THE IMPACT OF OSTEOPOROSIS TRAINING
ON PROFESSIONAL CARE STAFF’S OSTEOPOROSIS KNOWLEDGE AND
BELIEFS: A COMPARISON GROUP DESIGN AT A FACILITY FOR ADULTS
WITH INTELLECTUAL DISABILITY.

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A proposal submitted in partial fulfillment
of the Master of Science in the School of
Public Health-Bloomington
Indiana University
May 2014
Accepted by the Graduate Faculty, Indiana University, in partial fulfillment of the requirements for the degree of Master of Science.

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Acknowledgements

There are many people to whom I am grateful for their professional support and expertise. Without their guidance this project would not have been successful.

First, I thank my thesis advisor, Bryan McCormick, Ph.D., who spent countless hours providing support, reviewing my work and providing input. Bryan is known internationally as an expert in Recreation Therapy and it was an honor to have the opportunity to learn from him.

Next, I thank my thesis committee members Jennifer Piatt, Ph.D., and Marieke Van Puymbroeck Ph.D. These respected experts in Recreation Therapy provided me with excellent suggestions and feedback.

In addition to the scholars, I wish to thank the various leaders at the Northern Virginia Training Center (NVTC) who helped to make the implementation of this research project happen. This includes Mark Diorio Ph.D., Facility Director; Andrew Becker M.D., Director of Health Services; Joe Rajnic, Director of Residential Services, Cheryl Wacker, Director of Training; and Glenna Darlington, Training Coordinator. I will treasure this positive memory as we approach the closing of NVTC and begin a new chapter in our professional lives.

I have tremendous gratitude for my clinical colleagues, Mary McKay PT and Barbara Whitehead RD, who helped to develop the training workshops and were co-presenters at the enhanced workshops. I value and respect their clinical expertise. This project would not have been possible without them. I hope we will be able to work together on this topic in the future.

Although mentioned last, I commend my husband Bill most. He stuck with me through all the stages of this project, praying for my success and supporting me as I focused on my graduate work when he may have wanted me to focus more on him and our kids.
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CHAPTER 1-INTRODUCTION

The purpose of this study is to examine the impact of osteoporosis (OP) training on the knowledge and beliefs of employees who are caregivers to adults with moderate to profound intellectual disabilities (ID). The primary focus is to determine whether the provision of OP training for these staff will result in greater and more accurate employee knowledge and beliefs about OP. A comparison group design was utilized in order to examine two different models of employee OP training (active treatment) and to gain understanding as to which model may be most effective in contributing to increased employee knowledge and accurate beliefs regarding OP.

Background Information Regarding Osteoporosis

OP is considered a chronic disease that has become not only a serious national concern but also a major global health issue. It can be defined as “a disease characterized by low bone mass and structural deterioration of bone tissue, leading to bone fragility and an increased susceptibility to fractures” (National Osteoporosis Foundation, 2011, p.1). In 2004 the Surgeon General released a comprehensive report on bone health and OP for the first time. Since then, various organizations, such as the United States Bone and Joint Decade, the National Osteoporosis Foundation, and the World Health Organization have launched efforts to provide public education in an effort to reduce the prevalence of this disease. The statistics regarding prevalence are staggering. The Surgeon General’s report indicates that it is estimated that “10 million Americans over the age 50 have osteoporosis” and “another 34 million are at risk” (U.S Department of Health and Human Services, 2004, p.v). The instances of OP are expected to increase drastically as the
population ages. It is estimated that there will be 61 million cases of OP by year 2020 (Gueldner et al., 2008).

For years, it was believed that OP was an inevitable part of aging and little could be done to prevent its devastating results. Due to advances in research and medicine, we now know that OP is preventable and treatable. This fact supports the call to action for effective OP education. One of the most common risks associated with OP is fracture.

