tufts University, states that the "markers" of biological aging can not only be altered, in the case of specific physiological functions, they can actually be reversed. Evans (42) refers to the well-known essay "Disuse and Aging," by Dr. Walter M. Bortz II which concludes that at least a portion of the changes that are commonly attributed to aging are, actually, caused by immobility. There seems to be nothing that science can do that is as important as exercise is to an individual.

For individuals with mental retardation there is a myth in the medical profession that they are unable to participate in exercise at the same rate as the general population (Brummel-Smith Aging and Disability). Understanding the effects of the environmental setting on older people with mental retardation and how it relates to the amount of exercise that they participate in has not been investigated.

A survey instrument provided data from subjects who resided in five types of residential settings managed by Central Missouri

Regional Center. Subjects resided in 13 counties which are in the Central Missouri Regional Center catchment area. The 42 subjects were males and females ranging in age from 40 to 75 years.

This project addressed five issues: 1.) Whether aging persons with mental retardation will participate in more walking exercise in less restrictive facilities? 2.) whether they will have a better health rating in less restrictive environment such as independent supported living? 3) whether there will be a difference in gender of subjects in walking activity within residences? 4.) whether the age (40 to 75 years) will make a difference in walking activity? and 5.) whether level of retardation of the person will make a difference in the amount of walking exercise participation within residences.

In the review of literature, the researcher reviewed history and philosophy of the field of developmental disabilities/mental retardation as well as the characteristics of the individuals who experience these impairments. Information about the attitudes and behaviors typical of persons with developmental disabilities/mental retardation was explored. How and where they live, and how these individuals relate to others and their communities were included in the review.

Humanistic Foundations

The term "developmental disabilities" was first used in 1970 to unite disabilities that are attributable to mental retardation, cerebral palsy, epilepsy, and other neurological conditions with etiologies that begin early in life or during the

developmental period (Lippman and Loberg 41-45). The Developmental Disabilities' Act of 1984 defined developmental disability as a severe, chronic disability attributable to a mental or physical impairment, manifested before age 22, likely to continue indefinitely; and results in substantial functional limitations. Three or more limitations in the areas of self-care, receptive and expressive language, learning, mobility, self-direction, capacity for independent living, or economic self-sufficiency need to be present. Generally, the limitations will require interventions of lifelong or extended duration (Lippman and Loberg 41-45).

The DSM-IV criteria for mental retardation differs in that subaverage intellectual functioning is defined as an impairment which is measured by an Intelligent Quotient of 70 or below. It is also defined by lack of adaptive functioning in two of the following areas: communication, self-care, home living, social/interpersonal skills, use of community resources, self-direction, functional academic skills, work, leisure, health, and safety. The onset of impairment is before the age of 18 years (DSM-IV 40 and 46). The state of Missouri definition adds head injury, autism, and a learning disability related to a brain dysfunction as impairments.

Mental retardation can come about before, during or after birth and is caused by infections, intoxication, trauma, physical injury, metabolic disorders, nutritional deficits, glandular irregularities, tumors, growths and other hereditary diseases. Also, chromosomal abnormalities, prematurity, low birth weight,

and postmaturity are examples of gestational disorders that often result in mental retardation (Krishef 45; DSM-IV 39).

Individuals may also become retarded as a result of the environment in which they live. They may be kept so socially isolated that they fail to develop relationships with other people. Lack of development in social relationships can result in severe deficits in communication and language skills. Studies have shown that when humans are deprived of stimulation to their sense organs for even short periods of time considerable loss of intellectual function will occur (Krishef 52; DSM-IV 40).

The proceeding remarks support the belief that many of the individuals supported by the Department of Mental Health in large institutions or the more restrictive environments, do not reach their greatest potential because of the lack of stimulation. Stimulation may be lacking physically, socially, or emotionally. In particular, the opportunity to participate in daily activities which would embrace the body, mind, and spirit. The deprivation of stimulation might also result in lack of motivation for beneficial physical activity.

Intelligence, emotion, incentive, and social and physical competencies are all closely interrelated concepts which affect the person's adaptive functioning (Krishef 42; DSM-IV 40). It is believed by this researcher, that adaptive functioning is influenced by the amount of staff support to provide the level of stimulation needed to assist individuals in larger residential settings to enhance skill levels. The myth that individuals with mental retardation need to be protected or that they are unable

to do many things results in a loss of adaptive skills. This myth may also cause a delay in learning new skills. It is this type of thinking by staff and facility administrators that deprive individuals of the opportunity to participate in daily physical activities that provide the necessary stimulation for the development of the body, mind, and spirit.

Social/Philosophical Foundations

Defining the aging or elderly population with mental retardation encompasses biological, sociological, and psychological components (Wisniewski and Merz 177). These three components interact differentially in the older person and will affect the demographics and the characteristics of the disability.

In some rural regions, over a quarter of the clients of the Missouri Division of Mental Retardation/Developmental Disability (MR/DD) are over the age of 55 years. Overall, 20.3% of the population of the Missouri Division of MR/DD is 55 years or older. There is an additional 13.8% of middle aged persons or a total of 40% in the 45 to 74 years group served by the Division. Ten percent of these older persons are profoundly retarded, but the majority are either mildly (27.3%) or moderately (28%) retarded (Rinck 2 Profile).

Many researchers and professionals use a chronological age to define the lower limits of aging. Some authors suggest that social expectations of aging begins in this population as early as age 35 (Dickerson et al. 201.) Most researchers, however, have selected the mid-50s based on observation of changing

functional status and expectations for change in normative age-related activities (Janicki et al. 289).

For the purpose of this research project, "aging" persons with mental retardation are defined as individuals within the larger developmentally disabled population who are 40 to 75 years. Forty is used as the low end for aging because many individuals with Down's syndrome exhibit varying symptoms of aging at forty years and earlier (DSM-IV 43).

Historically, aging persons with mental retardation were rarely considered. Until relatively recently, persons with severe impairments have had relatively short life expectancies or they spent much of their lives out of sight in public institutions. Community sheltered workshops had not yet experienced a "graying" of their workers (Janicki 147). These factors contributed to the lack of awareness and concern for aging adults with mental retardation. With improved health and social conditions, and new programs and technologies, these individuals are living longer and are more numerous and conspicuous in natural community settings.

As individuals with mental retardation continue to be supported in good fitness and health programs, increased opportunities for participation in activities of daily living, and exercise regimes, the trend for this population to live longer, better lives will parallel that of the general population.

Although data have accumulated regarding lifelong preventative health care measures for the general population,

there have not been uniform recommendations for persons with mental retardation. As this population grows older, they are subject to all of the usual age-related changes and illnesses, as well as the unique physiological and psychological problems related to a lifetime of impairment, altered life-style, and, at times, neglect (Gambert, Liebeskind, and Cameron 292). It is imperative that exercise and fitness programs for this population not be appreciably different from those in the community for the general population of comparable chronological age.

Psychological Foundations

Brummel-Smith (Aging and Disability) notes that an interesting aspect of aging is that older people within the general population tend to think of their health in relatively positive terms. When asked in a survey questionnaire to rate their health, the majority of older people say their health is good, very good, or excellent. Age, gender, or income had no bearing on this report.

In spite of older people's perceptions that their health is good to excellent, research on aging has emphasized losses. The effects of the aging process itself has been exaggerated. The modifying effects of diet, exercise, personal habits, and psychosocial factors are underestimated for the general population and persons with mental retardation in particular (Seltzer and Luchterhand 130; Brummel-Smith Aging and Disability).

One alternative activity for older persons with mental retardation is exercise. Many losses in function are attributed

mistakenly to the aging process when, in fact, they occur because of the lack of exercise and the resultant deconditioning of muscle strength and other physical abilities. Proper exercise promotes health and well-being and prevents deconditioning (Seltzer and Luchterhand 131).

Aging is really a combination of three things--normal age-related changes plus the effects of disuse, and the affects of age-related disease (Brummel-Smith Aging and Disability). Persons with mental retardation, just like the general population, are not a homogeneous population. Their needs and abilities will differ widely, based not only upon age, but upon experience and how the physical aging process is affecting them.

