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EFFECT OF A STAFF NUTRITION EDUCATION PROGRAM
ON THE NUTRITION STATUS OF CLIENTS WITH
MENTAL RETARDATION LIVING IN
ICF/MR GROUP HOMES


by

Felicia L. Rocchi

A Dissertation Submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

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Approved by


Dissertation Adviser

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APPROVAL PAGE

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ROCCHI, FELICIA L., Ph.D. Effect of a Staff Nutrition Education Program on the Nutrition Status of Clients with Mental Retardation Living in ICF/MR Group Homes. (1996) Directed by Dr. Aden Magee. 78 pp.

The specific aims of this research were to assess the nutritional status of a group of clients with mental retardation living in a unit of ICF/MR group homes, before and after a nutrition education training curriculum for their direct care staff. Seven ICF/MR group homes were used in this study, with three homes serving as the treatment group homes, and four homes serving as control homes. Eighteen clients with mental retardation from the three treatment group homes comprised the treatment group, and 22 clients with mental retardation from the four control group homes comprised the control group. A total of 40 clients were assessed for dietary, clinical, and anthropometric measures at baseline, and at two follow-up periods. Statistical analysis was performed using the *t* test for independent samples to compare assessment measures for clients in the treatment group with clients in the control group at baseline and the second follow-up assessment and to determine any significant differences in assessment measures from baseline to the second follow-up assessment for clients within each group.

Prior to beginning the study, focus group interviews were used as a preliminary step in developing the nutrition education curriculum for direct care staff. Thirty-four direct care staff from the ICF/MR group homes in the unit participated in one of four focus group interviews. Results from these interviews indicated that the focus group approach was a qualitative means of obtaining valuable information from a representative group of direct care staff in an informal atmosphere, and was an effective technique in ascertaining relevant nutrition education needs specific to the group receiving it.

Nutrition knowledge of 61 direct care staff was assessed using pre- and post-test measures. Thirty-three staff from the three treatment group homes comprised the staff treatment group and 28 staff from the four control group homes comprised the control

group. The treatment group staff received four weeks of nutrition education training. The control group staff received no nutrition education. Staff nutrition knowledge was measured at three times during the study, with the pre-test completed prior to, the first post-test completed immediately following, and the second post-test completed ten weeks following the nutrition education training.

Statistical analysis was performed using the *t* test to compare the pre- and both post-test scores for staff in the treatment group with the same scores for staff in the control group. The *t* test analysis was also used to determine any significant differences among scores on all three tests of nutrition knowledge for staff within the treatment group and for staff within the control group.

Average scores on the first nutrition knowledge post-test showed a significant improvement for staff who received the nutrition education curriculum when compared with average scores for staff in the control group. Ten weeks following the nutrition education curriculum, average scores for staff in the treatment group continued to be higher than average scores for staff in the control group; however, this increase was not statistically significant. For clients in the treatment group, significant improvements in the average dietary intake of total fat, saturated fat, cholesterol and fiber were observed ten weeks after direct care staff received the nutrition education training. HDL-cholesterol also showed significant improvement for clients in the treatment group by this same time period. At the second client follow-up assessment, ten weeks following staff nutrition training, clients in the treatment group showed significant improvements in average values for dietary, clinical, and anthropometric measures.

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CHAPTER I

INTRODUCTION

Over the past 10 years, there have been major changes in the care of the mentally retarded. The size of public institutions for their care has steadily decreased, and the spectrum of community-based services for mentally retarded persons has greatly expanded. Intermediate care facilities for the mentally retarded, called ICF/MR group homes, are one important option for independent living, and provide the least restrictive, most normalized setting possible for individuals with mental retardation.

The trend to smaller residences has stimulated changes in regulations for the care of the mentally retarded which now allow facilities to focus on client outcomes. The scope of nutrition services provided in these settings has also changed, varying widely depending on community awareness, level of client disability, and funding source. Frequently, the transition has meant a shift in responsibility for nutrition and feeding from state and federally funded facilities to schools, group homes, day care, and work sites, with limited nutrition programs available for mentally retarded persons (American Dietetic Association, 1992; Braddock, 1986). This has given private agencies the responsibility of providing appropriate nutrition services to persons with mental retardation.

While individuals with mental retardation should first be viewed as persons with the same needs of any persons, they have many special needs by virtue of their disabilities. Nutritional management is an important part of their comprehensive care and rehabilitation. The benefits of providing nutrition services to these individuals include prevention of growth retardation or further disability and the improvement of health

(Pease, Wodarski, & Wang, 1989). In addition, adequate nourishment allows clients to perform optimally in the educational or work setting and helps to enhance their quality of life.

Concerns about the mentally retarded living in settings with different levels of control over their diet and choice of food is a critical issue as nutrition and feeding problems are prevalent in individuals with mental retardation (Danford, Smith, & Huber, 1982; Mercer & Ekvall, 1992). More frequent incidences of obesity, underweight, metabolic disorders, and growth retardation have been reported in individuals with mental retardation when compared with similar non-challenged individuals (Green & McIntosh, 1985; Lindeman, 1991; Siddall, 1981; Warpula, 1981).

The success of ICF/MR group homes in providing for mentally retarded clients depends of many factors, including client acquisition of self-care and health-related skills, development of vocational abilities, and training in areas that address care of the home environment, such as food shopping and meal preparation (Calvez, 1993). In many ways staff in group homes are charged with improving their clients' quality of life. Staff members teach skills such as food procurement and cooking to residents capable of some degree of independent living (Lindeman, 1991). Staff frequently express concerns about their limited knowledge of modified diets, the lack of available information about these diets, and their ability to plan nutritionally adequate meals for the clients they care for (Green & McIntosh, 1985). While guidelines for dietary care exist in the ICF/MR group home setting, staff may receive minimal dietary and nutrition training, with the potential for dietary excess or deficits, unsanitary food-handling practices, and inappropriate diet choices for the clients within the home (Bandini, 1982).

Nutrition education and training for direct care staff can lead to an enhanced knowledge base in order to provide for the nutritional needs of the clients in group

homes. The provision of nutrition services that includes assessment, dietary treatment, nutrition counseling and innovative nutrition education programs is one important way to meet the multiple nutrition needs of persons with mental retardation (ADA, 1986). Programs for direct care staff that include nutrition education have been found to improve efficiency and decrease health care costs in provision of services for the mentally retarded population (Schuster, 1988). Frequently, staff come to this setting with little pre-existing nutrition knowledge or experience (Hoffman, Aultman, & Pipes, 1992). Staff in ICF/MR group homes should be knowledgeable about basic nutrition and about the nutritional aspects of health problems such as diabetes, obesity, constipation, and underweight. Staff should also be skilled in translating that knowledge into low-cost, nutritionally adequate, health-promoting meals for their clients (Crosson, Lipscomb, Petkoff, & Petty, 1986).

The reviews of literature and research findings within this study described nutrition concerns of individuals with mental retardation. This review illustrated the need for nutrition assessment in the mentally retarded living in ICF/MR group homes, as well as the acute need for nutrition education training for their staff caretakers. The present study described the nutritional status of a group of mentally retarded individuals in a unit of ICF/MR group homes using a combination of dietary, anthropometric, and clinical measurements. The present study also addressed the need for staff nutrition education through a training curriculum. This curriculum was based on results from the assessment of nutritional status of a specific group of individuals with mental retardation, and results from the focus group interviews conducted with direct care staff.

The specific aims of this research were to determine nutrition excess or deficit in clients living within one unit of ICF/MR group homes, and address these needs through a nutrition education curriculum for staff working with these clients. The outcome

objectives of this study were enhanced nutritional well-being for these clients living in an ICF/MR settings and increased nutrition knowledge for direct care staff.

The purposes of this study were to:

1. Assess the nutrition status of a specific group of individuals with mental retardation living in ICF/MR group homes through selected dietary, clinical, and anthropometric measurements.
2. To measure nutrition knowledge of direct-care staff caring for a specific group of mentally retarded individuals living in ICF/MR group homes before and after a nutrition education training curriculum.
3. Determine if providing a nutrition education curriculum to direct-care staff has an effect on the nutrition status of individuals with mental retardation living in ICF/MR group homes.

CHAPTER II

REVIEW OF THE LITERATURE

Developmental disability is defined as a severe, chronic disability of an individual due to a combination of mental and physical impairments. Developmental disabilities are usually manifested before age 22, continue indefinitely, and result in substantial functional limitations in at least three of the following areas: self-care, receptive and expressive language, learning, mobility, self-direction, the capacity for independent living, and economic self-sufficiency (USDA, 1985). The American Dietetic Association states that individuals with developmental disabilities generally require a combination of special, interdisciplinary, or generic care, treatment, or other services which are of lifelong or extended duration, and are individually planned and coordinated. Individuals with developmental disabilities are at increased nutritional risk attributed to feeding problems, drug/nutrient interactions, metabolic disorders, decreased mobility, and altered growth patterns. They may be at further risk due to insufficient income, limited nutrition knowledge, and/or caregivers who may not provide an environment that promotes good nutrition. Developmental disabilities can cause serious limitations in self-care, learning, working, and social interaction (American Dietetic Association, 1987, 1992).

Mental retardation, part of the class of disorders described as developmental disabilities, is estimated to affect 1 to 3 percent of the United States population (Wickham & Black, 1985). McFadden and Burke (1991) describe mental retardation as a disorder of multiple etiologies characterized by subaverage intelligence and deficits in adaptive behavior. Braddock (1986) describes mental retardation as a major social, education, health, and economic concern for our society.

Thirty years ago, President Kennedy convened the first Presidential Panel on Mental Retardation. This panel issued a series of recommendations to assist individuals with mental retardation. Most notably, the panel recommended movement away from institutionalized care to community-based care whenever possible. In 1990, the Americans with Disabilities Act (Public Law 101-336) passed, bringing with it changes that would benefit mentally retarded individuals. This legislation stated integration, independence, and productivity as primary goals for the mentally retarded in society (Cross, 1993).

To meet these goals, the Americans with Disabilities Act has worked to integrate people with mental retardation into community life. This process, called deinstitutionalization, moves mentally retarded individuals from large institutions into small, community-based congregate residential facilities, called intermediate-care group homes for the mentally retarded (ICF/MR) (Shea, 1992). ICF/MR group homes provide a home for persons who cannot live independently because of mental and physical handicaps. These homes usually consist of 6, 8, or 15 mentally retarded adults living independently. Staff in the group home provide 24-hour care and assist in the development of independent living skills through "active treatment". Active treatment is the process of teaching mentally retarded persons activities of daily living and encourages resident participation in self-care and the care of their home (Pope, 1992). ICF/MR standards define active treatment as "aggressive, consistent implementation of a program of specialized and generic training, treatment, health services and related services that is directed towards: (i) the acquisition of the behaviors necessary for the client to function with as much self determination and independence as possible; and (ii) the prevention or deceleration of regression or loss of current optimal functional status" (Federal Register, 1986).

ICF/MR group homes were established through a federal initiative, the Intermediate Care Facilities for the Mentally Retarded Program. This program established a minimum standard of care for facilities that serve individuals with mental retardation (Braddock, 1986). The group homes are supported through Supplemental Security Income and administered by public or private nonprofit organization. Food services are regulated by the state Division of Licensing and Certification (Springer, 1987). ICF/MR regulations specifically state the standards of care in regards to the nutritional and dietary management of the clients (Federal Register, 1986). These standards state that "each client must receive a nourishing, well-balanced diet, and unless otherwise specified by medical needs, the diet must be prepared at least in accordance with the latest edition of the Recommended Dietary Allowances (RDAs) of the Food and Nutrition Board of the National Research Council, adjusted for age, sex, disability, and activity, and each client must receive at least three meals daily, at regular times comparable to normal mealtimes in the community" (Federal Register, 1986). In addition, standards are stated for staff training in that, ICF/MR facilities provide initial and continuing training that enables the employee to perform his or her job effectively, efficiently, and competently, with emphasis directed toward clients' developmental, behavioral, and health needs.