While it has been noted that over 50% of adult U.S. citizens over the age of 50 are likely to be at risk for fractures as a result of OP by the year 2020, action can be taken by these individuals who are at risk, as well as doctors and other health care providers to reduce this risk of fractures due to low bone mass. Initiative must also be taken on a larger scale within health systems, and by policy makers (U.S. Bone and Joint Decade, 2008). Other statistics indicate that 1.5 million people suffer a fracture related to OP each year, of the senior citizens who suffer a hip fracture, 20 percent die within the first year, and that fractures related to OP will occur in one out of every two women over 50 (U.S. Department of Health and Human Services, 2004). It is unfortunate that this debilitating disease is increasing in frequency when it is now known that OP is preventable and treatable.

Relevance to Direct Care Settings

In settings where employees provide direct care to consumers with ID and physical disabilities, administrators and supervisors often have an interest in developing and maintaining a workforce with healthy lifestyle attitudes and behaviors. It is hoped that the outcome will translate into fewer days absent from work, reduced injury, high quality of work, and reduced healthcare costs. Researchers have estimated that close to
70 percent of the cost of health care is attributable to illnesses that are preventable (Fries et al., 1993). In terms of the national expenditures related to OP, researchers have indicated that the cost is close to $17 billion and is expected to rise to $51 billion by 2040 (Melton et al., 1997). While this study was designed to primarily explore only knowledge and beliefs concerning OP, it is believed that positive changes in employee health knowledge and beliefs and awareness will result in positive outcomes regarding healthy life choices. While it is beyond the scope of this study, effective health education sessions delivered to employees, may also benefit the consumers supported by those employees, as the employees may become more aware of how the health issue may impact those consumers and may learn tools and strategies to facilitate bone healthy behaviors in those consumers. Facilitating accurate knowledge and beliefs about OP is a challenge, particularly in large facilities where specific staff-to-client ratios are required and staff must provide constant supervision of clients. Another challenge at facilities that provide 24-hour care to the individuals they serve is that multiple employee work shifts are needed to provide the level of care needed by the individuals served. It is of key importance for training to be cost and time efficient. At the same time, however, the efficiency is of little value if the training does not produce the desired learning outcomes.

General Overview of the Study

Statement of the Problem

The problem addressed in this study was to determine the best method of providing OP training and the most current and appropriate content of the training, in order to effectively facilitate positive change in care staff’s health knowledge and beliefs as they related to OP.
Objectives

General objectives for the study were to:

- Gain information as to how to efficiently and effectively facilitate accurate OP health knowledge and beliefs among direct care staff.
- Help employees understand that the individuals with ID that they support may be at greater risk for developing OP than the general population.
- Provide direct care staff with basic knowledge of ways they can promote bone health for themselves and the individuals with ID that they support.

Basic Design

A comparison group design was utilized in order to examine two different models of employee OP training and to gain understanding as to which model may be most effective in contributing to increased employee knowledge and accurate beliefs regarding OP. Intact groups of employees were randomly assigned to two independent variable training conditions. Pencil and paper pre and post-tests were administered to participants in both training conditions immediately before the training and immediately after the training in order to measure the differences in employee knowledge and beliefs regarding OP. In addition, employee self-efficacy scores were collected by use of a self-efficacy scale, administered at the conclusion of the training.

Research Questions

Specifically, this study sought to answer the following research questions:

1. Will an enhanced OP education workshop for professional care staff, which is built upon the Health Belief Model (HBM) and Social Cognitive Theory (SCT), and using
multiple evidenced-based instruction methods and teaching techniques, have a
significant positive impact on staff’s OP knowledge and beliefs?

2. Will OP education consisting of a DVD presentation paired with an outline
containing leading questions have a significant positive impact on staff’s OP
knowledge and beliefs?

3. Is there a difference in the impact of the two training approaches?

4. What OP self-efficacy scores will be reported at the conclusion of the employee
training and is there a significant difference in the self-efficacy scores of the different
treatment groups?