The current concept being pushed in gerontology and geriatrics is the difference between usual aging and successful aging (Rowe and Kahn 25). Usual aging refers to the typical, or average, situation for an older person who may have one or more chronic diseases or impairments. The tendency is to misinterpret what is typical as normal, rather than interpreting it as a result of an underlying disease. They typical aspects of aging may not have expressed itself to the point that it can be measured, or it is just something that is accepted by our society as being normal, such as walking more slowly (Rowe and Kahn 25).

Successful aging is described as an ideal physiological aging outside the realm of disease. It may be defined in terms of an individual retraining his or her capabilities to function as independently as possible into old age (Janicki 146). It does

appear that there are small numbers of people in today's society who undergo this form of aging.

Epidemiological research shows that age-extrinsic factors such as eating and exercise habits are potential explanations for successful aging. These habits are shaped and sustained by psychosocial influences whether by family, friends or professionals. Criteria include rate and completeness of recovery from injuries and illnesses and increased adherence to health-promoting activities (exercise, physical activity) (Rowe and Kahn 29-30; Burlew, Jones and Emerson 152).

Another relevant concept is *rehabilitative intent.* In the case of younger persons with mental retardation the intent is to promote skill development to assist the individual to be an independent member of society, working and enjoying the freedom of having his or her own household. With persons in middle age or later, independence still remains an important goal; however, it is now moderated by another complementary goal, *interdependence.* This is realized by fostering social skills that maintain personal independence and promote involvement with others. The emphasis for the aging person is on social and personal competence to maintain self-care skills and avoid institutionalization (Janicki 146). Exercise and physical activity is believed to be one of the best ways to promote a healthy involvement with others while enhancing personal competence and self-esteem.

The beneficial effects of exercise for the elderly, whether they have mental retardation or not, is a widely accepted

phenomenon. This population experiences physically, by improved cerebrovascular circulation, psychologically, by increased neuroendocrine sensitivity and function, and a change emotionally, whether by changes in body image or access to more positive psychosocial influence (Wiswell 943).

One of the primary concerns for individuals with mental retardation, especially if they are elderly, is the fact that they are more likely to reside in protective environments that promote hypoactivity (Neef et al. 136). Consequently, as these individuals grow older, their health risks are compounded by the adverse changes associated with aging as well as loss of function from disuse.

Historic Foundations of Residential Options

For adults with mental retardation in residential care, their impending geriatric status tests the preparedness of the setting to address their needs. Most community care systems are child and young adult oriented. Few are prepared or have been interested, at least to this point, in dealing with geriatric considerations. Understanding the effects of the environmental settings on older people and searching for optimal environments have become a major concern in recent years.

Krauss and Seltzer (238) found considerable variation in the characteristics and service needs of elderly persons with mental retardation living in different residential settings. They also found that older individuals who had significantly lower functional abilities, resided in more restrictive environments. There is a positive correlation between age and rate of placement

in nursing homes or other chronic care facilities (Krauss and Seltzer 238).

There is some evidence in the literature that older persons with mental retardation have fewer residential options than do younger individuals. This is due to historical and contemporary placement patterns and policies of service systems (Krauss and Seltzer 238).

In preindustrial Western societies few people lived to old age. Those that did were taken care of by their families or relied on the benevolence of churches or associations. Society, grudgingly, compensated for the elderly by the changes brought about by industrialization. They were offered almshouses patterned after those used in England. The unpleasantness of these almshouses were purposeful to limit the use by individuals. During the second half of the nineteenth century, the large, centralized institutions became the model of specialized housing for older persons. Provisions for certain groups of elderly, including widows and soldiers, were more plentiful. Beginning in 1827, homes for veterans were established for those who were no longer able to remain in the community. Private philanthropy also grew. By the 1920s, nonprofit homes for the aged had become the common model of care, supplemented by psychiatric hospitals and county homes. Such facilities heaped people together without much regard for a holistic approach to their health and fitness needs (Moos and Lemke 865).

With a growing mistrust of institutions in the 1930s and 1940s, elderly persons assumed the role of boarder in private

homes or entered small, family-run rest homes or sanitaria. As people became more disabled nursing care was added as a service, especially as more public monies became available (Moos and Lemke 865).

Philosophical Foundations of Residential Options

The emphasis of normalization and deinstitutionalization beginning around 1970, led to the expansion of the residential care systems, including group homes, skilled nursing facilities, and independent living programs (Willer and Intagliata 588; Meyers, Borthwick, and Eyman 266). It is believed that such facilities provide a greater opportunity for individuals to participate in physical activity and support exercise programs.

Stone (194) reports that institutionalization of persons with mental retardation has declined over the past ten years. This decline has led to a residential care continuum for most service systems that includes a range of long-term and transitional options that vary in size, intent, and restrictiveness. Although Krauss and Seltzer (238) found evidence that older persons with mental retardation have fewer housing options. Stone (195) found that the majority of this population reside in any and all types of housing options.

There have been two conflicting philosophies that have influenced residential options for the elderly person with developmental disabilities/mental retardation. In the 1990s' the primary emphasis has been to move away from what has previously been referred to as a "continuum" in which these individuals must first develop a certain set of skills before they are "allowed"

to move to the next level of housing options. The trend has been toward more normal living arrangement in which the individual and/or their family decide, just as anyone within the general population, where they wish to live and in which type of housing option.

The following housing options reflect this author's ten years experience in the field of developmental disabilities/mental retardation. Only those residential options included as consideration in this project will be defined. These include:

1. Residential Care Facilities: A residence that provides sleeping rooms and meals with limited assistance and more oversight in personal care but no formal training provided by the staff. The bed capacity is determined by the state.
2. Group Homes: A residence with staff 24 hours per day which provide care, supervision, and training of five to fourteen people with developmental disabilities/mental retardation.
3. Foster Home: A house or apartment owned or rented by a family with one to three persons with developmental disabilities/mental retardation living as a surrogate family member.
4. Individual Supported Living: A residence rented or purchased by the individual with developmental disabilities/mental retardation with staff who either reside in the residence or come into the residence on a

regular schedule to provide a predetermined amount of supervision, personal care, and/or training. The participant may live alone or with a roommate.

The more individualized the residential option for the elderly with mental retardation the more it allows them to maintain independence and engage in activities of daily living. It is through these physical activities that they have an opportunity to engage in "successful" aging practices much like the general population within the community. This type of lifestyle is in direct opposition to that of the larger supervised facilities which encourage dependency (Stone 199; Janicki and MacEachron 136).

Related Research

The goal of improving health is perhaps the most commonly perceived reason why an older person would engage in an exercise program. Potential gains include reduction in cardiovascular risk (Paffenbarger et al. 611; Pekkanen et al. 1475), control of obesity (Sidney, Shepherd, and Harrison 330), and better sleep patterns (Shepherd 62).

Regular exercise reduces cardiovascular risk in the elderly 75 to 80 years of age (Paffenbarger et al.610; Pekkanen et al.1476). Sidney et al. (331) demonstrated a substantial reduction of body fat when 65 year-old subjects participated in a 14-week program of endurance exercise. Regular weight-bearing exercise slows the rate of osteoporosis (Chow, Harrison, and Sturtridge 61). The muscles that are involved in the exercise

become stronger (Davies and White 28; Chow, Harrison, and Notarius 1443).

An improvement in functional capacity is perhaps the strongest argument for encouraging exercise in the elderly. Admission to an institution commonly reflects functional deterioration (Shepherd 62).

Because of the similarities between individuals with mental retardation and the general population it is reasonable to believe that the same philosophy would hold true for them. However, there is a dearth of research in which exercise participation of this population has been studied.

The relatively few empirical reports on this population may be due to the low visibility of this group to the general public and the professional domain, lack of ample description by various state systems, and the fact that the behaviors exhibited by these individuals resemble the behavior exhibited by the typical elderly person with diminishing cognitive capacities.(Dickerson et al. 8 and 10; Segal 12). Low public awareness combined with misconceptions about the mortality rate of individuals with mental retardation and the negative attitudes toward these individuals seem to mask their existence (Malone 2).

The number of individuals identified for services may be small relative to the actual population of those with mental retardation. This, along with those things previously mentioned, most likely attributed to this author inability to find any studies that directly addressed the relationships of exercise and place of residence of this population.

Chornoboy and Harvey (147) investigated the relationship of 30 activities (i.e. knitting, talking on the telephone, setting the table, painting a picture) and facility types for persons who are mentally retarded. The facility types reviewed were group homes (6 or more persons), independent living (own apartment with roommate), foster homes, individuals living with family, and senior citizens' homes.