As part of active treatment and the development of independent living skills, direct care staff in ICF/MR group homes assist clients in planning and preparing meals. Crosson, et al. (1986) reported that 80% of deinstitutionalized mentally retarded adults do not receive any training in meal preparation before discharge from institutions into group homes. The authors also report that nutrition services in group homes were usually limited to training in domestic living skills, such as table setting and cleaning after meals, by direct care staff. The lack of nutrition education for clients living in group homes is compounded by the limited nutrition training and knowledge that direct care staff report.

To adequately meet the multiple nutrition needs of persons with mental retardation, the American Dietetic Association recommends that all settings that serve these individuals include assessment, dietary treatment, nutrition counseling, and innovative nutrition education programs (American Dietetic Association, 1992, 1987).

Nutrition Concerns for Individuals in ICF/MR Group Homes

ICF/MR group homes provide a normalized, least restrictive environment for many mentally retarded persons. The development of independent living skills can be addressed in this setting, with clients responsible for self-care and home living skills such as food selection and preparation. While this environment can lead to an enhanced quality of life for the mentally retarded client, promote independence, and provide a normalized environment, group home living can also lead to nutrition concerns for this population.

Nutrition and feeding problems have been documented in the literature for individuals with mental retardation (Mercer & Ekvall, 1992; McDonald, 1985; Siddall, 1981; Wodarski, 1985). Inadequate food intake and the inability of staff to prepare nutritionally adequate meals for clients are concerns associated with a non-institutionalized environment (Crosson, et al., 1986). Estimates show that 85% of individuals with mental retardation are living in the community, and 9 out of 10 persons classified as mentally retarded live independently and self-sufficiently (Warpula, 1981). Residents living in ICF/MR group homes are given more responsibility for their food choices but often possess insufficient nutrition knowledge or food skills, thus relying on staff in the home to provide healthful food choices (Schuster, 1988).

Mentally retarded individuals can be at risk nutritionally because of oral/motor problems, drug-nutrient interactions, metabolic disorders, decreased mobility, and altered growth patterns. Nutrient needs may be altered as a result of long-term urinary or

respiratory infections, chronic constipation, and behavioral problems (Beange, McElduff, & Baker, 1995). Inappropriate eating practices, limited mobility, certain syndromes, and alterations in body composition are causes of obesity in persons with mental retardation, which, in addition to the increased risk of diabetes and heart disease, can have negative social consequences and require greater efforts from caregivers (Rimmer, Braddock, & Fujiura, 1993). Warpula (1991) found that meals served at large institutions were well-balanced but energy dense, and obesity was a primary problem for both mildly retarded and moderately retarded adults.

Feeding problems that arise from neuromuscular dysfunction, obstructive lesions, and/or psychological factors often reduce food intake, inhibit optimal growth and development, contribute to care-taker stress, and increase the risk of malnutrition in the mentally retarded population (Springer, 1987). Physical handicaps, such as Down's syndrome, is often characterized by poor tongue and lip control, poor fine and gross motor control, and may impair food intake (Wodarski, 1985). Cerebral palsy and brain damage may result in lack of mouth, head, and trunk control.

Growth retardation, excess weight gain, anorexia, drug-induced malnutrition, excessive appetite, and feeding problems have been reported for mentally retarded adults living in non-institutionalized settings (Rast, Ellinger-Allen, & Johnston, 1986; Rice, 1981). In addition, disruptive behavior, as well as an unwillingness and an inability to feed oneself can result in nutritional problems (Springer, 1987).

The American Dietetic Association identifies several nutrition problems of mentally retarded individuals. One concern involves caregiver-related problems, including difficulty in understanding and implementing diet instructions, inappropriate feeding practices, nutrition misinformation, lack of knowledge regarding proper food selection

and preparation, and difficulty in setting limits around food and feeding (American Dietetic Association 1987, 1992).

Federal standards have been established to insure that residents of ICF/MR group homes are provided with a nourishing, well-balanced diet which meets the RDAs and follows the Moderate Cost Food Plan of the United States Department of Agriculture (USDA) (Mercer & Ekvall, 1992). Pease, Wodarski, and Wang (1989) reported that persons living in institutions or group homes that meet ICF/MR standards appear to be better nourished now than in the past. The following are standards of care established by state and federal mandates specific to the nutritional and dietary needs of individuals living in ICF/MR group homes.

- (1) Each client must receive a nourishing, well-balanced diet including modified and specifically-prescribed diets.
- (2) Foods proposed for use as a primary reinforcement of adaptive behavior are evaluated in light of the client's nutritional status and needs.
- (3) Unless otherwise specified by medical needs, the diet must be prepared at least in accordance with the latest edition of the recommended dietary allowances of the Food and Nutrition Board of the National Research Council, National Academy of Sciences, adjusted for age, sex, disability, and activity.
- (4) Each client must receive at least three meals daily, at regular times comparable to normal mealtimes in the community.
- (5) Foods must be served in appropriate quantity; at appropriate temperatures; in a form consistent with the developmental level of the client; with appropriate utensils.
- (6) Menus must be prepared in advance; provide a variety of foods at each meal; be different each day of the week and adjusted for seasonal changes; and include the average portion sizes for menu items.

Typically, mentally retarded clients living in a residential setting are dependent on caretakers for food (Lindeman, 1991). Direct care staff in the home are responsible for selecting and preparing food to meet the client's nutritional needs and preferences. To accomplish this, direct care staff must be prepared to deal with the factors that affect food intake and nutrient availability, yet staff in group homes often lack basic nutrition

knowledge and food skills. Lindeman (1991) reported that staff in group homes caring for the mentally retarded client expressed concerns about their limited knowledge of modified diets, the lack of available information about these diets, and their inability to plan meals for their clients.

Nutritional Status of Clients in ICF/MR Group Homes

There is an overall lack of research describing the nutritional status of mentally retarded persons living in ICF/MR group homes. In a study examining the nutritional status of a group of children from special education classes living in a community residential setting, dietary nutrient inadequacies were found (Springer, 1982). While no overt signs of malnutrition were noted, the high incidence of dental caries and constipation reflected the consumption of excess sugar and insufficient fiber, and the need for dietary improvement in this group of individuals.

In a survey of nutrition practices in 42 mentally retarded adult foster-care facilities, Hill, Bruninicks, Lakin, Hauber, and McGuire (1985) identified numerous problems that could negatively affect the health and nutritional status of residents. This study showed that 93% of the homes did not serve meals that were adequate nutritionally, the amount of protein-rich foods served was inadequate in nearly half of the homes, and although 32% of the 247 residents were on modified diets, only 18% were eating meals prepared according to the prescribed diet.

Brogan, Callaghan, and Schemmel (1981) assessed the nutritional needs of adults living in residential-care homes. Results of this study found menus for these individuals were high in energy, fat and sugar, and low in fiber. Meat, egg or pancake breakfasts were served at least five days per week, and lunches were often high in fat and sodium. Staff expressed concerns about the fat content of meals, their lack of understanding of what constitutes a healthy diet, and how to substitute fresh foods for convenience items.

Nutrition education needs identified from this study included a need for improved menu design utilizing United States dietary goals and guidelines, a need for greater variety and healthier choices of foods for residents, an increase in basic nutrition knowledge for direct care staff, and a need for staff training in low-fat food preparation and food purchasing in the group home.

Green and McIntosh (1985) assessed the food and nutrition skills of a group of mentally retarded adults in an independent living program. Results from this study indicated that 48% of the adults in the study were obese, 43% of the clients were consuming less than half of the RDAs for one or more nutrient, and diets were most frequently low in iron, vitamin A, and calcium. Their findings demonstrated that residents had difficulties with shopping, menu planning, and food preparation tasks, and typically relied on staff to assist with these activities. The study suggested that ongoing reinforcement of basic nutrition knowledge and skills for direct care staff is critically needed, along with a practical cookbook to aid in the application of nutrition principles to daily menu planning and food preparation.

Nutrition Education Needs of Staff in ICF/MR Group Homes

In ICF/MR group homes, direct care staff are responsible for food procurement and the preparation of three meals and three snacks daily. Staff members also teach skills such as food buying and meal preparation to residents with independent living skills. In a nutrition survey of individuals with Prader-Willi syndrome who live in group homes, staff caring for these clients reported their greatest challenges were the selection and preparation of foods that were low in energy and menu planning (Hoffman, Aultman, & Pipes, 1992).

In two studies teaching meal planning and grocery shopping skills to mentally retarded adults, objectives included teaching mentally retarded individuals how to plan meals

according to acceptable dietary guidelines, how to translate meal plans into grocery lists, and how to shop for needed grocery items. (Johnson & Cuvo, 1981; Sarber, Halasz, & Messmer, 1983). Both studies utilized the four basic food groups to teach food selection. However, researchers found that the skills acquired by the mentally retarded individuals in the study were not reinforced by staff caring for these adults. Staff lacked knowledge concerning the role of fats, sugar, cholesterol and salt, nutritional adequacy in relation to clients' diets, and changes in the availability of foods (Cronin, Shaw, Krebs-Smith, Marsland, & Light, 1987).

Marchand-Martella, Windham, Wyse, and Martella, 1991, reviewed several studies that taught food preparation skills to individuals with mental retardation. Based on the results from this review, the authors determined that, although the participants were taught food preparation skills, none of the training programs emphasized food planning based on the Dietary Guidelines for Americans. Many of the foods prepared were relatively high in fat, sodium, and cholesterol. In addition, direct care staff consistently demonstrated a lack of basic nutrition knowledge and the ability to select and prepare appropriate foods. Based on their review of these studies, the authors concluded that, if the goal of these training programs was to enable participants to acquire and maintain healthful food preparation skills, staff education should be a primary part of the training.

Staff providing care for mentally retarded clients often lack basic nutrition knowledge and food skills necessary to select healthy foods. Mercer and Ekvall (1992) compared the diets of mentally retarded adults in large facilities with diets of those in ICF/MR group homes. Results from this study demonstrated the need for professional assistance in planning nutritionally optimum menus to meet dietary standards, with emphasis on nutrition education for staff in group homes. The study further suggested that residents

in group homes need supervision when selecting meals to meet nutritional requirements, preferably by care providers with sound nutrition knowledge and food skills.

Relationship of Staff Nutrition Education to the Health of Individuals Living in ICF/MR Group Homes

Optimal nutrition is important for the health and well-being of every person. In the mentally retarded population nutritional well-being is of particular importance in successfully coping with the demands of daily living (Calvez, 1993; Mercer & Ekvall, 1992; Siddall, 1981; Warpula, 1981; Wodarski, 1985). Insufficient supplies of essential nutrients, or nutritional imbalance, may cause fatigue, apathy, and general poor health, which may affect the client's day-to-day coping skills (American Dietetic Association, 1992; Ferrang, Johnson, & Ferrara, 1992).

The benefits of providing nutrition services to mentally retarded individuals include prevention of growth retardation or further disability, and the improvement of health status, resulting in fewer illnesses, shorter hospital stays, and decreased medical costs (Pease, Wodarski, & Wang, 1989). In addition, adequate nourishment allows clients to perform optimally in the educational or work setting. The benefits of staff nutrition education can translate to positive benefits for persons with mental retardation living in ICF/MR group homes. Those benefits include: (1) preventing further disability; (2) healthier individuals who experience fewer illnesses, hence decreasing costly medical services; (3) improved performance in education and work-related settings resulting from adequate nourishment; and prevention of nutrition-related problems and complications through education of clients and caregivers. All of these factors affect the normalization and the quality of life of individuals with mental retardation. Thus, the provision of nutrition education to direct care staff can help mentally retarded clients develop to their maximum educational, vocational, and social potential, allowing them to become

productive members of society. The primary goal for the mentally retarded client is for that person to live in the most normalized, least restrictive environment possible. Thus, nutrition education should form an integral part of staff training in group homes. As yet, research has not focused on this educational need for direct care staff.