Purpose of Study

The purpose of this study was to examine the impact of OP training on the OP
related knowledge and beliefs of staff who are caregivers to adults and senior adults with
significant ID and other disabilities. Due to current statistics regarding the prevalence of
the disease and its devastating consequences if not treated, the disease is considered a
major health threat. Concerns about increasing cases of bone loss or OP may be more
pronounced within healthcare settings. There is some evidence that individuals with
disabilities may be at higher risk for developing OP than the general population (Center,
1998).

Setting

The setting of this study was the Northern Virginia Training Center (NVTC), a
facility for adults with severe to profound ID as their primary diagnosis. Many of the
individuals who live at NVTC also have physical limitations and behavioral challenges.
NVTC, located in Fairfax, Virginia, employs over two hundred employees who work
directly with the individuals who reside at the facility, as caregivers. Knowing how to efficiently and effectively facilitate accurate health knowledge and beliefs among staff is of interest and concern to the administrators of this facility. This is primarily due to three factors. First, the job responsibilities of the caregivers involve a high frequency of physical labor and therefore the physical health of the employees is a key concern. Second, administrators are committed to providing the best training and supporting healthy lifestyles for the employees but this is often logistically difficult to accomplish. Third, the facility leaders want to expand the understanding of the employees that the individuals with ID who they serve, may be at greater risk for developing OP then the general population. Identified risk factors for OP are prevalent among the consumers served at this facility for adults with ID and other disabilities. These risk factors include being non-ambulatory or engaging in limited weight-bearing activity, using seizure medications and/or other necessary drugs that are known to deplete the body of calcium, limited time out of doors and therefore possible vitamin D deficiencies, menopause and other age related factors.

Because of these factors, a goal has been established to ensure that the foundational knowledge and beliefs of employees about OP are accurate and they understand ways to promote bone health for themselves and for the individuals with ID they support. The results of this study will provide leaders at NVTC with information that may be helpful in further understanding how to efficiently and effectively facilitate employee health knowledge and belief changes and set guidelines for workshop development.

Providing OP training that involves watching a DVD about OP, and providing an
outline to complete, could be easily implemented and would be most efficient from a cost and time perspective. However, DVD instruction may not be as effective in terms of learning outcomes, as providing a multi-instruction method workshop built upon the HBM, the SCT and utilizing evidenced-based teaching techniques with adult non-traditional learners in mind. It may be possible to improve the effectiveness of a DVD-based training by integrating strategies such as the use of a leading question, fill in the blank type form which the subjects complete while watching the instructional DVD.

Significance of Study

While much research has been conducted in the area of OP, health education, adult learning, and employee development, limited research could be located that addresses the education of staff with the goal of facilitating OP knowledge and belief changes. No prior studies were found that pertained to OP education for the population of staff who provide direct care to adults with severe to profound ID and secondary disabilities.

This study is of value in that it attempted to extend the understanding of the topic of OP employee training, within this unique setting and with this population. Because the setting and subjects involve a unique healthcare environment and caregiver role, this study is most applicable to similar healthcare settings. The design of this study did not include random assignment by individual but does randomly assign by intact employee groups and therefore does not provide for wide generalization. This study provided indication as to how to most effectively provide OP training to staff that provide direct care to adults with ID, including information about how to facilitate employee health knowledge and accurate health beliefs related to this topic. Insights were gained to help
administrators understand the participants’ efficacy beliefs concerning adopting bone healthy behaviors.

In addition to addressing the topic of effective employee training, this study was useful in increasing the awareness of OP, which is now considered a major health threat. The prevalence of OP is increasing dramatically. One way to begin to address this threat is for facilities to provide effective training to their employees regarding the risk factors for OP and preventative behaviors they can incorporate into their lives that are known to improve bone health. Given the risk factors for this disease, it is of extreme importance that employees who work with aging adults, specifically those with ID and physical disabilities, be aware of these risk factors and ways to enhance bone health. Since people with ID and other disabilities often possess more of the OP risk factors, educating the staff supporting these individuals with ID is extremely important.