Senior citizens showed a higher frequency overall of sedentary activities with little staff intervention. In the homes where the respondents received training (group homes, foster homes, and independent apartments) the activity participation was higher when the trainer was available.

Included in the individual's activities was physical fitness, such as walking, as well as sedentary activities such as board/table games. Female participants performed a greater number of activities more frequently. The fact that many of the activities were domestic may account for a higher frequency and number of activities performed by females (Chornoboy and Harvey (152). The small sample size of the Chornoboy and Harvey study make any conclusions tentative, as the human involvement seemed to have more affect on the types of activities the persons engaged in than did the facility type.

Lakin et al. (65) reviewed the programs and services received by a national sample of 370 individuals with mental retardation, age 63 and over, and found that 70% of these individuals engaged in some form of exercise program. The facilities included in this study were foster care, small group

homes (15 or fewer residents), large private facilities (16 or more persons), and state-operated facilities (16 or more persons)(Lakin et al. 72). There was generally no significant difference in gender except in the state institution where 56% of the males were able to walk 10 feet without assistance as opposed to 43% of the females. The ability to be independent is comfounded by the fact that more severely disabled individuals usually reside in more restrictive housing options (Lakin et al. 72).

Very few studies have been reported in which there were specific, purposeful interventions to increase exercise by those with mental retardation. Most have been compromised by methodology such as ambiguous procedures or outcome variables. The types of interventions would limit applicability to a residential setting because of the amount of staff time, effort, or resources required for implementation (Hussey, Maurer, and Schofield 703; Montgomery, Reid, and Seidl 76; Moon and Renzaglia 280). In fact, in a review of exercise training studies conducted with individuals with mental retardation, Pitetti and Campbell (590) noted that all but one of the interventions involved a degree of supervision and prompting that would exceed the capabilities of most facilities.

One of the most beneficial means of promoting exercise among nondisabled persons is the use of videotaped exercise programs. Neef et al. (137) conducted an exploratory study of the effects of participation in therapeutic exercises using videotaped participant-modeling. This study investigated the effects that

homes (15 or fewer residents), large private facilities (16 or more persons), and state-operated facilities (16 or more persons)(Lakin et al. 72). There was generally no significant difference in gender except in the state institution where 56% of the males were able to walk 10 feet without assistance as opposed to 43% of the females. The ability to be independent is comfounded by the fact that more severely disabled individuals usually reside in more restrictive housing options (Lakin et al. 72).

Very few studies have been reported in which there were specific, purposeful interventions to increase exercise by those with mental retardation. Most have been compromised by methodology such as ambiguous procedures or outcome variables. The types of interventions would limit applicability to a residential setting because of the amount of staff time, effort, or resources required for implementation (Hussey, Maurer, and Schofield 703; Montgomery, Reid, and Seidl 76; Moon and Renzaglia 280). In fact, in a review of exercise training studies conducted with individuals with mental retardation, Pitetti and Campbell (590) noted that all but one of the interventions involved a degree of supervision and prompting that would exceed the capabilities of most facilities.

One of the most beneficial means of promoting exercise among nondisabled persons is the use of videotaped exercise programs. Neef et al. (137) conducted an exploratory study of the effects of participation in therapeutic exercises using videotaped participant-modeling. This study investigated the effects that

exercise has on the gait and balance of five elderly women with mental retardation in a geriatric institution. A videotape of themselves was used to guide their performance of a walk test. Improvements in gait occurred with continued exercise participation. This research supports the Chornoboy and Harvey study that an intervention by a trainer or support staff is important in motivating persons with mental retardation to participate in a regular exercise program. Although this study was limited to a large institution, these results are encouraging for the reduction in falls or risk of osteoporosis that were noted (Winnett, Moore, and Anderson 229).

Sixty percent of nursing home residents practice some kind of physical activity during weekly programs. Walking indoors appears to be most popular. However, their physical activity was lower than for those individuals who live in their own homes. This might be expected since limited functioning ability is often the major criterion for nursing home placement. Men carried out more intensive exercise than women which supports earlier literature concerning the physical activity of noninstitutionalized elderly persons (Ruuskanen and Parkatti 990).

Regular physical activity is believed to increase total daily activity level, upgrade patient self-care, and increase activity tolerance levels in institutionalized geriatric mental patients. Over a 12 week period, subjects in an exercise group, a social group and a control group were measured on heart rate, neuromuscular tests, self-care measures and daily activity

levels. The analysis showed that the variable best accounting for the variance in the trials was daily activity levels. There was no significant differences between males and females as all subjects increased their activity level (Clark et al. 571).

Exercise and physical activity are known to have a variety of physiological and fitness benefits for older adults which enhance longevity and health. Physical activity improves cardiovascular fitness, neuromuscular function, bone density, respiratory function, and metabolic function in older adults (Stewart and King 108; DeVries 335; Emery et al.468; McMurdo and Burnett 292).

The benefits of low intensity versus moderate intensity of exercise has been investigated with elderly individuals in residential settings (Stevenson and Topp 210; Stewart and King 108). Nursing homes and residential care facilities were included in this study. No significant differences in physical fitness levels were realized between the low intensity group and the moderate intensity group; however, the moderate-intensity protocol may have been too mild to maximize the differences between the groups in relation to maximum oxygen consumption.

The effects of exercise on quality of life issues has been investigated with senior adults (Stevenson and Topp 209; Stewart and King 108; Shepherd 61). Low to moderate intensity of exercise has quality of life benefits (i.e. feeling better generally, functioning better on a day-to-day basis, maintaining independence for a longer period of time) even when the levels were insufficient to achieve cardiovascular benefits (Stewart and

King 108; Stevenson and Topp 217; Shepherd 62). Stewart and King (108) suggested that walking provides seniors an opportunity to get outdoors, which may improve well-being regardless of the amount of energy actually expended.

Many of the studies, whether with the general population or with individuals with mental retardation, were directed toward only one residential option. There are a vast number of residential options available to all people today. Philosophy regarding least restrictive environment and the social roles of individuals are also different today. Society is more responsive to these individual living and participating in their local community.

Summary

In conclusion, the population of persons with mental retardation living into old age is increasing. Living longer is due to better health care and the opportunity to more fully participate in activities of daily living. New programs and technology can also increase the likelihood of living longer.

The philosophy regarding this population and type of residential placement has changed throughout history. Institutionalization is no longer looked upon favorably. There are no easy answers to which residential placement is appropriate for the person with mental retardation. The functional ability of the aging individuals, the match between the characteristics of the proposed placement option to the person's needs, and the feelings of the aging individual are all major considerations when out-of-home placement is imminent (Janicki et al. 290).

Human service professionals are challenged to provide the amount of needed support while maintaining the greatest amount of freedom and independence.

The process of aging encompasses biological, sociological, and psychological components that reflect changes as the aging person with mental retardation moves through the life cycle. It is critical that more be known about the nature and the needs of this population. The effects of diet, exercise, and personal habits in relation to their living arrangement merit attention.

The lack of information and the dearth of research with individuals with mental retardation in relation to their exercise habits led to the development of this project/thesis. It is important to determine which type of residential facility will best promote a healthy lifestyle.

Despite its importance, affecting participation in and adherence to an exercise program for persons with mental retardation has been notoriously problematic. Persons with mental retardation need to move into that part of the life cycle referred to as "aging" in a pleasant and healthy manner. Caretakers within all types of residences must see to it that an individualized and lifelong preventative health program is incorporated into the individual's plan of care. Attention must be given to the holistic concept; the physical, psychosocial, exercise, and nutritional needs of each person. The support to meet the goals established for maximal physical and psychosocial functioning is imperative. At the very least, these individuals should be walking as much as possible and participating in

regular household chores to the extent that their disability allows for. Early planning and lifelong preventative measures will undoubtedly result in additional years of productivity and improved quality of life for many of these individuals.

Previous studies have not looked at the relationship between the amount of exercise that a person with mental retardation participates in and their place of residence. The survey of the present investigation will produce quantitative and qualitative data of activity that is currently happening within the various residences. From this exploratory study, an understanding will be gained as to the extent to which individuals with mental retardation participate in regular exercise and activities of daily living. Knowing how the current residential placement effects the health status of these individuals can assist professionals and service providers in planning for favorable and desirable housing options and programs in the future. Effective program planning can result in physical activity and exercise becoming an integral part of the daily life of persons with mental retardation regardless of the status of residential placement.