ICF/MR group homes are a recent option in providing care for the mentally retarded individuals. To date, much of the attention directed toward these facilities has been in the area of developing physical sites and establishing accreditation and licensing standards (Bruininks, 1991). While food and nutrition standards exist for ICF/MR group homes, there is no research documenting the establishment of a quality assurance system to assure that nutrition goals for mentally retarded individuals. Recent changes in federal regulations for group homes have increased the need for nutrition services, yet a concurrent increase in nutrition training for direct care staff has not followed (Ponder & Bergman, 1980). The lack of assessment measurements for mentally retarded individuals living in ICF/MR group homes, combining dietary, clinical, and anthropometric measurements is supported by a review of the current literature.

Direct care staff as the primary caretakers of mentally retarded clients, are responsible for food procurement and meal preparation. In many situations, staff are responsible for teaching food shopping and cooking to clients to foster independent living. The present study was undertaken to determine nutrition concerns in a specific group of individuals with mental retardation living in ICF/MR group homes, and identify any change in health outcomes in this group after direct care staff received a nutrition education curriculum.

CHAPTER III

METHODS AND PROCEDURES

The present study had three purposes. The first purpose was to determine a nutrition profile of a unit of mentally retarded clients living in ICF/MR group homes. The second purpose was to measure change in nutrition knowledge of direct-care staff before and after a nutrition education training curriculum. The third purpose was to determine the effect of a nutrition education program for direct-care staff on health outcomes in a unit of mentally retarded individuals living in ICF/MR group homes. The study consisted of a sample of 40 ICF/MR clients selected from the unit's total population of 63 ICF/MR clients, and a sample of 61 direct care staff selected from 118 staff members of the total population in a unit of ICF/MR group homes in Maxton, North Carolina.

Research Design

A quasi-experimental nonrandomized control group pre-test/post-test design was used in this study. The dependent variable for direct care staff was nutrition knowledge. The dependent variable for clients was selected health outcomes. The independent variable was the nutrition intervention component.

Selection of Subjects

This research study was conducted in a unit of ICF/MR group homes located within three counties in North Carolina. The counties were Scotland, Robeson, and Moore. This unit known collectively as Maxton South Central, is part of a large health care company known as RHA Health Services, Inc. Permission to conduct this research was obtained from the administrative offices of RHA Health Services, Inc. There were nine

ICF/MR group homes in the Maxton South Central unit, and seven were selected to be used in this study. The two ICF/MR group homes from this unit that were not used in this study were a pediatric facility and a geriatric facility. A total of seven group homes were selected for either the treatment group or the control group in order to provide a balance of male and female clients and an equal mix of level of mental retardation and ambulatory status. The seven group homes were divided into either the treatment group, which consisted of three group homes, and the clients and staff within those facilities; or the control group, which consisted of the remaining four group homes, and the clients and staff within those facilities. Of the 42 clients with mental retardation from the seven ICF/MR group homes selected for this study, consent was obtained for 40 clients to participate. Sixty-one direct care staff were selected to participate in the nutrition education component of this study, and 61 participated. The total number of direct care staff in the Maxton South Central unit equaled 118 individuals.

Informed Consent

After receiving permission for the study from the administrative office of the ICF/MR unit involved, the researcher sent an informed consent letter to the parents and guardians of the mentally retarded clients who participated in this study. Guardians or parents were informed that all information would be kept confidential, no client would be identified by name or number, and they could decline for their ward to participate or withdraw at any time without penalty. An oral presentation including an explanation of the research purpose and procedures, benefits and risks, the opportunity to withdraw without penalty, and the confidentiality of data was used with direct care staff participating in the nutrition education component of the study. A similar oral presentation was used for staff participating in the focus group interviews. Signatures from all 61 staff members for participation in the nutrition education component, and signatures from 34 staff

members for participation in focus group interviews was obtained indicating informed consent to participate in the study. This study was approved by the Institutional Review Board at the University of North Carolina at Greensboro.

PROCEDURES

Client Sample

Seven ICF/MR group homes from Maxton South Central yielded a convenience sample of 42 mentally retarded clients, both male and female. Three ICF/MR group homes were selected from the seven group homes, and 18 clients from these 3 homes were selected for the treatment group. Guardian/parental consent was obtained for all 18 subjects. The remaining 4 ICF/MR group homes were used for the control group and 24 clients from these group homes comprised the control group. Guardian or parent consent was obtained for 22 subjects, therefore, the actual control group consisted of 22 subjects. Two guardians refused permission for their wards to participate in the study. A total sample of forty clients with mental retardation from the seven ICF/MR group homes participated in the nutritional assessment segment of this study. This sample represented 63% of the unit's total client population.

Direct Care Staff Sample

Sixty-one direct care staff from the seven group homes made up the sample for the nutrition education component of this study. Twenty-one direct care staff from the three ICF/MR group homes previously selected as the treatment group received the nutrition education intervention. Direct care staff from the four ICF/MR group homes previously selected as the control group numbered 40 direct care staff. This group received no treatment. This sample represented 51% of the unit's total direct care staff population (n=118).

Instrumentation

Nutrition knowledge and behaviors were measured by a paper and pencil test developed by the investigator (Appendix A). The test contained 20 multiple choice items pertaining to the objectives for the staff nutrition education program. One point was given for each correct response with a potential score of 20. Test items were developed using information from *Skimming The Fat: A Practical Food Guide* (The American Dietetic Association, 1992), *Healthy Eating* (Diabetes Center, 1988), *Heart & Soul: Facts and Foods For Your Health* (MetroHealth and the American Heart Association Northeast Affiliate, 1990), and *Five a Day: The Produce Revolution* (The Learning Seed, 1995). Two house managers, a job coach, and three members of the management staff from the unit rated the readability, clarity, and content validity of the test. Items which were deemed confusing were removed from the test. The same test was used for the pretest and both posttests. Administration of the instrument was conducted by the researcher. Directions and questions were read aloud and staff members were encouraged to ask for clarification.

Data Analysis

The *t* test for independent samples was used to test for statistically significant differences in mean scores for the client assessment measures and the staff nutrition knowledge test. Specifically, this measure was used to see if client assessment measures differed significantly before and after a nutrition education curriculum was provided to direct care staff. The *t* test was used to compare the means within the client treatment and control groups for differences from the baseline assessment to the second follow-up assessment for dietary, clinical, and anthropometric measures. The *t* test was also used to compare the means between the client treatment and control groups for dietary, clinical, and anthropometric measures for the baseline assessment and the second follow-up

assessment. This statistic was used to see whether staff nutrition knowledge scores differed significantly before and after a nutrition knowledge curriculum was provided to staff. This analysis was done for mean scores within the staff treatment and control groups, and the mean scores between the staff treatment and control groups.

Focus Group Interviews

In this study, focus group interviews were the preliminary step in planning the nutrition education program for direct care staff. Specifically, the focus group interviews were used (a) to understand the staff's attitudes and behaviors related to nutrition education content and strategies, (b) obtain pertinent information about the eating beliefs and practices of staff and clients in ICF/MR group homes, (c) to identify health and nutrition topics of interest to the target audience, direct care staff, and (d) to identify salient issues and questions that staff report as relative to their role in providing for the nutritional health of clients in ICF/MR group homes.

The focus group research technique was selected because it has been widely used in marketing to obtain informal information from consumers (Basch, 1987). As a qualitative research approach, focus group interviews offer a way of obtaining in-depth information from representatives of a target audience in an atmosphere that encourages discussion of feelings, attitudes, and perceptions about a specific topic. Knowledge about the target population is necessary to plan an intervention that uses preferred educational approaches and that is appropriate for the group's lifestyle, beliefs, and interests (Crockett, Heller, Merkel, & Peterson, 1990). Focus group interviews were used to gain insight into those variables that might enhance the nutritional health of mentally retarded clients living in group homes, and to gain a better understanding of nutrition education needs and interests of staff caring for these clients.

The target population for focus group interviews were direct-care staff working in any one of seven ICF/MR group homes in Maxton South Central unit. All participants lived in either Robeson, Scotland, or Moore Counties.

A discussion guide (Appendix B), was developed to identify key issues, concerns, and questions about nutrition, health, and nutrition education related to staff's perceived needs for themselves and for the clients they care for. This guide consisted of ten main questions and several accompanying probe questions. A list of topics was also included, specific to the nutritional needs of clients in the group homes.

Thirty-four staff members participated in the four focus groups conducted in late Summer 1995. Focus group interviews were conducted at RHA's Maxton Day Program, because all staff were familiar with this site. For successful group interviews, the environment should be relaxed and natural, to encourage informal discussion (Basch, 1987). Refreshments were provided at all four meetings. Participants were informed that the sessions would be tape recorded, and the information would be used in a general report, but that names would not be connected with anything they said.

Each focus group session lasted one hour. The principal investigator was the moderator for all focus group sessions. Because the moderator was familiar to all the members of the focus group, a good rapport was quickly established, and members seemed to be comfortable answering the questions honestly and openly. A brief demographic questionnaire was completed by participants at the end of each session.

Content was analyzed from the four focus groups using methods described by Krueger (1994). The audio tapes were listened to, and notes were made of key ideas, phrases, and quotes from the participants of the groups. Summary statements were prepared for each of the questions, from which conclusions could be drawn about the nutrition education training component for direct care staff. Appendix C describes the focus group results.

DATA COLLECTION

Client Assessment Procedures

Nutritional assessments were conducted on all mentally retarded clients included in this study after informed consent was obtained (n=40). This assessment used 3-day food intake records, skinfold measurements, waist to hip ratio (WHR), physical activity patterns, blood pressure measurements, and values for total serum cholesterol, HDL- and LDL-cholesterol. Height and weight were also assessed, and routine medications taken by the clients were identified.

The assessment data was collected from clients three times during the study period. The initial assessment was obtained at the start of the study, the second assessment was obtained after completion of the nutrition education curriculum for direct care staff, and the third assessment was obtained ten weeks after completion of the second assessment. Client assessments were performed during a two week period in June 1995, October 1995, and December 1995.

Diet

A 3-day food record was used to collect dietary data on all 40 clients in this study. Staff in the seven group homes completed the records. Specific instructions for completing the 3-day food record had been provided to all staff members before the initial food record collection. All training was conducted by the researcher, and was identical for all staff. Food intake was recorded on 3 consecutive days (2 weekdays, 1 weekend day). Food records were monitored by the researcher during the 3 day period. After each collection, food records were reviewed by the researcher and edited. If necessary, the staff person recording intake was contacted in person for clarification. To increase the validity and reliability of data from the 3-day food records, cross-checking of

reported food intake was performed by comparing food records with menu items from the same three days.

The 3-day food record was completed at three separate times during the study. The first collection of 3-day food records was obtained at the start of the study, the second was collected after completion of the nutrition education curriculum for direct care staff, and the third collection occurred ten weeks after the completion of the second 3-day food record collection. Collection of 3-day food intake records were performed for three days in June 1995, October 1995, and December 1995.

Each clients' food records were analyzed at each of the three collection periods using *The Food Processor Plus*, (ESHA Research, 1992). This analysis incorporated the nutrient content of each food item, the frequency, and the specific portion size to calculate each daily nutrient intake. Analysis of each clients' 3-day food intake provided information regarding the amount of calories, carbohydrate, protein, total fat, saturated fat, cholesterol, and fiber. This information was pooled to yield the total average daily intake for calories, carbohydrate, protein, total fat, saturated fat, cholesterol, and fiber at each of the three assessment periods. Nutrient ratios were also calculated from the pooled data, yielding percentages of calories from protein, carbohydrates, fat, and saturated fat.