Last of all, this study may prove useful in extending the testing of the specific assessment tools to be utilized in this research project. Although these tools have been utilized in other studies (Horan, et al., 1998; Kim, et al., 1991; Kim, et al. 1998; Piaseu, et al., 2001), they have not been utilized with employees who provide direct care to individuals with ID.

Relevance of the Study to Recreation Therapy

Healthcare has experienced a paradigm shift in the last few decades in that it has changed from having a focus mainly on disease and treating disease to a focus that is more holistic. The shift has brought health promotion and preventative interventions into the foreground rather than the background. This has resulted in creating new opportunities for Recreation Therapists (RTs) to become highly contributing members of
the health promotion/health prevention healthcare team. These views are asserted by Shank & Coyle (2002) who indicated that “there is increasing attention to health promotion programs, and rehabilitation services are emphasizing the prevention of secondary health conditions (p. xiii). They go on to say that the focus changes are good news for RTs because they “represent opportunities for Therapeutic Recreation (TR) Professionals to be valued and contributing members of healthcare and human service systems” (p. xiii). They do stress, however, the importance of RTs being “knowledgeable and skilled professionals who will practice with integrity, thoughtfulness, and discipline” (p. xiii). To implement a successful OP education program, which is a form of health promotion and a preventative intervention, RT’s must ensure that they are not only knowledgeable of RT principles and practices but they must also develop a strong knowledge base, of the most current and accurate information about OP, as well as evidenced-based interventions for OP prevention and treatment that are appropriate for implementation by RTs.

OP is a serious health condition that is expected to increase in prevalence in the years ahead due to factors including a lack of knowledge and accurate beliefs about the condition, and a lack of tools or skills to address prevention of the condition or treatment of the condition, for those who already have bone loss. To be more specific, if people do not recognize what the risk factors for OP are and/or realize their susceptibility, they may not realize how important it is for them to make lifestyle changes to promote their own bone health, and would not be inclined to do so. This information helps to validate the importance of this study. Not only is it important for staff, who are caregivers to people
with ID, to have knowledge about OP, it is also important for staff to learn preventative or treatment steps they can take to improve their own health.

*Typical Interventions*

The two evidenced based clinical interventions generally provided for effective OP treatment involve weight-bearing activity and the intake of recommended amounts of calcium and vitamin D. These two interventions are appropriate for implementation by RTs who have gained substantial education and experience regarding OP and interventions for OP. Other inventions such as surgery or prescription medications are provided by medical doctors and not appropriate for implementation by RTs.

Exercise and diet interventions can be effectively and appropriately designed and implemented according to evidenced-based practice, by RTs as well as other therapists with background in anatomy and physiology, exercise and nutrition. It is important, however, that RT’s and other therapists gain considerable knowledge of and experience in planning and implementing these interventions and be certain to confirm findings available through current research. For example, based on the most recent research, dietary associations may update their guidelines as to the recommended dietary allowances of calcium or vitamin D. Similarly, other professional organizations such as the National Osteoporosis Foundation may make changes to recommendations about physical exercise to maintain bone health. RTs may effectively provide their services in the basic education, exercise, or dietary components of OP intervention. Physical activities involving weight bearing can be effectively planned and implemented by RTs and include interventions such as walking, jogging, various types of dancing, golf, tennis, and other active endeavors that involve supporting ones weight. Adding a resistance
component to exercise is also recommended, such as using elastic bands, or walking while holding weights. Diet oriented interventions that RTs may implement include nutritional education workshops, smart shopping groups (which include how to interpret a food label), cooking classes, and games focused on choosing foods rich in calcium. Outdoor activities providing exposure of participants to sunlight, will naturally activate the production of Vitamin D through their skin, and are also recommended.