Chapter 3

Historical Review of Project

Purpose

The purpose of this research project was to determine whether individuals with mental retardation would report greater amounts of walking activity when residing in facilities with less restrictions or in facilities with greater restrictions. The project involved administering a Health and Exercise Survey to individuals residing in five facility types. The researcher also sought to determine whether individuals in facilities with less restrictions had better health ratings, whether females participated in activities to a greater extent than males, whether older individuals (57-75 years) spent less time involved in activities, whether the level of retardation played a part in the amount of activity participation, and whether the subjects participated in more formalized activities on a regular basis. It is believed that individuals who reside in facilities with less restrictions will be more involved in exercise activity on a daily basis. Data obtained from the survey was evaluated statistically to determine results.

The location of this project was within the 13 county catchment area of Central Missouri Regional Center(CMRC). The agency is a part of the Missouri Department of Mental Health with headquarters in Columbia, Missouri. The agency also has several satellite offices located throughout the 13 county service area. Many of the service areas are rural by definition. Which made a diverse group for this project. The location of participants

ranged from a residence which is located approximately 2 miles from the closest neighbor and approximately 10 miles from an incorporated town to a residence that is in a town of 20,000.

At the time of this survey, over 2000 individuals with mental retardation and/or developmental disabilities were receiving services from CMRC. Of this 2000, 647 were receiving residential services and 274 were over the age of 40.

It was hypothesized that participants who report a higher level of walking activity (defined as the amount of time spent walking to work, shopping, and for pleasure) and better health rating will reside in facilities that are less restrictive. It was further predicted that females would participate in more walking activity than males, and older individuals would spend lesser amounts of time in walking activity than younger subjects. It was anticipated that there would be no difference in reported walking activity among the levels of mental retardation.

Participants

The researcher planned the study and designed the survey to obtain data, and conducted many of the interviews. The researcher has been employed by regional centers for over eight years. Previous to that time, experience about individuals with mental retardation and/or developmental disabilities was gained through employment in a vocational program as a job coach.

The researcher personally believes that for too long individuals with mental retardation and/or developmental disabilities have suffered from damaging and false stereotypes. In fact, for those with little experience "fear" might best

define their attitude. The current mental health philosophy, encourages these individuals to be a natural part of their community for living, working, and playing. Mental health agencies will continue to provide valuable education to society in general. The researcher spends a great deal of time advocating for individuals with mental retardation and/or developmental disabilities to be a part of mainstream society.

Forty-two clients of the Central Missouri Regional Center, between the ages of 40 and 75 (mean = 56) volunteered to participate in this project. Health ratings were provided by the support staff. All individuals have some degree of mental retardation and reside in a residential placement which is licensed by the Department of Mental Health. All subjects receive some level of support from staff.

Implementation Activities

A listing of all individuals who receive support for residential placement was obtained from the CMRC information data base. Those persons under the age of 40 years were identified and deleted from the list. The lists were separated into categories of least restrictive; 3 or less people living together in either Individual Supported Living (ISL), foster homes or an independent apartment, and more restrictive; 6 or more people living together in a group home or residential care facility (RCF). Forty-two individuals were identified to participate in this project by selecting the fifth name on each list. Women were the minority, with 20% and 29%, respectively, in the more restrictive and less restrictive groups.

Walking exercise was defined as walking engaged in when going to work, shopping, or for pleasure. Subjects were also asked to list other physical activities in which they engaged in which might further support the research question.

The researcher conceptualized this project and submitted it for approval in December 1995. Chapter 1 was completed in March 1996. The project was submitted to the Department of Mental Health in April 1996 for approval. Approval was received in May 1996.

The original project called for subjects to participate in an actual exercise program during the summer months of 1996. However, due to the loss of several of those subjects either to death or other health related problem, resulting in too few subjects to make the research meaningful, the project was changed.

In December 1996, it was decided to select and survey a representative sample of subjects about the walking activities that they engaged in. Samples were selected from two types of facilities, more restrictive (6 or more individuals residing together) or less restrictive (3 or less individuals residing together). A survey was developed and permission for the subject's participation in the project was obtained from the responsible party.

At that time, it was necessary to update The Department of Mental Health (DMH) on the status of the project. The changes as outlined above were submitted and accepted by DMH.

Statistical Analysis of Results

Appropriate statistical analysis was performed on the data for the total sample of individuals residing in either a more restrictive living environment or a less restrictive environment.

The data for hypotheses I,IV, and V was nominal and of the ordinal variety for independent samples, thus the U-test was used. In all instances the .05 level of significance for a one-tailed test was used because the direction of the results was preselected. The data collected for hypothesis II was raw data converted to frequencies and then converted to percentage form. The F-test was used in the statistical analysis of hypothesis III. The F-test is used when data is ordinal and the testing is between several groups.

Hypothesis I

Individuals with mental retardation who reside in more restrictive residential environments will spend less time in walking activity.

Table 3.1 Walking Activity

Group 1, More Restrictive		Group 2, Less Restrictive	
Raw Score	Rank	Raw Score	Rank
214	1	189	2
171	3	154	4
77	11	129	5
77	11	111	6
66	13	107	7
60	14.5	90	8
60	14.5	81	9
57	16	77	11
51	18	55	17
49	19	39	25.5
47	20	39	25.5

Group 1, More Restrictive		Group 2, Less Restrictive	
Raw Score	Rank	Raw Score	Rank
39	25.5	39	25.5
39	25.5	39	25.5
39	25.5	39	25.5
39	25.5	31	32
39	25.5	30	35
31	32	19	41
31	32	10	42
30	35		R= 346.5
30	35		
27	38		
27	38		
27	38		
26	40		
	R= 556.5		

U-Score for Group 1 is 475.5
U-Score for Group 2 is 427.5
The obtained value for Z is 5.37
The critical value for Z is .4147.
Because 5.37 is greater than .4147, the null is accepted

Conclusion: Hypothesis I was not confirmed.

Hypothesis II

Individuals who reside in less restrictive residential environments will have a better health rating. Excellent and Good ratings were converted to Group A and Fair and Poor ratings were converted to Group B.

Table 3.2 Health Ratings

	More Restrictive		Less Restrictive	
	Cases	Percent	Cases	Percent
Group A (Excellent/Good)	16	38%	16	38%
Group B (Fair/Poor)	8	19%	2	2.4%

There is no difference between Group A and Group B.

Thirty-eight percent of the respondents reported the same health rating in both living environments. In Group B (Fair/Poor), 19% of those who lived in a more restrictive environment had a better health rating compared with just 2.4% of the respondents living in a less restrictive environment.

Conclusion: The major hypothesis was not confirmed.

Hypothesis III

There will be no difference in walking activity among levels of retardation regardless of residential environment.

Table 3.3

Mild		Moderate		Severe	
X	X2	X	X2	X	X2
154	23716	214	45796	77	5929
129	16641	189	35721	57	3249
111	12321	171	29241	49	2401
107	11449	77	5929	39	1521
81	6561	60	3600	27	729
77	5929	55	3025	Total	13,929
60	3600	47	2209		
51	2601	39	1521		
39	1521	31	961		
39	1521	30	900		
39	1521	30	900		
39	1521	26	676		
39	1521	Total	129,803		
39	1521				
39	1521				
31	961				
31	961				
30	900				
27	729				
19	361				
10	100				
Total	97,477				

The obtained value for F is 2.36.
The critical value for F is 3.24

Because the obtained value of 2.36 is less than the critical value of 3.24 the null hypothesis is rejected

Conclusion: Hypothesis III was confirmed..

Hypothesis IV

Individuals age 57-75 years will spend less time in walking activity than individuals age 40-56 years.

Table 3.4 Age Groups

Group I (40-56)		Group II (57-75)	
Score	Rank	Score	Rank
189	2	214	1
171	3	111	6
154	4	107	7
129	5	77	11
90	8	77	11
81	9	66	13
77	11	60	14.5
60	14.5	55	17
57	16	51	18
49	19	47	20
39	25.5	39	25.5
39	25.5	39	25.5
39	25.5	39	25.5
39	25.5	39	25.5
39	25.5	39	25.5
31	32	31	32
30	35	30	35
30	35	27	38
26	40	27	38
19	41	27	10
10	42		R= 27
	R= 476		

The obtained value for U for Group I is 217.
The obtained value for U for Group II is 233.
The obtained value for Z-score is .08.
The critical value for Z-score is .0987.
Because .08 is less than .0987, the null hypothesis is rejected.