Body Composition

Height, weight, and skinfold measurements were assessed at three times during the study on all clients participating in the study. Body weight of ambulatory clients was measured using a Healthometer balance scale with the subjects wearing shorts and tee shirt. Height of ambulatory clients was measured using a wall-mounted stadiometer. Weight of non-ambulatory clients was measured using a chair scale with the subjects

wearing a tee shirt and shorts. Recumbent length of non-ambulatory clients was measured using a supine measuring table (Harpenden, Carlstadt, NJ).

Determination of skinfold thickness was made with a Lange caliper (Cambridge Scientific Industries, Cambridge, MD) at three sites for all clients. Measurements were taken on the right side of the body using the procedures described by Lukaski (1987). Three separate skinfold measurements were made at each site, and the mean score was recorded as the actual measurement. To reduce the possibility of experimenter bias, a full series of measurements was recorded before starting the second series of measurement of each subject. The sum of three skinfolds (chest, abdomen, thigh) and age were used to calculate the body densities of the male clients by the equation of Jackson and Pollock (1978). The sum of three skinfolds (triceps, abdomen, suprailiac) and age were used to calculate the body densities of the female clients by the equation of Jackson and Pollock (1980). Percent body fat of all clients were determined by the method of Siri (1956). Subjects were rated optimal, slightly overfat, and fat based on percent body fat classifications described in Fitness and Sports Medicine: An Introduction (Nieman, 1990).

Fat Distribution

Body-fat distribution was assessed by waist to hip ratio (WHR) on all clients participating in the study. Waist circumference was measured midway between the lower rib margin and the iliac crest. The hip circumference was measured at the level of the widest circumference over the great trochanters. The circumferences were measured to the nearest 0.1 cm with the subject standing upright. WHR was calculated as waist circumference divided by hip circumference (Bray & Gray, 1988).

Plasma Lipid Assessment

Plasma total cholesterol, HDL-cholesterol, LDL-cholesterol, and triglyceride levels of all clients participating in the study were assessed two times during the study. The first assessment was June, 1995, at the start of the study, and the second in December 1995, at the end of the study. Determination of plasma total cholesterol, HDL-cholesterol, LDL-cholesterol, and triglyceride levels were obtained from clients' records.

Description of the Nutrition Education Program

Staff from seven group homes made up the sample for the nutrition education training component. From the seven group homes, random selection of 3 group homes comprised the treatment group and the remaining 4 group homes served as the control group. Total number of direct care staff from the treatment and control group homes was sixty-one. This sample represented 52% of the unit's total staff population (n=118). Based on the group home in which they worked, subjects were part of the treatment group (n=33) which received the nutrition education training, or served as the control group, (n=28) which received no treatment.

The nutrition curriculum consisted of three sessions over a consecutive three week period, with a total of 9 separate sessions. Information presented during these sessions was consistent with *Nutrition and Your Health: Dietary Guidelines for Americans* (USDA/USDHHS, 1990), which recommend that individuals choose a diet low in fat, saturated fat, and cholesterol, use sodium and sugar only in moderation, consume plenty of complex carbohydrates and fiber-rich foods, and maintain a healthy weight. Specific topics selected for this training were based on information from focus group interviews previously conducted with direct care staff, and from a comprehensive assessment of ICF/MR clients performed at the start of the study. Sessions were conducted at the same time each week, and were three hours in length, with 10 minute breaks provided hourly.

The nutrition education session was divided into three classes with one specific topic presented during each class. The curriculum was conducted during September and October of 1995. Prior to beginning the curriculum, all subjects in the treatment and control groups (n=61) were administered the pre-test. The first post-test was administered in the same way to all subjects (n=61) after completion of the nutrition curriculum. The second post-test was administered in the same way to all subjects (n=61) 10 weeks after the first post-test, in December 1995. An outline the curriculum is provided in Appendix D. The researcher, a nutritionist, taught the nutrition education component. Participants learned how to select and prepare balanced meals using less fat, sugar, and salt. The sessions included information about basic nutrition, different types of fats in foods, information about fats and cholesterol, healthy snacking, low-fat cooking, examples of low fat cooking techniques, and recipe modification, all based on the Dietary Guidelines for Americans (USDA/USDHHS, 1990). Emphasis was on low fat selection and preparation of foods, methods of substituting healthier foods for those higher in sugar, and menu and snack alternatives to convenience foods. Sources for materials included the American Heart Association, USDA/DHHS, American Diabetes Association, the North Carolina Cooperative Extension Service, and The American Dietetic Association. Videos-tapes used were obtained from The Learning Seed, Cambridge Research Group, Meridian Education Corporation, and National Health Videos.

Each weekly nutrition education session was divided into three parts, each lasting one hour, with a total of nine classes over the three week period. During these time blocks, nutrition information was presented using several methods. Teaching techniques used during the study were demonstration, discussion, video-tapes, lectures, worksheets and handouts, cooking techniques and recipes. Short lectures were used to present important

nutrition concepts, and group discussions were used before and after video-tapes and worksheets. Active involvement by participants was encouraged to make the sessions fun and interesting. The major objectives of the sessions was to provide basic nutritional knowledge, to promote positive nutritional attitudes and to promote positive changes in how staff selects and prepares meals for the clients.

CHAPTER IV

RESULTS

The specific aims of this dissertation research were to assess the nutrition status of a group of individuals with mental retardation living in group homes through selected assessment measures, to provide a nutrition education curriculum for direct care staff caring for these individuals with mental retardation, and to determine if providing a nutrition education curriculum to direct care staff had an effect on the nutrition status of these individuals with mental retardation.

The first part of this study involved assessment of specific dietary, clinical, and anthropometric measures to determine the nutritional status of clients with mental retardation living in a specific unit of residential facilities called ICF/MR group homes. Dietary and anthropometric measures were assessed three times during the study, with the first measure as the baseline measure, the second assessment three months from the baseline, and the third assessment six months from the baseline measure. These assessments were labeled as baseline, follow-up 1, and follow-up 2. Clinical measures were assessed two times during the study, with the first assessment as the baseline measure, and the single follow-up assessment six months following the baseline measure, at the end of the study. These two measures were labeled as baseline and follow-up.

The results of this study are reported in two parts to simplify the presentation of data. The first part describes the results from the client assessment component. The second part describes the results from the staff nutrition education component.

Characteristics of Clients in the Study

A total of 40 subjects participated in the client assessment. Demographics of the clients who participated in the study are presented in Table 1. Average age of the clients in the study was 33 years. Forty-five percent of the clients participating in the study were male, and 45% were female. Of the total clients in the study, 33% were black, 17% were Lumbee Indian, and 50% were white. Seventy-five percent of the clients received a regular calorie diet, 7% received a low cholesterol diet, and 18% received an 1800 calorie diet. Seventy-two percent of the clients were ambulatory, and 28% were non-ambulatory. Fifty-seven percent of the clients were taking medication, and 43% were taking no medication. The levels of mental retardation for all clients participating in the study were as follows: 30% were classified as profound, 58% were classified as severe, and 12% were classified as moderate.

Clients were selected for participation in the study based on the group home in which they lived. Three group homes consisting of 18 clients comprised the treatment group. Four group homes consisting of 22 clients comprised the control group. The treatment and control groups were selected in order to maintain intact ICF/MR group homes, and to provide the most homogeneous balance of clients in both the treatment and control group. Treatment and control clients were similar with respect to gender, body mass index, race, type of mental retardation, medication, age and mobility. When the *t* test analysis was performed, there were no significant differences found between clients in the treatment group and clients in the control group regarding these variables.

Dietary Data

Dietary intake data for the clients who participated in the study is presented in Table 2. Baseline and two follow-up dietary measures of interest for the clients in the study included the average intake for calories, protein, carbohydrate, total fat, saturated fat, dietary cholesterol, and fiber. Nutrient ratios were also calculated yielding percentages of calories from protein, carbohydrate, fat and saturated fat, and are presented in Table 3.

Average caloric intake for treatment group clients was 695 calories greater than for control group clients, and treatment group clients showed an average reduction of 302 calories from baseline to the second follow-up measures. Control group clients averaged an increase of 62 calories from baseline to the second follow-up measure. Daily protein intake for treatment group clients averaged a daily intake of 27 grams greater than control group clients, and decreased by an average of 4 grams at the second follow-up. Daily protein intake for control group clients averaged an increase of 8 grams by the second follow-up.

Dietary cholesterol intake for treatment group clients averaged 283 mg daily at baseline, decreased to 268 mg at the first follow-up, and averaged 218 mg at the second follow-up, with a total reduction of 65 mg. The American Heart Association advises Americans to limit dietary cholesterol to no more than 300 milligrams per day, and a diet low in total fat and saturated fat is also likely to fall within the recommended range for cholesterol. Treatment group clients averaged a dietary cholesterol just under this recommendation, which may indicate that this group consumes meats, milk, cheese, and eggs in greater amounts than necessary for a healthy diet.

Average fiber intake for treatment group clients at baseline was 21 grams, 20 grams at follow-up one, and increased to an average of 26 grams at follow-up two. The average daily intake of fiber at baseline for control group clients was 14 grams, increased to 16

grams at follow-up one, and increased to 17 grams at follow-up two. Fiber intake for treatment group clients at baseline and follow-up 1 was less than the recommended 25 to 35 grams of fiber daily (AHA, 1986); by follow-up 2, the average fiber intake for this group was within the recommended range. Control group clients averaged a daily fiber intake lower than the amount recommended at baseline and at both follow-up periods.

In the United States, the average intake of carbohydrates by adults is estimated at 45% of total calories (USDA, 1986). The Nutrition Committee of the American Heart Association specifies dietary guidelines for carbohydrate and protein intake (AHA, 1986). Carbohydrate intake should constitute 50 to 55% or more of calories, with emphasis on increased complex carbohydrates; protein intake should be about 15% of calories. When compared with these recommendations, clients in the treatment and control groups had intakes similar to these recommendations. Treatment group clients consumed 53% of total calories as carbohydrate; control group clients consumed 57% of total calories as carbohydrate. Protein intake for treatment group clients averaged 13% at baseline, 13% at follow-up 1, and 14% at follow-up 2. Protein intake for control group clients averaged 13% at baseline, 13% at follow-up 1, and 14% at follow-up 2.

Treatment group clients consumed 36% of their total calories as fat, and saturated fat comprised 11% of total calories. Control group clients consumed 33% of their total calories as fat, and saturated fat comprised 11% of total calories. The Dietary Guidelines for Americans (USDA/USDHHS, 1990) suggest that less than 30% of total calories should come from fat, and saturated fats kept to less than 10% or one-third of the total daily calorie intake. Clients in treatment and control groups consumed greater than 30% of their total intake as fat, but both groups consumed only slightly more than the recommendations for saturated fat.

The *t* test analysis was conducted to determine if the dietary intakes of the clients in the treatment and control groups changed from the baseline assessment to follow-up 2 assessment. For the treatment group clients, significant changes were found for average intakes of calories, protein, total fat, saturated fat, cholesterol, and fiber. Average intakes of these dietary components showed a beneficial decrease for the treatment group clients by the second assessment. For the control group clients, there were no significant changes found for any dietary component from baseline to follow-up 2 assessment.

When dietary intakes for treatment group clients were compared with dietary intakes for control group clients at baseline, there were significant differences between the two groups for average intakes of calories, protein, carbohydrates, total fat, saturated fat, cholesterol and fiber. When dietary intakes for treatment group clients were compared with dietary intakes for control group clients at follow-up 2, there were significant differences for average intakes of calories, protein, total fat, and fiber.

Clinical Data

Clinical values assessed included age, height, weight, serum cholesterol, HDL-cholesterol, LDL-cholesterol, and triglyceride. This information was assessed at baseline and at one follow-up period at the end of the study for clients in the study. Clinical data is presented in Table 4.