*Value of Multidisciplinary Collaboration*

An effective way to help ensure a broad knowledge and experience base, when developing an OP prevention program, is to employ a multidisciplinary approach. This particular project was strengthened by the collective education, experience and skills of a Certified RT, Physical Therapist (PT), and Registered Dietitian (RD). This approach is valuable because each clinician comes with unique areas of expertise adding to the quality of the program. Rather than compete with other clinical therapies, RTs may find it advantageous to collaborate on program development and implementation. This is particularly beneficial when addressing medical issues, as PTs generally have more medically oriented schooling at a graduate level. Obtaining a graduate degree in RT with a focus on clinical or medical settings is one way for RTs to expand their intervention repertoire into health promotion and health prevention for special population groups.

*Delimitations*

The scope of this proposed study was delimited to the following:

1. Organization of the employee-training workshop around the goal of facilitating increased employee knowledge and accurate beliefs related to the topic of bone health and OP.
2. Population consisting of 100+ employees at a residential facility for adults with severe-profound ID and secondary physical disabilities.

3. Voluntary participation of subjects from the population group who work during the morning or afternoon shifts.

4. Quasi-Experimental Design with intact groups of employees (based upon work sites) randomly assigned to either the multi-instruction method enhanced workshop or the DVD/Outline with leading questions instruction method.

5. The goal of 15 participants for each of the training conditions, for a total of 30 participants from the subject group.

6. Paper and pencil pre and post-tests administered to both treatment groups immediately before and after training.

Limitations

The following were limitations considered when interpreting the results:

1. No random assignment on an individual basis to intervention groups.

2. The DVD/leading question training sessions were conducted by one facilitator, while multiple professionals conducted the enhanced workshop.

3. Small sample size.

4. OP training workshops, used as active treatment in this study, have not been previously tested for effectiveness and therefore there is no known effectiveness information.

Assumptions

The basic assumptions of this proposed study were:

1. Employees of healthcare facilities serving individuals with ID are at risk for OP.
2. Individuals with moderate to profound ID and physical disabilities are at higher risk for OP due to additional risk factors.

3. Individuals with moderate to profound ID and physical disabilities tend to lead more sedentary lifestyles than the general population of the same age group.

4. Increased knowledge and awareness of OP may lead to positive individual health belief and lifestyle changes among direct care staff employed at this facility for adults with ID and physical disabilities.

**Hypotheses**

This study was designed to test the following null and alternative hypotheses:

**Null Hypothesis**

There is no difference in the OP knowledge, OP beliefs, and OP self-efficacy of the subjects in the DVD/leading question instruction method, and those of the subjects who received the multi-instruction method enhanced OP workshop.

**Alternative Hypothesis**

The OP knowledge, OP beliefs, and OP self-efficacy results of subjects who received the multi-instruction enhanced OP workshop indicate greater employee health knowledge and belief change, from pre to post test, than the test results of subjects who received the DVD/leading question instruction method.

**Definition of terms**

The following terms are defined for clarification purposes within this study:

**Osteoporosis.** A disease characterized by low bone mass and structural deterioration of bone tissue, leading to bone fragility and an increased susceptibility to fractures. (National Osteoporosis Foundation, 2011).
**Osteoporosis Knowledge.** The degree of accurate information employees know, as measured by the Osteoporosis Knowledge Test (Kim, et. al., 1991), about the characteristics and risk factors of osteoporosis and effective preventative actions they can take to prevent OP.

**Osteoporosis Beliefs.** Perceptions of employees regarding facts about OP that include risk reduction behaviors such as calcium intake and exercise, susceptibility and seriousness of the disease, and barriers and motivation to implement recommended preventative actions.

**Health Promotion.** Strategies utilized to educate people about the importance of, and ways to improve their health.

**Health Beliefs.** Perceptions of people regarding health related issues including risk factors, preventative measures, and views regarding health outcomes.

**Adult Learning Theories.** Theories that address or attempt to explain the unique ways that adults learn.

**Adult Learning Techniques:** Specific techniques, based on adult learning theories, which are utilized to help adults learn most effectively.

**Andragogy:** “The art and science of helping adults learn”. (Knowles, 1970).

**Enhanced Employee Workshop:** An employee training session that utilizes multiple evidenced-based instruction methods in a live format, built upon the HBM and SCT.