Conclusion: Hypothesis III was confirmed.

Hypothesis V

Females will participate in more walking activity than males regardless of which residential environment they reside in.

Table 3.5

Males		Females	
Scores	Rank	Scores	Rank
214	1	171	3
189	2	154	4
90	8	129	5
77	11	111	6
77	11	107	7
77	11	81	9
60	14.5	66	13
51	18	60	14.5
49	19	57	16
47	20	55	17
39	25.5	39	25.5
39	25.5	39	25.5
39	25.5	39	25.5
39	25.5	39	25.5
39	25.5	31	32
39	25.5	30	35
31	32	27	38
31	32	27	38
30	35	26	40
30	35	10	42
27	38		R= 421.5
19	41		
	R= 481.5		

The U-score value for males is 211.5.
The U-score value for female is 228.5.
The obtained value for Z is .21.
The critical value for Z is .2019.
Because .21 is greater than .2019 the null is accepted.

Conclusion: Hypothesis V was not confirmed.

In addition to the five major hypotheses for this project the writer sought to determine whether individuals who reside in a less restrictive environment participate in other beneficial exercise activities beyond daily walking activity. The

activities listed for more restrictive environments were bowling, aerobics, and climbing stairs. Activities listed for less restrictive environments included bowling and biking.

Because the data was ordinal, nominal, and involved two independent samples the U-test was used.

Table 3.6 Additional Activities

More Restrictive Group I	Rank	Less Restrictive Group II	Rank
315	1	120	3
193	2	90	6

More Restrictive Group I	Rank	Less Restrictive Group II	Rank
105	4	90	6
90	6	60	11
70	8	60	11
45	14	60	11
10	16	60	11
10	16	60	11
10	16		R= 70
	R= 83		

The U-score for Group I is 34.
The U-score for Group II is 38.
The obtained value for Z is .19.
The critical value for Z is .0753.
Because .19 is greater than .0753, null hypothesis is accepted.

Conclusion: The assumption was not confirmed.

Discussion of Results

Hypothesis I. Individuals with mental retardation who reside in more restrictive residential environments will spend less time in walking activity.

Hypothesis I was not confirmed.

Results indicated that individuals did equally well regardless of residential facility. It is possible that those residences which have a greater number of individuals living together can provide meaningful activities. The amount of activity that an individual takes part in on a daily basis may be more dependent upon the support staff and other professionals involved than the residence per se. It is possible that there is an attitude of indifference on the part of staff to motivate individuals to participate in daily activities. The human involvement seemed to have more affect on the types of activities than did the facility type (Chornboy and Harvey 152). However, conclusions may be tentative in the Chornboy and Harey study because work activity time was not included, and the sample size was small.

It is possible that lack of training and exposure to various activities have left many individuals unmotivated to engage in activities. Most of the respondents for this project grew up in large state habilitation centers. They may have become so routine-oriented that changes in their fixed patterns of behavior would be difficult to change. Many of these individuals may require highly individualized assessments and programs to determine specific interests which would motivate them to participate in regular exercise activity (Malone 10). Effecting participation in, and adherence to, daily activities with accumulative health benefits continues to be notoriously problematic for this segment of the aging population (Brummel-Smith Aging and Disability).

Hypothesis II. Individuals who reside in less restrictive residential environments will have a better health rating.

The major tenet of Hypothesis II was not confirmed.

A greater number, 19%, of those with fair/poor health ratings resided in more restrictive residential placements. The combination of the aging and mental retardation process itself may be accelerated, thus increasing the chances of placement in a more restrictive living facility. The Krauss and Seltzer study (238) found that among older individuals with mental retardation there is a higher rate of institutional placement associated with advance aging. The literature supports the findings, that in general, the more complex the physical problems (e.g. cerebral palsy), and the greater the levels of overall impairment, the more likely an individual will reside in a more restrictive environment (Janicki and MacEachron 131; Anderson 30).

In combination, 76% of the respondents reported to be in excellent or good health. Although these findings provide valuable information on the current health status of those in residential placement; it may reflect untested beliefs or assumptions about the cognitive, medical, and functional status of elderly persons with retardation.

The differences in the findings of this study may be because the health status of the subjects was reported by support staff rather then by the individuals themselves. Other studies need to be done that would break down health status by level of retardation. Since there was no difference in the reported health rating between the residence in the excellent/good group,

more of those individuals may have mild retardation and have more in common with the general population. A greater percentage of the individuals in the fair/poor group resided in more restrictive environments.

In recent years "institution" has become negatively stereotyped (Malone 5). It is possible that individuals who experience better health are placed in Individualized Supported Living (ISL) as opposed to those who may be more medically fragile. Until recently, persons with severe impairments have had relatively short life spans (Janicki 147). Better health care for this population has increased the likelihood that they may live in less restrictive environments if they chose (Brummel-Smith Aging and Disability). State regulations requiring individuals to see physicians on a regular basis has also contributed to better health care. Prevention services are also emphasized within state supported residential settings and contributes to the well-being of these individuals.

Experience has shown that guardians and family members are more reluctant to agree to individuals who have greater medical needs residing in small homes within the community. Many of them continue to favor the larger state institutions.

Hypothesis III. There will be no difference in walking activity among levels of retardation regardless of residential environment.

Hypothesis III was confirmed.

An individual's adaptive functioning can vary irregardless of the level of retardation. Their intellectual competencies,

while showing a lower baseline than the general population, may not differ as dramatically in pattern from that of the typical elderly (Malone 4). Experience has shown and Malone's (4) studies have supported, that particularly those who have had extensive community involvement and the opportunity to receive one on one assistance from their family, prior to community placement, have acquired a greater number of adaptive skills (Malone 4).

The adaptive skills or the availability of support from a trainer, is more likely to determine the number of activities performed, rather than level of retardation. Neef et al. (147) found that whether using self- or peer-modeling videotapes to guide performance, activity levels increased, and errors in a walking test decreased. All participants resided in a community residential care facility.

Of all the respondents, 50% listed their retardation level as mild and 29% as moderate. This assumption is supported by the Center for Residential and Community Services, University of Minnesota study which showed respondent in community placement more likely to have mild or moderate retardation (Larkin et al. 66). This conclusion also concurs with Malone's (3) finding that the less severely handicapped are also the individuals who reach old age and would be more likely to reside in community facilities. Only 12% of the respondents reported severe retardation. Larkin et al (68), reported that 82% of those individuals with severe retardation resided in state institutions rather than community placement.

Hypothesis IV. Individuals age 57-75 years will spend less time in walking activity than individuals age 40-56 years, regardless of residential environment.

Hypothesis IV was confirmed.

Respondents were equally divided in the two age groups with a mean age of 56. The results were in keeping with the activity level of individuals in general whether mental retardation is present or not. The older individuals become the more likely they are to lead a sedentary lifestyle. The Surgeon General's report indicates that 60% of American adults are not regularly active and 25% of the adult population is not active at all. For most people, exercise just isn't that much fun over the long haul. Enthusiasm for a certain activity may keep an individual motivated for a time, but such enthusiasm tends to be short lived (Brummel-Smith Aging and Disability).

It is difficult to make accurate comparisons in studying this aging group since determining what constitutes "old-age" for them is an arbitrary decision by the researcher. Chronological age, as opposed to life stages and functional ability, has emerged as the most widely used; however, the arbitrary range has been from 30 to 60 years of age (Malone 2).

Furthermore, as individuals age they are more likely to succumb to health related factors that prevent exercise. They are more likely to have less energy and stamina (Malone, 3).

Hypothesis V. Females will participate in more walking activities than males regardless of which residential environment they reside in.

Hypothesis V was not confirmed.