On average, weight for treatment group clients at baseline was 151 pounds, and decreased to 149 pounds by follow-up. Control group clients average weight, was 139 pounds at baseline and increased to 140 by follow-up. *Nutrition and Your Health: Dietary Guidelines for Americans* (USDA/USDHHS, 1990), has established figures for a healthy weight range for adults based on body mass index, and these were used to compare the weights from clients in both groups. Treatment group clients averaged 14 pounds above what is considered to be the healthy weight range at baseline, and control

group client's average weight was within the healthy weight range at baseline. Average weight for treatment group clients at follow-up continued above the recommended weight range. Average weight for control group clients at follow-up showed an increase of 1.2 pounds, and continued within the range established as a healthy weight.

Serum cholesterol levels for treatment group clients at baseline averaged 184 mg/dl, LDL-cholesterol levels were 112 mg/dl, and HDL-cholesterol levels were 47 mg/dl. For control group clients, baseline serum cholesterol levels averaged 186 mg/dl, LDL-cholesterol levels were 121 mg/dl, and HDL-cholesterol levels were 39 mg/dl. Serum cholesterol levels for treatment group clients at follow-up averaged 175 mg/dl, LDL-cholesterol averaged 101 mg/dl, and HDL-cholesterol averaged 57 mg/dl. Serum cholesterol for control group clients at follow-up averaged 182 mg/dl, LDL-cholesterol averaged 121 mg/dl, and HDL-cholesterol averaged 41 mg/dl. These values are within the range considered to be acceptable for heart disease risk by many health organizations.

The amount of change for treatment group clients from baseline to follow-up for serum cholesterol averaged 9 mg/dl, HDL-cholesterol levels increased an average of 10 mg/dl, LDL-cholesterol levels decreased by 11 mg/dl, and triglyceride levels decreased an average of 9 mg/dl. Amount of change for control group clients on average, from baseline to follow-up for serum cholesterol was 4 mg/dl, HDL-cholesterol levels averaged an increase of 2 mg/dl, LDL-cholesterol levels showed no change, and triglyceride levels decreased an average of 2 mg/dl.

When statistical analysis was performed using the *t* test for clinical values, significant differences were found for treatment group clients from baseline to the follow-up assessment for HDL-cholesterol. Clinical values for control group clients showed no significant differences from baseline to follow-up.

The *t* test was used to compare differences in clinical values between treatment and control group clients, and no significant differences were found at baseline between the two groups. There was a significant difference found between treatment and control group clients at the follow-up assessment for HDL-cholesterol.

Anthropometric Data

Baseline and follow-up anthropometric measures included average body fat percent and hip/waist ratio (HWR) for the clients participating in the study, and was assessed at baseline, and at two follow-up periods. This data was stratified by group and gender and are presented in Table 5.

Male clients in the treatment group had an average body fat of 20% at baseline, 21% at follow-up 1, and 20% at follow-up 2. Male clients in the control group had an average body fat of 21% at baseline and this measurement remained without change through follow-up 1 and 2. Female clients in the treatment group had an average body fat of 26% at baseline, and this measurement remained without change through follow-up 1 and decreased to 23% by follow-up 2. Female clients in the control group averaged a body fat of 23% at baseline and follow-up 1, which decreased to an average of 22% by follow-up 2.

For females, the optimal percent body fat is 13-20%; slightly overfat is 21-25%; and fat is 26-32; for males, the optimal percent body fat is 8-15%; slightly overfat is 16-20%; and fat is 21-24% (Neiman, 1990). Treatment group females at baseline were classified as fat and decreased by follow-up 2 to the category of slightly overfat. Control group females at baseline and at both follow-up periods were classified as slightly overfat. Treatment group males were classified as slightly overfat throughout the study. Control group males were classified as fat throughout the study.

When *t* test analysis was used to test for differences in body fat percent for treatment and control group clients from the baseline assessment to the follow-up 2 assessment, no significant differences were found. When the two groups were compared at baseline and follow-up 2 for differences between the treatment and control clients, no significant differences were found between the two groups.

Treatment group males averaged a WHR of 0.98 at baseline. This value decreased to 0.96 at follow-up 1, and further decreased to average of 0.90 at follow-up 2. Control group males had an average WHR of 0.95 at baseline, which remained unchanged at both follow-ups.

Treatment group females averaged a WHR of 0.95 at baseline and at follow-up 1, and decreased to 0.91 by follow-up 2. Control group females averaged a WHR of 0.80 at baseline and follow-up 1, and showed a decrease to 0.78 by follow-up 2.

When *t* test analysis was used to test for differences in WHR for treatment and control group clients from the baseline assessment to the follow-up 2 assessment, no significant differences were found. When WHR for treatment control group clients were compared at baseline and at follow-up 2, no significant differences were found between the two groups of clients.

Characteristics of Staff in the Study

Sixty-one direct care staff participated in the nutrition education curriculum. Thirty-three (54%) direct care staff comprised the treatment group, and 28 (46%) direct care staff comprised the control group. Staff in the treatment and control groups were similar with respect to gender, age, race, and education. Of the 61 subjects, 38 were black, 10 were Lumbee Indian, and 13 were white. Average age of the sample was 26 years old, and all staff from the sample had completed high school or the equivalent. Twenty-one subjects were males and 40 subjects were females. All subjects could read, write, and

understand English. No significant differences were found for demographic variables when these two groups were compared. Table 6 presents demographic data for direct care staff that participated in the study.

Staff Nutrition Education Component Results

Table 7 shows the results of the pre-test, post-test 1, and post-test 2 scores for direct care staff in the study. The total possible score on the nutrition knowledge test was 20. The differences from pre-test to post-test 1, pre-test to post-test 2, and post-test 1 to post-test 2 are included. Data is also represented as percent of total scores for all three tests. Average pre-test scores for the treatment group staff was 6.2, and average post-test 1 scores were 15.6. This was an overall increase of 9.0 points at the first post-test. Post-test 2 scores for treatment group staff averaged 9.7, and pre-test scores to post-test 2 scores averaged an overall increase of 3.0 points. Post-test 1 scores decreased by an average of 5.9 points at post-test 2.

Average pre-test and post-test 1 scores for control group staff were 8.7 and 10.3, respectively. This represented an overall increase of 1.6 points at the first post-test. Post-test 2 scores for control group staff averaged 8.2. Pre-test scores to post-test 2 scores for control group staff averaged an overall decrease of 0.5 points. Post-test 1 scores decreased an average of 2.1 points at post-test 2 for control group staff.

Staff in the treatment group average pre-test score was 2.1 points lower than pre-test scores for control group staff. Post-test scores for treatment group staff were 5.3 points higher when compared with post-test scores for control group staff. Post-test 2 scores for treatment group staff were 1.5 points higher than post-test 2 scores for the control group staff. When staff treatment and control group scores were compared from pre-test to post-test 2, average scores for treatment group staff were 3.0 points higher. Average scores for control group staff decreased by .05 points from pre-test to post-test 2.

When *t* test analysis was used to determine differences for staff treatment group scores from pre-test to post-test 1, a significant difference was found. A significant difference was also found for staff treatment group scores from pre-test to post-test 2, and for post-test 1 to post-test 2. There were no significant differences found for control group staff when scores were compared from pre-test to post 1, pre-test to post-test 2, and post-test 1 to post-test 2.

When staff treatment group scores were compared with staff control group scores using the *t* test analysis, a significant difference was found for pre-test scores and post-test 1 scores between groups. There were no significant differences found between these two groups on post-test 2 scores on the nutrition knowledge test.

Table 1

Demographics of Clients in the Study*

	Treatment Group	Control Group	Total
Gender			
Male	11 (61)	11 (50)	22 (55)
Female	7 (39)	11 (50)	18 (45)
Race			
White	9 (50)	11 (50)	20 (50)
Black	8 (44)	5 (28)	13 (33)
Lumbee Indian	2 (6)	5 (27)	7 (17)
Diet			
Regular	13 (72)	17 (77)	30 (75)
Low Cholesterol	3 (17)	0 (0)	3 (7)
1800 Calorie	2 (11)	5 (23)	7 (18)
Activity Level			
Ambulatory	16 (89)	13 (59)	29 (72)
Non-Ambulatory	2 (11)	9 (41)	11 (28)
Medication			
Medication	9 (50)	14 (64)	23 (57)
No Medication	9 (50)	8 (36)	17 (43)
Level of Mental Retardation			
Profound	4 (22)	8 (36)	12 (30)
Severe	10 (57)	13 (59)	23 (58)
Moderate	4 (22)	1 (4)	5 (12)

*Data given as number and (percent).

Table 2

Dietary Intakes for Clients in Study*

Component	Baseline	Follow-up 1	Follow-up 2
Treatment Group (n = 18)			
Calories	3073 (575)*a^	2937 (397)	2771(333)a
Protein (g)	103 (22)b	101 (21)	99 (22)b
Carbohydrate (g)	409 (88)c	393 (71)	391 (69)
Total fat (g)	124 (23)d	118 (27)	96 (19)d
Saturated fat (g)	39 (9)e	35 (8)	29 (6)e
Cholesterol (mg)	283 (104)f	268 (94)	218 (68)f
Fiber (g)	21 (81)g	20 (8)	26 (68)
Control Group (n = 22)			
Calories	2379 (439)*a	2424 (345)	2441 (365)a
Protein (g)	76 (17)b	80 (19)	84 (19)
Carbohydrate (g)	338 (71)c	357 (67)	360 (64)
Total fat (g)	88 (15)d	89 (15)	80 (18)
Saturated fat (g)	30 (6)e	27 (8)	27 (4)
Cholesterol (mg)	211 (48)f	198 (47)	206 (47)
Fiber (g)	14 (5)g	16 (4)	17 (4)

*Data given as mean and (standard deviation).

^Each value sharing a common superscript is significantly different ($p < 0.05$).

Table 3

Baseline and Follow-up Nutrient Ratios* of Clients in the Study

Percent of calories from	Baseline	Follow-up 1	Follow-up 2
<u>Treatment Group (n=18)</u>			
Protein	13.4	13.7	14.3
Carbohydrate	53.2	53.5	56.4
Total fat	36.3	36.1	31.1
Saturated Fat	11.4	10.7	9.4
<u>Control Group (n=22)</u>			
Protein	12.7	13.2	13.7
Carbohydrate	56.8	58.9	58.9
Total fat	33.2	33.0	29.4
Saturated fat	11.3	10.1	9.9

*Ratios are expressed as a percentage of total calories.

Table 4

Clinical Measures* for Clients in Study

Measures	Baseline	Follow-up
Treatment Group (n=18)		
Height (in.)	62 (4)	62 (4)
Weight (lbs.)	151 (32)	149 (29)
Age (years)	29 (8)	30 (8)
Cholesterol (mg/dl)	184 (49)	175 (41)
HDL-cholesterol (mg/dl)	47 (13) a [^]	57 (14) a
LDL-cholesterol (mg/dl)	112 (36)	101 (31)
Triglyceride (mg/dl)	108 (65)	99 (55)
Control Group (n=22)		
Height (in.)	65 (4)	65 (4)
Weight (lbs.)	139 (38)	140 (38)
Age (years)	37 (9)	37 (10)
Cholesterol (mg/dl)	186 (42)	182 (38)
HDL-cholesterol (mg/dl)	39 (11)	41 (12) a
LDL-cholesterol (mg/dl)	121 (29)	121 (29)
Triglyceride (mg/dl)	122 (44)	119 (42)

*Data given as mean and (standard deviation).

[^]Each value sharing a common superscript is significantly different ($p < 0.05$).