**Positive Impact:** Higher OP knowledge and belief test scores.
Osteoporosis Self-Efficacy: The degree of confidence an employee has, as measured by the Osteoporosis Self-Efficacy Scale (Kim, et. al., 1991), that he/she will implement physical activity and calcium intake to prevent OP.

Intact Employee Group: A group of staff members who regularly work together as a team in the same building.

DVD/Leading question Instruction Method: Employee OP training consisting of viewing the DVD entitled: Healthy Body Healthy Mind. Treating and Preventing Osteoporosis. Available from www.healthybodyhealthymind.com or from Information Television Network, Inc. at www.itvisus.com and paired with use of an outline which will include leading questions in which participants can fill in a blank.
CHAPTER 2-REVIEW OF THE RELATED LITERATURE

This chapter includes a review of literature about OP knowledge and beliefs. Pertinence of OP education to the population is discussed, as well as the theoretical foundations for this study. The theoretical foundations for this research project are based upon the HBM and SCT as they apply to Health Education. Key concepts within these models have been utilized to design the OP workshops, especially the enhanced workshop. A review of the key concepts within the HBM and SCT are included in this chapter. Finally, an overview of basic adult learning theory and general teaching techniques, which are supported through research, are also reviewed in this chapter. Evidence-based teaching techniques and strategies were integrated into the enhanced OP for the purpose of increasing the effectiveness of the workshop. A few evidenced-based strategies were also incorporated into the DVD based training.

Osteoporosis Knowledge and Beliefs

Advertisements we see on television or in pamphlets regarding OP and medications for the treatment of OP seem to reinforce the false belief that OP is a disease of elderly women. They show gray haired women in their golden years explaining the benefits of a particular OP medication. Most medical providers do not begin to recommend bone density testing for women until they are in most cases postmenopausal. Very little attention or advertising is given regarding the issue of OP in persons with disabilities, men, young adults, or in people taking particular medications that may put them at risk for the disease. As a result of a lack of education and outreach, many people may not realize that they have bone loss or are at risk for OP.

Common Myths
The National Osteoporosis Foundation published an educational document entitled “Ten Common Myths about Osteoporosis”, in 2011. Table 2.1 outlines the common myths that people have about OP.

Table 2.1: Common Myths about OP

<table>
<thead>
<tr>
<th>Myth</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Most people don’t need to worry about osteoporosis</td>
<td></td>
</tr>
<tr>
<td>Osteoporosis is only a problem for older Caucasian women</td>
<td></td>
</tr>
<tr>
<td>You don’t need to worry about osteoporosis if you break a bone from a serious fall or accident</td>
<td></td>
</tr>
<tr>
<td>People with osteoporosis can feel their bones getting weaker</td>
<td></td>
</tr>
<tr>
<td>An osteoporosis test is painful and exposes you to a lot of radiation</td>
<td></td>
</tr>
<tr>
<td>Children and teens do not need to worry about their bone health</td>
<td></td>
</tr>
<tr>
<td>If you drink a lot of milk and exercise, you are not a risk for osteoporosis</td>
<td></td>
</tr>
<tr>
<td>Osteoporosis isn’t serious</td>
<td></td>
</tr>
<tr>
<td>Taking extra calcium supplements can help prevent osteoporosis</td>
<td></td>
</tr>
<tr>
<td>Most people do not need to take a vitamin D supplement</td>
<td></td>
</tr>
</tbody>
</table>

(Adapted from National Osteoporosis Foundation, 2011).