These results are consistent with the Clark et al. (571) study in which no significant differences were found. Of all respondents, 52% were male and 48% were female. All subjects included in this study have some level of support staff to assist or perform routine daily activities for them. It is reasonable to suggest that the difference in activities within various facility types appear to be related to the human elements in the environment (Chornoboy and Harvey 153). In contrast, Chornoboy and Harvey (152) found that females participated in a greater number of activities. Many of the activities that were assessed were domestic tasks which may account for these results. This study did investigate the same types of residential facilities as the current project; however, as with the current project, the sample size was small. The trends and patterns of females within the general population indicate that inactivity is more prevalent among women than men and among older than younger adults (Surgeon General).

In addition to the five major hypotheses, the researcher sought to determine whether individuals who reside in less restrictive environments participate in other beneficial exercise activities beyond daily walking.

This assumption was not confirmed.

It can be concluded that place of residence has no main effect on sports related activities. Only 19% of those individuals who reside in less restrictive residential environments participate in more structured activities. While

22% of those residing in more restrictive environments participated in sports activity. Bowling was reported by both groups to be the primary sport. Aerobics, biking and climbing stairs were listed as other regular activities.

It is possible that aging individuals who participate in additional activities, such as bowling and aerobics, have fewer health related factors to begin with. In addition, the place of residence may be in a location that is close to where these recreational opportunities are available.

Generally, support staff in the facilities are younger and may be more inclined to encourage involvement in sports related activities. It is feasible that the staff may enjoy sports activities and participate along with the resident. The participation in the sport by staff would likely motivate the individual with a disability to participate in the sport as well.

Walking is more popular as a physical activity than sports related activities. It is inexpensive and readily available to everyone regardless of economic status.

Most aging individuals with mental retardation have limited financial resources to participate in activities that require a fee. Because of the inability to participate in such activities on a regular basis, few health benefits can be expected.

One individual spent an inordinate amount of time biking. This individual resided in a more restrictive environment. Activity is very individualized, and the facility may be seen either as an aid or as a deterrent to the functioning of the elderly individual with mental retardation (Malone 6).

Chapter IV

Implications and Recommendations

The purpose of this project was to determine if aging individuals diagnosed with mental retardation, who reside in less restrictive residential environments, would participate in more daily walking activity than individuals who reside in a more restrictive residential environment. The project involved designing a survey to gather the data. The researcher was assisted by casemanagers, who are coworkers at Central Missouri Regional Center, in collecting the data. Also providing assistance in collecting data, were service coordinators employed by a provider agency for the regional center, Center for Human Services. The survey was administered in February 1997. Results were then tabulated for statistical analysis.

Implications

The amount of walking activity of individuals in facilities that are less restrictive, as compared to those individuals that are in more restrictive facilities, did not reveal a significant difference. The lack of evidence to support any main effect could be attributed to the support staff's reporting. Staff who reported on the survey may not have been aware of activities that the individual participated in when they were not on duty. This lack of awareness can also be due to staff turnover and inconsistency in facilities. Many times workers are shifted from facility to facility when employees fail to report for work. In many instances, residents do not know who their caregiver will be from one day to the next. Inaccurate reporting for whatever

reason, could be expected to reflect a more sedentary lifestyle. This may be true, particularly if the caregiver already has a negative stereotype of individuals with mental retardation and their abilities.

Staff ratios in the various facilities could impact the amount of training or encouragement that subjects received to participate in exercise activity. In group homes the staffing ratio is one to four, and in an ISL the staffing ratio is generally one to two. The results of this study do not support smaller staffing ratios. It is unlikely that financially, providers can staff a facility with greater ratios than would be expected. Current DMH funding could not support a greater client to staff ratio even if an increase in staff could make a positive change in exercise participation.

Given the small sample size of the current study, any conclusion may also be tentative. However, it also seems reasonable to suggest that the differences in activities within the various residential facilities appear to be related to the caregivers and their interest and enthusiasm for activities.

The results of health ratings were mixed. An interesting aspect of aging is that older people within the general population usually report their health in relatively positive terms. It can be concluded that individuals with mental retardation, or their caregivers, also report their health in positive terms.

Physical activity is difficult to measure with the survey method because of the disparity in reporting. A more objectively

measured characteristic would be cardiorespiratory fitness which is measured by aerobic participation (Brummel-Smith Aging and Disability).

Respondents indicated, from a checklist, that lack of exercise had a negative effect on the subject's health in nearly all instances. Information from the survey was inconsistent. Data relating to medication, blood pressure, height, and weight resulted in all subject being equal and able to fully participate in exercise activity. The physical conditions of these subjects do not appear to create unusual problems in the area of health management. The results do support the Department of Mental Health philosophy that ISLs are for all individuals regardless of the extent of the disability.

The health needs of this group appear to be much like the general population. Hence the need for earlier and more frequent screenings to determine what is considered normal aging as opposed to disease.

The results of the comparison of walking activities among levels of retardation indicated that level of retardation had no main effect. It may be concluded that stimulation and training are more of a contingency to participation in exercise than level of retardation.

Societal assumption about the general competency levels at which this population is capable of functioning may be outdated and too low. The current philosophy of creating an interdependent support system, as being invaluable (Malone 9),

may be more substantive in the facilities that were investigated than was originally believed.

Accuracy of the diagnosis of mental retardation may be questionable, thus confounding the results. Experience has shown that many times the diagnoses are questionable due to the individual's ability to participate in cognitive evaluations. Also, individuals have been labeled during the school or developmental years, and may not be viewed as mentally retarded when entering the competitive job market. Often mildly retarded individuals go undetected in society (Malone 4). As well, individuals may be viewed as functioning lower than they actually do.

As individuals with mental retardation age their lifestyles gravitate toward fewer activities. These finding are consistent with the lifestyle of the general population.

There is limited amounts of information on this special group of the elderly. Relatively few empirical reports have been disseminated. This is probably due to the low visibility of this group.

The trend of increased life expectancies for citizens with mental retardation has created special issues that have yet to be addressed. This is a group that has not been detected and provided for within the service delivery system. Most community care systems have been child and young adult oriented. Few are prepared, and perhaps even interested in, dealing with geriatric considerations (Walz et al. 626).

The results of this study did not find significant difference in males and females in exercise activity. There are two probable causes. In today's society men are more socialized to accept responsibility for household duties. It is likely that these results were the influence of this socialization. Many of the facilities hire males as support staff. Their training is directed toward encouraging males to participate in activities of daily living.

Second, this project did not ask respondents to name specific activities and the amount of participation time spent in each. It is reasonable to assume that the bulk of the time of female participants could have been spent in more domestic activities. Men's time may have been spent in more outdoor or work related tasks.

The place of residence did not have an effect on regular, structured activities (e.g. bowling). The perceived value of such activities must be greater than the cost or barriers (Burlew, Jones, and Emerson 154). It is likely that training in the benefits and the importance of such activity on physical and mental health has not occurred. These individuals often do not have the monetary resources for regular participation.

Recommendations

Although many aging individuals with mental retardation engage in lower rates of activities, this is not a necessary condition. Whether in a more restrictive residential placement or one where fewer people reside and less restriction is applied, proper planning and programming should include social activities,

training in daily skill competencies, and a host of other activities. Such programming, while aimed at promoting patterns of increased activities, will be beneficial in supporting and enhancing the exercise necessary for good health. The development of interdependent support systems between the person with mental retardation, the caregiver, and other community members will be invaluable in benefiting the quality of life of this elderly population.

Professionals need to examine their own beliefs about these individuals, and begin immediately assessing the service needs of this population for appropriate exercise activity. Consideration for the interests and wishes of the individual is more appropriate and realistic than professional prescription. Aging individuals with mental retardation and developmental disabilities can and do form their own opinions on issues and problems they face and establish goals that they want to achieve (Malone 10). Professionals should begin immediately listening carefully to the choices of aging individuals with mental retardation. Those choices and goals need to be added to the Individual Plans. If the human element is as vital as suggested by this project, the resources need to be available. Advocates for individuals with mental retardation need to start now addressing this issue with state systems so that facilities and staffing patterns are available to promote the activities required by this aging population.

Longitudinal studies are needed to assess the activities of individuals to eliminate, to a greater extent, the human element

reporting. Longitudinal studies would also control the bearing that the time of the year might have on the activities reported. Generally, people are more active in the summer months than in the winter months when the current survey was conducted.

Determining the attitudes and expectations of the support staff toward exercise activity is needed. Training to eliminate any negative stereotypes about this group's abilities to participate in regular exercise must start now.