Table 5

Anthropometric Measures* for Clients in Study

	Body Fat Percent		Hip/Waist Ratio	
	Males	Females	Males	Females
Treatment Group				
(n = 18)				
Baseline	20 (7.2)	26 (7.1)	0.98 (0.2)	0.95 (0.6)
Follow-up 1	21 (8.1)	26 (6.3)	0.96 (0.2)	0.95 (0.6)
Follow-up 2	20 (8.3)	23 (7.4)	0.90 (0.2)	0.91 (0.1)
Control Group				
(n = 22)				
Baseline	21 (8.2)	23 (7.1)	0.95 (0.9)	0.80 (0.6)
Follow-up 1	21 (8.4)	23 (7.3)	0.95 (0.9)	0.80 (0.6)
Follow-up 2	21 (8.1)	22 (7.1)	0.95 (0.9)	0.78 (0.7)

*Data given as mean and (standard deviation).

Table 6

Demographics of Staff Subjects In Study*

	Treatment (n = 33)	Control (n = 28)	Total (n = 61)
Gender			
Male	12 (13)	9 (32)	21 (36)
Female	<u>21 (20)</u>	<u>19 (68)</u>	<u>40 (64)</u>
	33 (54)	28 (46)	61 (100)
Race			
White	4 (12)	9 (32)	13 (21)
Black	22 (66)	16 (57)	38 (62)
Lumbee	<u>7 (21)</u>	<u>3 (11)</u>	<u>10 (16)</u>
	33 (54)	28 (46)	61 (100)

*Data given as number of individuals and (percent).

Table 7

Scores of Staff Subjects In Study on Pre- and Post-Nutrition Tests*

	Treatment Group (n = 33)	Control Group (n = 28)
Age	26 (6)	27 (6)
Pre-Test	6.6 (3.5)a [^]	8.7 (3.7)a
Post-test 1	15.6 (3.5)b	10.3 (4.2)b
Post-test 1 - Pre-test	9.0 (3.1)c	1.6 (2.2)
Post-test 2	9.7 (4.5)	8.2 (4.4)
Post-test 2 - Post-test 1	-5.9 (4.0)d	-2.1 (3.7)
Post-test 2 - Pre-test	3.0 (4.0)e	-0.5 (3.2)

*Data given as mean and (standard deviation).

[^]Each value sharing a common superscript is significantly different ($p < 0.05$).

c - Significant difference from treatment group post-test 1 - pre-test.

d - Significant difference from treatment group post-test 2 - post-test 1

e - Significant difference from treatment group post-test 2 - pre-test.

CHAPTER V

DISCUSSION

Data indicated that nutrition education can be successful with direct care staff who care for mentally retarded clients. Results from this study supported the findings that staff need nutrition training in order to meet the nutritional needs of clients living in ICF/MR group homes (Brogan, Callaghan, & Schemmel, 1981). In the present study, direct care staff who received a nutrition education curriculum demonstrated greater improvements in nutrition knowledge and demonstrated more positive changes in providing clients in ICF/MR group homes a diet in keeping with recommendations from the US Dietary Guidelines for Americans.

One purpose of the present study was to assess the nutrition status of clients with mental retardation living in ICF/MR group homes through specific assessment measures. A second purpose was to provide a nutrition education curriculum for direct care staff based on recommendations described in the US Dietary Guidelines for Americans. The main goal of the staff nutrition curriculum was to train staff how to provide healthy diets for mentally retarded clients living in group homes. A third purpose of the study was to determine if nutrition education training for direct care staff had long-term effects on the nutritional status of clients in their care.

Dietary, clinical, and anthropometric measures were assessed on all clients when the study began in June 1995. These assessments occurred prior to the start of the nutrition education curriculum for direct care staff. Dietary and anthropometric assessment measures were completed on all clients in the study at two additional times, with the second client assessment performed in October 1995, and the third client assessment

performed in December 1995. Clinical assessment measures were completed on all clients in the study at one additional period, in December 1995. The second client assessment was performed shortly after completion of the staff nutrition education curriculum. The third client assessment was performed ten weeks following the second client assessment. The purpose of the repeated client assessments was to determine any differences in the assessment measures before and after the nutrition education curriculum was presented to direct care staff.

After completion of the nutrition education curriculum for direct care staff, dietary changes were observed for clients in the treatment group in both the type and amount of food(s) consumed. Staff who received nutrition education were replacing butter and whole milk with reduced-calorie margarine and skim milk. Staff were adding spices and flavorings when preparing clients' food instead of salt. Meat was prepared by broiling and baking rather than frying, and visible fat was trimmed before cooking. For the meals observed, meat was used in smaller amounts, with beans and grains added to mixed dishes to extend the meat. These changes observed in the treatment group homes were independent of any intervention from clinical or supervisory staff.

Staff who received the nutrition education consistently were able to choose appropriate substitutions from the correct exchange group for clients' meals and snacks. Snack options for clients from the treatment group were lower in fat, lower in calories, and complex carbohydrate foods replaced higher fat choices. High-sugared soft drinks were replaced with fruit juice and flavored waters. Consumption of fresh fruits, fresh vegetables, and whole-grain products were consumed in greater amounts by clients. Dietary intake records showed increased amounts of complex carbohydrates and fiber, and lower intakes of food high in saturated fats and cholesterol when compared with dietary intake records for clients in the control group.

When dietary intakes for treatment group clients were compared with dietary intakes for control group clients at baseline, there were significant differences for average intake of all the nutrients assessed. At the second follow-up assessment, significant differences between the client treatment and control groups were only noted for average intake of calories, protein, total fat and fiber. Most importantly, treatment group clients had significant differences in their average intakes of calories, protein, total fat, and saturated fat, and cholesterol intake from the baseline assessment to the second follow-up assessment, ten weeks after completion of the nutrition education curriculum for direct care staff, with positive changes observed for these dietary components. Control group clients showed no significant differences from the baseline assessment to the second follow-up assessment for any of the dietary components assessed.

It is interesting to note that 72% of Group 1 clients, and 77% of Group 2 clients were prescribed a regular diet as part of their plan of care. This type of diet provides approximately 2200 calories daily. Menus in the group homes were written by a registered dietitian; were designed to be low in fat, cholesterol, sodium, and simple sugars; high in fiber; and were specific as to the amount and portions of foods allowed for clients. Based on dietary intake data collected during this study, most of the clients in both groups at the start of the study were consuming diets well in excess of 2200 calories. By the end of the study, dietary intake data indicated that clients in the treatment group had decreased their average calorie intake by 300 calories a day, thus moving closer to their prescribed diets. Clients in the control group, by contrast, had increased their averaged calorie intake by 62 calories, thus continuing to consume daily calories in excess of the prescribed diets.

Clients in the treatment group and control group had a baseline percent of fat at 36% and 33%, respectively, which exceeded the current upper limit set by the US Department

of Agriculture, the American Heart Association, and the American Dietetic Association. All three of these organizations recommend that the percent of calories from fat not exceed 30%. By the end of the study, the treatment clients had a average fat intake of 31% of total calories, which was a decrease of 5%. Saturated fat intake was lowered from an average of 11% at the start of the study to 9% at the completion of the study. Fiber intake for clients in the treatment group had increased from an average of 21 grams consumed per day to 26 grams per day. Overall diets for clients in the control group changed very little throughout the entire study period. Average intakes of calories, protein, carbohydrate, saturated fat, and fiber remained fairly consistent at all three assessment periods for control group clients.

Clients in the treatment group were, on average, heavier than the weight range recommended in the Dietary Guidelines for Americans. Clients in the control group were within the recommended range. However, clients in the treatment group had lost an average of two pounds by the end of the study, while control clients gained an average of one pound. The treatment group had a greater number of male clients, which may have explained the higher weights, however, the control group contained a greater number of non-ambulatory clients.

While average lipid levels for both groups of clients were within the acceptable range for risk of heart disease (USDHHS/NIH, 1987), clients in the treatment group demonstrated lowered values from baseline measures to the follow up measures for serum cholesterol, with an increase in HDL-cholesterol, a decrease in LDL-cholesterol, and lowered triglyceride levels. Clients in the control group showed no significant differences in serum cholesterol and HDL-cholesterol levels, and no change in LDL-cholesterol values during the study. Significant differences were found for average HDL-

cholesterol levels for clients in Group 1 from baseline to the follow-up assessment at the end of the study.

Anthropometric assessment included assessment of body fat percent and WHR for all clients at the start of the study; again, following nutrition education training for staff in the treatment group, and at the completion of the study. The data was stratified by group and gender. For identifying persons at higher risk for the health problems of obesity, cutoff points for WHR have been specified at 0.95 for men and 0.80 for women (Lohman, Roche, & Martorell, 1988). A high WHR is associated with increased risk for death overall, mortality due to cardiovascular disease or diabetes, and high levels of blood pressure, lipids, and insulin (Croft, Keenan, Sheridan, Wheeler, & Speers, 1995). These values were used to compare the WHR assessed for clients in the treatment and control groups.

Male clients in the treatment group averaged a WHR of 0.98, which was above the cutoff point associated with a higher risk of disease. This value had decreased to an average value of 0.90, by the end of the study. Male clients in the control group, by contrast, had an average WHR of 0.95 at baseline, and this value remained unchanged throughout the total study period. Female clients in the treatment group at the start of the study averaged a WHR of 0.95 which decreased to an average WHR of 0.91 by the end of the study. While this value was still above the cutoff point for disease risk, the decrease may have been due to clients receiving diets from direct care staff following with guidelines presented in the staff nutrition education curriculum. Female clients in the control group began the study with an average WHR of 0.80, which was lower than those associated with disease risk, and this value decreased to 0.78 by the end of the study.

When body fat percent for clients in the treatment and control groups were compared with body fat norms described by Nieman (1990), male clients in the treatment group averaged an initial body fat that classified them as slightly overfat. The average body fat percent for male clients in the treatment group did not change by the end of the study. At the start of the study, the average body fat percent for females in the treatment group classified them as fat. By the end of the study, females clients in the treatment group had an average body fat percent that classified them as slightly overfat, which signified a decreased in average body fat percent. Male clients in the control group maintained the same body fat percent throughout the entire study period, which classified them as fat. Females clients in the control group maintained the same body fat percent throughout the entire study period that classified them as slightly overfat.

Results from the anthropometric assessment in this study agree with the findings of other studies. However, research on the prevalence of obesity in mentally retarded individuals has primarily used height and weight standards, or the triceps skinfold as the criterion (Fox, Burkhardt, & Rotatori, 1983; Polednak & Auliffe, 1976). Using height, weight and triceps skinfold measurement in a institutionalized mentally retarded population, Fox and Rotatori (1982) found a strong inverse relationship between IQ and adiposity for female and a similar but less pronounced trend for males. The percentages of body fat for clients in this study were less than those reported for both males and females with mental retardation by McArdle, Katch, and Katch, (1981). Previous research has determined body fat levels in mentally retarded adults using an institutionalized population (Kelly, Rimmer, & Ness, 1986). The clients in the present study live in group homes where they have the opportunity for a greater amount of activity and exercise. This may account for a greater calorie expenditure and decreased amount of body fat. In addition, three skinfold measurements were used for both male

and female clients in this study, which may yield a closer approximation of the total body fat percentage.

Female clients in this study, averaged a greater percent body fat measures than the male subjects, and this trend was consistent with that found in the nonhandicapped adult population (McArdle, et al., 1981). Because clients in the present study cannot control their dietary intake, and must rely on staff to provide meals and snacks for them, nutrition education for staff providers can have an effect on client's body fat. The clients in the treatment group demonstrated a decreased both in average WHR measurements and body fat percent from the start of the study to completion, when compared with clients in the control group. However, when both treatment and control group clients' average values for body fat percent and WHR were compared at baseline and follow-up 2, no statistically significant differences were found.