This study did not include the ratio of staff to clients within the various facilities. This would be a beneficial part of future research to determine if those placement facilities, which have a greater staff to client ratio, would indeed encourage and support this elderly group in greater exercise participation. Evidence of an increased participation of activities, coinciding with the presence of one-to-one trainers, suggests that planners should take human resources into account when determining funding (Chornoboy and Harvey 153).

Further research is needed to determine the relationship between various residential facilities and health ratings, and impairment. This project found that health ratings and levels of retardation had no significant bearing on activity levels. Krauss and Seltzer (240) found a significant interaction between the age group and residential placement with respect to level of retardation. Older persons with retardation in this sample were less impaired cognitively and resided in community based settings.

Research is needed cross-culturally within this population. All subjects in the current project were Caucasian. It may be significant to determine the extent to which these individuals differ in their cognitive, medical, functional characteristics, and service needs. Also a larger sampling of subjects than this project had would result in more significant findings.

There is clearly a need for additional research regarding the impact of the elements within the housing facility types upon the activities of the elderly population with mental retardation. Identification of the ideal amount, frequency, and type of activity, as determined by the individual, and within what facility it occurs, should support the creation of living arrangements that promote healthy lifestyles for individuals.

APPENDIX

Appendix A

HEALTH AND EXERCISE SURVEY

1. Please provide the following information about the client:

   a. Date of birth: __Month __Day __Year

   b. Gender: __Male __Female c. Blood pressure: _____

   d. Weight _____lbs. Height ____feet ____inches

   e. Any kind of special diet? ___Yes ___No

   If yes, the reason? _____

   f. Type of resident: __Group __Foster __ISL

   __RCF __Independent Apartment

   g. Number of people residing in resident. ____.

2. Indicate the general health of the client:

   __Excellent __Good __Fair __Poor __Don't know

3. What are the things about the client's life now that has a negative effect on health?

   __Unable to move about independently

   __Environment/Housing

   __Work

   __Financial/Income

   __Family or relationship problems

   __Friends/neighbors/social activity

   __Smoking/Drinking

   __Exercise (lack of)

4. Does the client currently take any prescription medication (if female other than oral contraceptive), vitamins, etc?_____

5. List client's disabilities.

_____

_____

6. Does the client's disability (s) limit activities in any way compared with people of client's own age? __Yes __No If so, how?

__unable to work

__unable to do housework

__unable to climb stairs

__unable to walk around outside without aid

__unable to walk around inside without aid

__other (specify)_____.

7.On weekdays, how much time, on average, per day, does client spend walking (i.e. work, shopping, pleasure, etc.)?

____Hours ____Minutes

8. On weekends, how much time, on average, per day, does client spend walking? ____hours ____minutes

9. List other physical activities (work, home, or recreational) and the amount of time client spent doing them?

ACTIVITY	HOURS	MINUTES

Appendix B

Date

Names

Address

RE:

Dear_____,

I am a graduate student with Lindenwood College, St. Charles, MO, who is working on a thesis project as part of those studies. I am also employed by Central Missouri Regional Center as a Casemanagement Supervisor. I have worked with the agency for over eight years. I am requesting your consent for _____to participate in a research project which is required to obtain my degree.

It has been determined by previous research that aging individuals within the general population benefit physically from a regular walking exercise program. It is believed that aging individuals with mental retardation often do not participate in such exercise programs. It is from this premise that I have developed this thesis/project.

I am requesting your permission to obtain information from _____. This information will be obtained via a survey. The results will be statistically analyzed to determine the extent of walking exercise that he/she is currently participating in. All information obtained will be held in the strictest confidence. Also, I have obtained approval from the Department of Mental Health to conduct this research.

If you have any further questions or concerns about the project you may reach my by calling (816) 530-5700 during the day or (816) 827-1032 in the evening. If you are in agreement to _____ participating in the project please sign the attached form and return it to me in the enclosed self-addressed, stamped envelope. Thank you for your consideration in this matter.

Sincerely,

Sandra Wise

enclosure (2)

I hereby give my permission for _____ to participate in the survey as conducted by Sandra Wise for her thesis/project.

Name:_____Date:_____

MEL CARNAHAN
GOVERNOR

ROY C. WILSON, M.D.
DIRECTOR

DIVISION OF COMPREHENSIVE PSYCHIATRIC SERVICES
(573) 751-5212
(573) 751-8017 TT
(573) 751-7815 FAX

GREG KRAMER, DIRECTOR
DIVISION OF MENTAL RETARDATION DEVELOPMENTAL DISABILITIES
(573) 751-4054
(573) 751-8217 TT
(573) 751-9207 FAX

MICHAEL COUTY, DIRECTOR
DIVISION OF ALCOHOL AND DRUG ABUSE
(573) 751-4942
(573) 751-7093 TT
(573) 751-7814 FAX

STATE OF MISSOURI
DEPARTMENT OF MENTAL HEALTH
1706 EAST ELM STREET
P.O. BOX 687
JEFFERSON CITY, MISSOURI 65102
(573) 751-4122
(573) 526-1201 TT

June 13, 1996

Ms. Sandra Wise
17175 Thornleigh Road
Hughesville, MO 65334

Dear Ms. Wise:

After analysis by the Professional Review Committee, I hereby approve your research entitled **"Walking Improves Certain Physiological Changes in the Developmentally Disabled."**

This office will contact you in six months to review progress of your research as required by state regulation. Please remember that a final report of research results is also required.

Good luck with your project.

Sincerely,

E. Benton Goon, Deputy Director
Office of Departmental Affairs

EBG:eb

cc: Research File #9604.12
Dr. Beck
Dr. Jim Magruder, CMRC

Works Cited

Altchiler, L. and Motta, R. "Effects of Aerobic and Nonaerobic Exercise on Anxiety, Absenteeism, and Job Satisfaction." Journal of Clinical Psychology, 50-6 (November, 1994): 829-840.

Anderson, D. "Health Issues." Eds. E. Sutton, A. R. Factor, B. Hawkins, T. Heller, and G. Seltzer, Older Adults with Developmental Disabilities: Optimizing Choices and Change. Baltimore, MD: Brookes. 1993. 29-48.

Brummel-Smith, Dr. Kenneth. "Aging and Disability: A Comparison of Health Related Changes." Online. Internet.

Burlew, L. E., Jones, J., and Emerson, P. "Exercise and the Elderly: A Group Counseling Approach: The Journal for Specialists in Group Work, 16-3 (September, 1991): 152-158.

Chornoboy, Cleanor G., and harvey, Carol H. D. "Relationship between the Housing Facility Type of Aging Persons who are Developmentally Disabled and their Activities." Education and Training in Mental Retardation (June, 1988): 147-155.

Chow, R. K., Harrison, J. E., and Sturtridge, W. "The Effect of Exercise on Bone Mass of Osteoporotic Patients on Fluoride Treatment." Clinical Investigative Medicine, 10-2 (1987): 59-63.

Clark, B. A., Wade, M. G., Massey, B. H., and Van Dyke, R. "Response of institutionalized Geriatric Mental Patients to a Twelve-Week program of Regular Physical Activity." Journal of Gerontology, 30-5 (1975): 565-573.

DeVries, Herbert A. "Physiological Effects of an Exercise Training Regimen Upon Men Aged 52 to 88." Journal of Gerontology 25. 4(1970): 325-336.

Dickerson, M., Hamilton, J., Huber, R., and Segal, R. "The Aged Mentally Retarded: The Invisible Client, a Challenge to the Community." D. P. Sweeney and T. V. Wilson, Ed. Double Jeopardy: The Plight of Aging and Aged Developmentally Disabled Persons in Mid-America. Ann Arbor: University of Michigan, Institute for the Study of Mental Retardation and Related Disabilities, (1979): 8-25.

Diagnostic and Statistical Manual of Mental Disorders: Amer. Psychological Assn., 4th ed. Washington D.C. 1994.

Emery, Charles, F. "Effects of Age on Physiological and Psychological Functioning Among COPD Patients in an Exercise Program." Journal of Aging and Health, 6-1 (February, 1994): 3-16.

Emery, Charles F., Hauck, E. R., and Blumental, J. A. "Exercise Adherence or Maintenance Among Older Adults: 1-Year Follow-Up Study." Psychology and Aging, 7-3 (1992): 466-470.

Emery, Charles, F., Huppert, Felicia A, and Schein, Rebecca L. "Relationships Among Age, Exercise, Health, and Cognitive Function in a British Sample."The Gerontologist 35 (1995): 378-383 .

Emes, Claudia G. "The Effects of a Regular Program of Light Exercise on Seniors." J Sports Medicine 19 (1979): 185-190.

Evans, William. "Boosting Your Biomarkers of Youth." Prevention March 1991: 40.

Gamber, S. R., Liebeskind, S. and Cameron, D. "Lifelong Preventative Health Care for Elderly Persons with Disabilities." Journal of the Association for Persons with Severe Handicaps, 12-4 (1987): 292-296.

Hussey, C., Maurer, J. F., and Schofield, L. J. "Physical Education Training for Adult Retardates in a Sheltered Workshop Setting." Journal of Clinical Psychology, 32 (1963): 701-705.

Janicki, Matthew P. "Policies and Supports for Older Persons with Mental Retardation." Eds. Marsha M. Seltzer, Marty W. Krauss, and Matthew P. Janicki. Life Course Perspectives on Adulthood and Old Age. Washington D. C. American Association on Mental Retardation. 1994. 143-165.

Janicki, M. P., and MacEachron, A. E. "Residential, Health, and Social Service Needs of Elderly Developmentally Disabled Persons." The Gerontologist, 24 (1984): 128-137.

Janicki, Matthew P., Otis, James. P., Puccio, Paul S., Rettig, Judith H., and Jacobson, John W. "Service Needs Among Older Developmentally Disabled Persons." Aging and Developmental Disabilities: Issues and Approaches. Ed. Matthew P. Janicki and Henry M.Wisniewski. Baltimore: Brooke, 1985.

Krauss, M. W. and Seltzer, M. M. "Comparison of Elderly and Adult Mentally Retarded Persons in Community and Institutional

Settings." American Journal of Mental Deficiency. 91-3, (1986): 237-243.

Krishef, Curtis H. An Introduction to Mental Retardation. Springfield, IL: Thomas. 1983

Lakin, L. C., Anderson, D. J., Hill, B. K., Bruininks, R. H., and Wright, E. A. "Programs and Services Received by Older Persons with Mental Retardation." Mental Retardation, 29-2, (April, 1991): 65-74.

Lippman, Leopold and Loberg, David E. "An Overview of Developmental Disabilities." Aging and Developmental Disabilities: Issues and Approaches. Ed. Matthew P. Janicki and Henry M. Wisniewski. Baltimore: Brooke, 1985.

Malone, D. Michael. "Aging Persons with Mental Retardation: Identifications of The Needs of a Special Population." Gerontology Review, 3-1 (1990): 1-14.

McMurdo, M. E. T. and Burnett, Lesley. "Randomized Controlled Trial of Exercise in the Elderly." Gerontology, 38 (1992): 292-298.

Meyers, C. E., Borthwick, S. A., and Eyman, R. "Place of Residence by Age, Ethnicity, and Level of Retardation of the Mentally Retarded/Developmentally Disabled Population of California." American Journal of Mental Deficiency, 90 (1985): 266-270.

Montgomery, D. L., Reid, G., and Seidl, C. "The Effects of Two Physical Fitness programs Designed for Mentally Retarded Adults." Canadian Journal of Aging, 6 (1988): 175-187.

Moon, M. S., and Renzaglia, A. "Physical Fitness and the Mentally Retarded: A critical Review of the Literature." The Journal of Special Education, 16 (1982): 269-287.

Moos, R. H. and Lemke, S. "Specialized Living Environments for Older People." Eds. J. E. Birren and K. W. Schaie, Handbook of the Psychology Aging. 3rd ed. San Diego: Academic Press, 1990. 864-889.

Neef, Nancy A., Bill-Harvey, D., Shade, D., Iezzi, M., and DeLorenzo, T. "Exercise Participation with Videotaped Modeling: Effects on Balance and Gait in Elderly Residents of Care Facilities." Behavior Therapy, 26 (1995): 135-151.

Paffenbarger, R. S., Hyde, R. T., Wing, A. L., and Hsieh, C. C. "Physical Activity, All-Cause Mortality and Longevity of College Alumni." New England Journal of Medicine, 314 (1986): 605-613.

Pekkanen J., Marti, B., Nissinin, A. and Tuomilehto, J., "Reduction of Premature Mortality by High Physical Activity: A 20 Year Follow-Up of Middle-Aged Finnish Men." Lancet, (1987): 1473-1477.

Pitetti, L., and Campbell, K. D. "Mentally Retarded Individuals-A Population at Risk?" Medicine and Science in Sports and Exercise, 23 (1982): 586-593.

Rinck, Christine. "Physical Changes as Persons with Developmental Disabilities Age." Fast Facts on Aging #3 (February, 1992): 1-4.

"Program Planning for Older Persons with Developmental Disabilities."Fast Facts on Aging #8 (June, 1992): 1-7.

"Alzheimer's Disease and Down Syndrome." Fast Facts on Aging #1 (February, 1992): 1-7.

"Profile of Older Persons with Developmental Disabilities in Missouri." Fast Facts on Aging #7 (September, 1992)" 1-7.

Rowe, J., W. and Kahn, R. L. "Human Aging: Usual and Successful." Science, 237 (1987): 25-31.

Ruuskanen, J. M. and Parkatti, T. "Physical Activity and Related Factors Among Nursing Home Residents." The American Geriatrics Society 42. 9 (September, 1994): 987-991.

Seltzer, Gary B. and Luchterhand, Charlene. "Health and Well-Being of Older Persons with Developmental Disabilities: A Clinical Review." Eds Marshal M. Seltzer, Marty W. Krauss, and Matthew P. Janicki. Life Course Perspectives on Adulthood and Old Age. Washington, D.C. American Association of Mental Retardation. 1994. 109-142.

Sheldahl, L. M., Tristani, F. E., Hastings, J. E., Wenzler, R. B., and Levandoski, S. G. "Comparison of Adaptations and Compliance to Exercise Training Between Middle-Aged and Older Men." Journal of the American Geriatrics Society, 41 (1993): 795-801.

Shephard, Roy J. "Exercise and Aging: Extending Independence in Older Adults." Geriatrics, 48 (May, 1993): 61-64.

Sidney, K. H., Shephard, R. J., and Harrison, J. "Endurance Training and Body Composition of the Elderly." American Journal of Clinical Nutrition, 30 (1977): 326-333.

Stamford, B. A. "Physiological effects of Training Upon Institutionalized Geriatric Men." Journal of Gerontology, 27 (1972): 451-455.

Stevenson, J. S. and Ropp, R. "Effects of Moderate and Low Intensity Long-Term Exercise by Older Adults." Research in Nursing and Health, 13 (1990): 209-218.

Stewart, N. L. and King, A. C. "Evaluating the Efficacy of Physical Activity for Influencing Quality-Of-Life Outcomes in Older Adults." The Society of Behavioral Medicine, 13-3 (1991): 108-116.

Stone, James A. "Housing Options for Older People with Developmental Disabilities: Implications for Adult Residential Care." Adult Residential Care Journal, 3-3, (Fall, 1989): 193-207.

United States. Surgeon General Report. Physical Activity and Health Summary. Online. Internet. 24 March. 1997.

Walz, Thomas, Harper, Dennis, and Wilson, John. "The Aging Developmentally Disabled Person: Review." The Gerontologist 26-6 (1986): 622-629.

Willer, B. and Intagliata, J., "Comparison of Family-Care and Group Homes as Alternatives to Institutions." American Journal of Mental Deficiency, 86-6, (1982): 588-595.

Winett, R. A., Moore, J. F., and Anderson, E. S. "Extending the Concept of Social Validity: Behavior Analysis for Disease Prevention and Health Promotion." Journal of Applied Behavior Analysis, 24 (1991): 215-230.

Wisniewski, H. M., and Merz, G. S., "Aging, Alzheimer's Disease, and Developmental Disabilities." Eds. M. P. Janicki and H. M. Wisniewski: Aging and Developmental Disabilities: Issues and Approaches. Baltimore: Brooke, 1985.

Wiswell, Robert A. "Relaxation, Exercise, and Aging." Eds. James E. Birren and R. Bruce Sloane. Handbook of Mental Health and Aging. Englecliff, NJ. Prentice-Hall. 1980. 943-955.