The second part of this study were the results from the 20-item nutrition education test administered to direct care staff. Staff in treatment group averaged a pre-test score of 6.6 or 33% correct. Staff in the control group averaged a pre-test score of 8.7 or 44% correct. Directly following the nutrition education curriculum, the same test was administered to both groups of staff. The treatment group staff who received the curriculum, averaged a score of 15.6 or 78% correct. The control group staff, who received no nutrition curriculum, averaged a score of 10.3 or 52% correct. Since the time period between these two tests was only four weeks, it was possible that increased scores for control group staff indicated they may have remembered test items, or gained nutrition knowledge purely from taking the test. When staff treatment and control group test scores were compared, a significant difference was found for the pre-test and first post-test scores. Ten weeks after the first post-test, the second post-test was administered to the same two groups of direct care staff. The treatment group staff averaged 9.7 or

49% correct responses; the control group staff averaged 8.2 or 41% correct responses. No significant differences were found for average scores on post-test 2 when staff treatment and control groups were compared. However, significant differences were found for treatment group staff who received the nutrition education curriculum for average scores from pre-test to post-test 1, for average scores from pre-test to post-test 2, and for average scores from post-test 1 to post-test 2. No significant differences were found for control group staff scores on any of these measures.

A positive trend was found for treatment group staff for average scores from pre-test to post-test 1, and post-test 1 to post-test 2. Lower average scores for treatment group staff from post-test 1 to post-test 2 may have been due to staff forgetting a portion of what they learned during the nutrition education curriculum, or may be due with staff feeling uncomfortable with another test. The first and second time staff answered the nutrition knowledge test, the average time for all staff in the study to complete the test was two to three hours. The third time the nutrition knowledge test was administered, staff completed the test in about one hour. Initially, staff reported feeling apprehensive when presented with a paper and pencil test. Staff were permitted to use as much time as needed to finish the nutrition knowledge test at all three times it was administered. While the instrument was reviewed for understandability prior to its use, direct care staff are rarely required to read and answer test questions. Staff may also have felt pressured to perform well on the post-tests as the nutrition education curriculum was part of their job requirement, and this may have caused them to guess more answers. It is possible that staff experienced test anxiety which may have affected their ability to answer correctly.

While average scores on the second-post test, ten weeks after the nutrition education curriculum was presented did not demonstrate significant differences between the two

groups of direct care staff, staff in the treatment group who were exposed to more nutrition information, cooking principles, food selection, and preparation activities than control group staff, demonstrated greater practical improvements in nutrition knowledge through positive changes in food choices and meal preparation for the clients they care for. This was reflected in the clients' dietary and clinical assessment measures at the end of the study, and observed changes during meal preparation and mealtimes in the group homes.

The current study demonstrated the need for nutritional assessment in a group of adults with mental retardation. Because this population represented a selective group of individuals living in a specific unit of ICF/MR group homes, it is difficult to say whether similar nutritional concerns exist in other groups of individuals with mental retardation. The positive changes in the assessment measures from the start to its completion, however, supported the concept of nutrition training for direct care staff, who are the primary providers of food, exercise, and interaction for clients with mental retardation living in group homes. The enthusiasm and cooperation exhibited by direct care staff who participated in the nutrition education curriculum emphasized the value and significance of this training, and the need for educational efforts with this group of care providers.

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

One of the purposes of this quasi-experimental study was to determine a nutrition profile of a unit of mentally retarded clients living in ICF/MR group homes. A second purpose was to measure change in the nutrition knowledge of direct care staff before and after a nutrition education curriculum. The third purpose was to determine whether the effects of the nutrition education curriculum for staff would have any effect of the nutritional status of the clients living in the ICF/MR group homes.

Dietary, clinical, and anthropometric assessments were performed on two groups of clients with mental retardation living in a unit of ICF/MR group homes. These measures were assessed again, at two additional times during the study, after the nutrition curriculum for direct care staff, and again 10 weeks later, at the end of the study. The ICF/MR group homes in which clients lived were divided into two groups. Based on the group homes in which clients lived, clients from one group represented the treatment group, and clients from the other group represented the control group. Treatment group clients lived in the group homes where direct care staff received a four-week nutrition education training curriculum. Control group clients lived in the group homes where direct care staff received no nutrition education training.

Mean values were calculated from the dietary, clinical, and anthropometric data for all clients. Baseline and follow-up data was compared. The *t* test analysis was used to compare for differences in assessment measures from baseline to the second follow-up for the treatment and control clients. The comparison between baseline and two periods

of follow-up was completed for the overall group, and between clients in the treatment group and clients in the control group

The instrument used to assess nutrition knowledge in direct care staff was a 20-item nutrition test developed by the researcher. Staff were divided into two groups based on whether they worked in the treatment group homes or the control group homes. The treatment group staff received a 3-week nutrition education curriculum; the control group staff did not receive the curriculum. The nutrition test was administered to the two groups of direct care staff prior to the nutrition education curriculum, directly following the curriculum, and again 10 weeks later, at the end of the study. Mean values were calculated from the nutrition test for pre-test, post-test, and post-test 2 for both groups. The t test analysis was used to test for significant differences between scores on the pre-test, post-test and post-test 2 for the staff treatment group and the staff control group.

Conclusions

From the results of this study, the following conclusions were drawn:

1. Clients in the treatment group significantly improved their dietary intake from baseline to the second follow up when compared with clients in the control group.
2. Clients in the treatment group showed no significant changes in anthropometric measures from baseline to follow-up when compared with clients in the control group.
3. HDL-cholesterol showed a significant improvement for treatment group clients from the baseline assessment to the end of study follow-up assessment.
4. After completion of the nutrition education curriculum, the staff in the treatment group homes were observed to be better able to provide clients with intakes recommended by the US Dietary Guidelines when compared with staff in the control group homes.

5. Average scores on the first post-test for direct care staff in the treatment group were significantly greater than average scores on the first post test for staff in the control group following a nutrition education curriculum.
6. Nutrition education training for direct care staff in ICF/MR group homes can have an acute effect on clients dietary intake and clinical markers for disease risk.
7. Providing direct care staff with nutrition education training is an effective way to improve their nutrition knowledge in the short term, as well as the nutritional status of the clients with mental retardation they provide care to.

Recommendations

This research assessed the nutritional status of a group of clients with mental retardation living in ICF/MR group homes and the effect of nutrition education for direct care staff on the nutritional status of these clients. As a result of the findings of the study, the following recommendations are offered for the development and study of adults with mental retardation living in group homes, and the staff that are their care providers.

Research efforts are needed to establish anthropometric standards specific to adults with mental retardation. These would include, but not be limited to, norms for percent body fat, waist to hip ratio, multi-site skinfold measurements, and norms for healthy weight ranges for both ambulatory and non-ambulatory individuals, in order to provide ongoing evaluation of the nutritional and health status of these individuals. Because of the lack of current standards for this population, baseline values serve as the control by which changes are measured.

The needs of each ICF/MR group home vary according to the functional level of the clients and the skills of the direct care staff. Providing written materials and staff

training and conducting cooking classes and grocery shopping tours, are activities to address staff training needs while improving the quality of nutritional care for the client with mental retardation.

Clients living in group homes should be provided with nutritionally well-balanced meals in the quantity that meets their daily caloric requirements. Meals for clients should be modified to meet the health care and medical needs of the individual. In addition, nutrition training strategies are needed for staff working with mentally retarded adults in group homes, that will assist staff follow the US Dietary Guidelines recommendations.

This training should be long-term, comprehensive, and provide staff with appropriate resource materials, and may involve a quality assurance system to ensure that nutrition goals for clients are met. It is also recommended that The Food Guide Pyramid be used in training staff how to plan and prepare nutritionally appropriate diets for clients living in ICF/MR group homes.

Materials used for the nutrition education curriculum in this study will be put into a training format and recommendations to the administrative offices of RHA, Inc. will be made for distributing these materials to other units throughout North and South Carolina. Recommendations will be made to the corporate offices of the company involved in the present study to provide regular, ongoing nutrition education for direct care staff. This could be part of the regular training module currently in place within RHA, Inc., or as part of a special training segment for interested staff. An incentive could also be provided for staff that complete nutrition training, to encourage all staff to participate.

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APPENDIX A
NUTRITION KNOWLEDGE TEST

Nutrition Knowledge Pre- Post Test for Direct Care Staff

1. The USDA recommends we limit our fat intake to no more than what percentage of our total daily calories?
 - a 10-20%
 - b 30%
 - c 45%
 - d 50-60%

2. Where can you find information about the fats in foods?
 - a cookbooks
 - b food labels
 - c consumer sections of the supermarket
 - d all of the above

3. What is a key in low-fat cooking?
 - a using coconut oil to give food flavor
 - b lower-fat cooking techniques
 - c using butter instead of bacon fat
 - d leaving the fat around the meat before cooking

4. What are some examples of saturated fats?
 - a butter
 - b lard
 - c bacon and meat fat
 - d all of the above

5. What are some examples of low-fat oil choices?
 - a safflower, canola, peanut oils
 - b coconut oil
 - c palm oil
 - d none of the above

6. Many dairy products are high in fat and cholesterol. But they contain valuable nutrients. What are they?
 - a calcium and protein
 - b vitamin A and vitamin K
 - c B complex vitamins
 - d minerals and trace elements

7. How can we tell if a food has cholesterol?
 - a it is solid at room temperature
 - b it comes from a plant or vegetable source

- c it comes from an animal source
- d it is high in calories

8. Almost all fruits and vegetables are low in fat. What is one exception?

- a potatoes
- b avocado
- c bread
- d banana

9. Don't add oil to the water before cooking pasta. Why?

- a pasta will slide off the spoon when testing for doneness
- b pasta will break up in hot water when oil is added
- c oil adds fat, and coats the pasta making sauces slide off
- d oil will change the taste of the pasta after cooking

10. Which of the following cuts of meat is lowest in fat

- a. short ribs
- b. ground round
- c. liver
- d. pork blade roll

11. Which is the healthier popcorn selection?

- a. microwave butter-flavor
- b. hot air-popped popcorn
- b. reduced-fat popcorn
- d. caramel popcorn

12. What is the most common health problem from eating too much sugar?

- a. obesity
- b. diabetes
- c. tooth decay
- d. heart disease

13. Of the following options, what would be a healthier selection in a fast food restaurant?

- a. choose regular burgers instead of quarter pounders
- b. select diet soft drinks instead of regular sodas
- c. skip the cheese, sauces and dressing. Add lettuce and tomato instead
- d. all of the above

14. Choose the one item below that could be substituted for 1/2 cup lima beans.

- a. 1 cup string beans
- b. 1/4 cup cottage cheese

- c. 1 slice whole wheat bread
- d. 1 medium apple

15. Your client won't eat his breakfast egg. What could you offer him instead?

- a. 1 tablespoon peanut butter
- b. 1/4 cup canned tuna
- c. 1 oz. cheese
- d. all of the above would be an appropriate substitute for 1 egg.

16. When reading ingredients on food labels, the main ingredient or the one in the largest amount is listed

- a. last
- b. first
- c. in bold print
- d. on the front of the box

17. Fresh cooked vegetables are important to include in our daily diet because vegetables a. are low in fat and cholesterol

- b. are an important source of fiber
- c. contain many vitamins and minerals that our bodies need
- d all of the above

18. How can you change the way you cook to help lower your cholesterol?

- a. choose lean meat, fish, poultry, dry beans and peas.
- b. before cooking trim excess fat from meat and remove skin from poultry
- c. avoid fried foods. Broil, bake, or roast instead.
- d. all of the above

19. What is one of the three major nutrients in food, provides about 4 calories per gram, is found in foods from the milk and meat exchange lists?

- a. protein
- b. fat
- c. sugar
- d. sodium

20. What is an indigestible part of certain foods, usually those from the starch/bread, vegetable and fruit exchange lists, and is important in the diet a roughage or bulk?

- a. fiber
- b. minerals
- c. triglycerides
- d. sugar

APPENDIX B
FOCUS GROUP DISCUSSION GUIDE

Focus Group Discussion Guide

Focus group interviews were the preliminary research step in the design and development of a nutrition education curriculum used with direct care staff in this study. The focus group participants were 34 direct care staff members, currently working in the ICF/MR group homes included in this study. These staff members participated in one of four focus groups conducted between June 20th and July 18th. The focus group interviews were scheduled during the time that a regularly scheduled staff house meeting was held. This was done to allow direct care staff to participate in the focus groups during working hours and during a time period that was established for staff to be free from any other duties. Each group was tape recorded and carefully analyzed.

The focus groups were characterized by homogeneity as all members were direct care staff, working in the same unit of group homes, with similarities as to education and age. Males and females participated in the focus groups, as both genders are responsible for all aspects of client care in the group homes. Each focus group contained 6 to 9 participants, so that everyone had an opportunity to share insights as well as allowing diversity of perceptions. Four focus groups were conducted in a series over a four week period with direct care staff member participating in only one group. Participants were informed at the beginning of the focus group as to the purpose of the discussion. The purpose of the focus group testing was to produce qualitative data that would provide insight into the attitudes, perceptions, and opinions of participants.

Using information described by Krueger (1994) and a review of focus group interview techniques by Basch (1987), a discussion guide was developed by this researcher, consisting of a series of open-ended questions pertinent to the purpose of

the study. Questions were arranged in order from general to specific, to establish the context for specific questions created first by the more general questions. In addition to topics that participants felt would enhance their job of caring for the nutritional health of mentally retarded clients, responses were also elicited regarding format and types of materials that staff members would like to see in a nutrition education curriculum. The following is the focus group discussion guide and summaries from the group transcripts from the four focus groups conducted with direct care staff.

Discussion Guide Used For the Focus Group Interviews

Introductory Question: Tell us your name and what home you work in; tell us one thing you enjoy doing.

1. What are your concerns regarding clients' health in the group homes?
2. A number of concerns have been mentioned. Now, think about clients' nutritional health, what they eat, how they feel, how they enjoy what is prepared for them. How do these things compare with the other issues already mentioned?
3. Tell us about what you think is your responsibility regarding clients' diets and food intake?
4. What do you think you could do to help clients' eat healthy foods, or foods that they enjoy that are good for them as well?
5. What are the best ways to find out how to make sure clients' are eating a healthy diet?
6. What are the best ways to find out what foods make up a healthy diet?
7. What are the things in our lives that could make it easier for us to be healthy and enjoy eating good food?

This is a list of some topics that might have some interest to you in helping our clients eat a healthy diet. As I read through this list, please feel free to comment on

what importance any of these things might have for you in helping our clients feel healthier.

Portion Control	Grocery Shopping	Menu Planning
Dietary Standards	Client participation in meal planning	
Food Groups	Food Guide Pyramid	

8. Let's summarize the key points of our discussion. Does this summary sound complete? Do you have any changes or anything else to add?
9. The goal is to find out what kind of training will provide you with the tools necessary to enhance clients' nutritional health. Have we missed anything?
10. What kind of ways would you be interested in having training materials presented? Do you think visual information is better than listening to information? What ways might help you learn about new topics the best?
11. What advice do you have for us?
12. What do you think direct care staff can do to help clients' eat healthier and better?

The following are typical comments made by staff during the focus group interviews.

"Clients get so tired of eating cheese sandwiches or meat salad sandwiches. Some weeks they get a sandwich every day." (Bernice)

"If they (clients) don't like what is served for supper they (clients) don't have any other choices, so we have to make them a peanut butter and jelly sandwich." (Twanda)

"I am used to frying everything and I don't know how else to cook chicken or meat any other way. If you don't fry it, it don't taste right." (Hattie)

"All the vegetables they (clients) eat are canned and the only fresh fruit is bananas" (Kenny)

"Any way that breakfast could be different that the clients would eat would help me out." (Sabrina)

"Recipes need to be easier to prepare. When they get too hard to follow, I cook it the way I do it at home." (Barbara)

"I think skim milk tastes like water; I just can't drink the stuff, and I am sure not going to give it to my clients." (Marilynn)

APPENDIX C
FOCUS GROUP RESULTS

Results From the Focus Group Interviews

In each of the four focus group sessions, direct care staff cited a number of issues that they felt affected clients' nutritional health and food intake. The most common concerns from all focus groups were summarized as follows:

1. portion control for clients, especially those clients on restricted diets, i.e. for weight gain or loss;
2. giving the clients the foods they like to eat;
3. menu variety, especially lunch menus;
4. how to substitute foods using the food exchange system;
5. healthy snacks for clients;
6. acceptable reinforcers, especially those foods used for behavior control;
7. low-fat cooking techniques.

Staff were interested in client's enjoyment of the foods they eat, and expressed concern about providing as much variety as possible for their clients. Many staff members felt they lacked the ability to determine what constituted a healthy diet, and admitted they felt comfortable when they had a predetermined menu to follow. They also said that the recipes they used to prepare clients' meals were not the way they cooked at home, and often times staff would modify cooking directions to make the food more tasty or appealing so clients would eat it. Staff agreed that the toughest part of their job concerning clients' diets was making substitutions using the food exchange lists, and requested an easier and quicker way to do this

Members of the focus groups felt as though frying food was the best way to make food taste good, and oven-baking or broiling dried food out. Vegetables were rarely cooked without fat, and canned fruits and vegetables were used for all meals. Snack options were usually cookies or chips, and no one suggested fruit, yogurt, or cereal as

an alternative snack for the clients. Most of the staff members agreed that a difficult part of their job concerning client's diets was making substitutions when clients refused a food item or a meal, and requested an easy, quick way to do this. Milk was believed to be a beverage like water or Koolaid, and staff would allow clients extra milk at meals. Often iced tea was used to replace milk because staff thought the clients liked sweet tea better. Staff used whole milk for the clients because they felt it was more nutritious than lower fat milk.

The participants thought that better eating habits would make one feel better or healthier. Participants believed that changing eating habits depended a great deal on individuals choice and that preventing health problems, looking better, feeling better, and living longer were considered motivators for making changes in food and eating patterns. Group members thought that healthy food choices, basic nutrition, incorporating fiber in diets, snacking, new ideas for preparing tasty foods, and cooking were appropriate topics.

Staff participating in the focus group interviews thought that some of the best ways to introduce nutrition topics included lessons with demonstrations, workshops with slides or videotapes, and one-on-one instruction. Staff felt that developing menus with the unit's dietitian would also give them the opportunity to help select the foods the clients liked best while staying within nutritional guidelines for a healthy diet. Most participants requested that nutrition education be fun and upbeat, and present information that could be directly applied to their jobs and families. Participants felt that nutrition education should be an on-going part of their job training, as food is an important part of clients' lives, and the staff participating in the focus groups had minimal training or knowledge in this area.

The focus group technique worked successfully with direct care staff in ICF/MR group homes as a means of identifying concerns and opinions about nutrition, health, and nutrition education needs. The input from the staff participating in the interviews was helpful in planning the nutrition education curriculum. The focus group interviews were useful as an initial step in determining what kind of nutrition information staff in these group homes felt was important for the clients they care for. Focus group interviews were a convenient and direct method of getting information about staff training needs. This method allowed participants to verbally express their beliefs and opinions in a safe setting. While a written questionnaire may provide more quantitative data, for this group of individuals, a written format may prevent individuals from responding as completely and easily as they were able to do during the focus group interviews. During this focus group process, this researcher found it helpful to offer suggestions at times, to which participants were able to respond, rather than relying completely on open-ended questions. It seemed that for this group of individuals, there were instances when suggestions gave participants a better way of providing input.

The focus group technique worked successfully with direct care staff as a means of identifying concerns and opinions about health, nutrition, and nutrition education. The input of the staff interviewed was very helpful in planning a nutrition education curriculum for direct care staff. It is important to remember that the generalizability of the focus group information depends on how representative the focus groups are of the target population.

APPENDIX D
STAFF NUTRITION EDUCATION CURRICULUM

Nutrition Education Curriculum for the Staff Treatment Group

Learning Objectives for Sessions 1 and 2

This session introduced nutrition by discussing the nutrients needed by the body to maintain good health. The role of calories, protein, carbohydrates, and fats in the body was explained.

Session Objectives:

1. Explain what kinds of foods supply calories and nutrients.
2. Explain the differences between complex and simple carbohydrates.
3. Discuss saturated and polyunsaturated fats and their effects on the body.
4. Explain the basic food groups.

The following questions were used for group discussion:

1. What foods do you think are nutritious and which ones are not?
2. What effect do you think each of the four food groups have on your body?
3. Are there factors other than nutrition which contribute to your health?

Post-session discussion consisted of the following questions:

1. What are some of the foods that supply good nutrients to your body?
2. Why are complex carbohydrates better for you than simpler carbohydrates?
3. What effects do saturated and polyunsaturated fats have on your body?
4. What are the four basic food groups?

Learning Objectives for Sessions 3 :

1. How to determine the grams of fat you can consume each day and stay within the recommended 30% or less of calories from fat..
2. Where most fat comes from in a typical diet.
3. How different oils compare in terms of saturation.
4. How to enjoy meat and poultry but still keep fat intake reasonable.
5. How to evaluate "lite" foods. What companies mean by "lite" food.
6. How to judge if a food contains cholesterol without even reading the label.
7. How to use seafood to cut fat. Seafood is lower in fat than beef and pork, but some types of fish have ten times more fat than others.
8. Menu modification from the "average American diet" to a low fat diet.
9. Practical guidelines for grocery shopping and reading labels.
10. Low fat cooking techniques

Learning Objectives for Session 4

This session was based on increasing the use of fresh fruits and vegetables in the daily diet. Five a Day: The Produce Revolution was the topic, and included a 35 minute video and study guide. Information centered on practical ways to incorporate five servings of fruits and vegetables in an average diet.

1. How to see beneath the skin and select the best quality in fruits and vegetables from apples and citrus fruits to leafy greens and sweet potatoes.
2. How to use color as a nutritional guide.

3. Which fruits and vegetables offer the most nutrition and which are overrated.
4. Why health experts recommend at least five servings daily of fruits and vegetables.
5. How fruits and vegetables protect one's health.

Handouts included 25 ways to add fruits and vegetables to the diet; serving sizes; the ten most popular fruits and vegetables; and a guide to fruit and vegetable shopping.

Learning Objective for Lesson 5

This session centered around the theme of "Junk Food: Nothing To Snickers About".

Learning objectives were:

1. nutritional information to look for on labels;
"What's On The Label?"
2. examining the nutritional value of common snack foods;
"Nothing To Snicker About"
3. sugar and tooth decay;
"Candy Isn't Dandy"
4. how the body uses food for energy;
"Metabolism: How The Body Uses Energy"
5. a guide to healthy snacking;
"A Guide To Healthy Snacking"
6. fast food choices for healthier eating;
"What Should I Eat?"

This section included a 45 minute video and four exercises for the group to complete, review and discuss. Review Questions on each segment were scheduled during the last 40 minutes, and handouts were given to the group with simple, entertaining information about each of the topics covered.

Lesson 6

This section was titled "Heart and Soul: Facts and Foods For Your Health". The focus was on lowering fat, cholesterol, and sodium intake, especially for those individuals who tend to eat a traditional soul food diet.

Objectives of this session were:

1. Risk factors for heart disease;
2. Foods black families eat that may increase the risk for heart disease;
3. How cholesterol causes heart disease;
4. Ways to reduce the risk of heart disease;
5. Healthy shopping;
6. Healthy substitutes to use in preparing traditional foods.

The information was presented in a 50 minute video, through hands-on food preparation, and with a take-home booklet of recipes using the modifications described in this session.