Literature review pertaining to OP knowledge and beliefs

Several studies reviewed have investigated topics related to OP knowledge and beliefs. Cline & Worley (2006) surveyed 990 women and found that they could be clustered into three meaningful subgroups based on their similar health beliefs related to OP. Those in the first group believed that they were susceptible to OP, understood that there were many benefits to taking calcium, and perceived that there were few barriers to doing so. Those in the second grouping also believed that they were susceptible to OP
and that its consequences could be serious, however, they indicated that there were barriers that would significantly affect their ability to consume more calcium. In addition, they did not perceive many benefits to taking calcium. Those in the last group did not believe they were susceptible to OP, lacked strong health beliefs, and had very limited opinions regarding calcium intake (Cline & Worley, 2006). Wallace (2002) investigated the OP related health beliefs and behaviors in college women. The researchers found, through survey, that large numbers of women did not take the amount of calcium recommended by current health guidelines, nor did they exercise according to current guidelines. Doheny (2007) completed a secondary analysis of 218 women and 226 men who were healthy and lived in the community. These study participants completed a questionnaire about OP before having a bone density test. Bone density test results indicated that over half of the participants had abnormal bone density scores. Results pertaining to OP health knowledge indicated that the women’s knowledge of OP was low but the men’s knowledge was even lower. Regarding health beliefs related to OP, the women in the study believed that OP was a serious disease that could impact their quality of life and they also believed that they were susceptible. The men however, did not believe that they were susceptible or that OP was that serious. In terms of self-efficacy to engage in exercise, which is a preventative measure against OP, men were found to be more motivated and were confident in their ability to engage in exercise behaviors. Turner (2004) designed and implemented an OP prevention program and used the health belief model (HBM) as the theoretical foundation for the development of the training. The article noted some faulty beliefs that negatively impact bone healthy behaviors. These erroneous beliefs included “osteoporosis is not serious’ (p 116) and
“osteoporosis only happens to old women” (p. 117). These researchers indicated that while studies examining the design and implementation of OP education are limited, some literature regarding this topic is available. Examples include the studies of Sedlak, Doheny & Jones (2000) and Blalock et al. (2000). These studies both showed positive outcomes as a result of OP education.

Osteoporosis Education: Relevance to Direct Care Support Staff

The importance of OP education for employees who provide direct care support to individuals with severe-profound ID can be addressed from several perspectives. Some of these perspectives include individual employee health, costs associated with employee injury or illness, loss of employee work time due to injury or illness, and employee knowledge of OP as it relates to the specific risks, needs, and appropriate preventative measures pertaining to the individuals with disabilities who the caregivers support.

Impacts on Staff Health

In this setting where employees provide essential support to individuals with ID and physical disabilities, administrators and supervisors are eager to develop and maintain a workforce that demonstrates healthy lifestyle attitudes and behaviors. It is hoped that this outcome will translate into fewer days absent from work, reduced illness and injury, a high quality of work, and reduced healthcare costs. Researchers have estimated that close to 70 percent of the cost of health care is attributable to illnesses that are preventable (Fries et al., 1993). The national costs related to osteoporosis have been estimated to be close to $17 billion and researchers have indicated that this estimate is expected to rise to $51 billion by 2040 (Melton et al., 1997). NVTC has implemented an employee health education component, organized by the Commonwealth of Virginia, entitled Commonhealth. Brief health education sessions, posters, or brochures are
provided to educate employees about serious health concerns. Limited focus has been placed on the issue of OP and its seriousness and possible debilitating effects. Additional and more thorough OP education is needed in order for employees to understand the seriousness of this disease, the risk factors and the prevention and treatment choices that can be made.

Impacts on Client Services

While this study did not address behavioral change, it was hoped that the delivery of effective OP education sessions would benefit both the employees and the consumers with ID supported by the employees. Literature supports the finding that individuals with disabilities are at higher risk for developing OP than the general population (Center, et al., 1998; Jaffe, et al., 2005; Lohiya, et al. 2004; Schrager, 2004; Schrager, 2006; and Wagemans, et al. 1998). Because individuals with severe-profound ID, who often have secondary physical disabilities, often must rely on the support of care-givers to ensure that their daily needs are met, it is essential that caregivers are aware of the risk factors and preventative measures that may impact this population group. Schrager (2004) noted that women with disabilities have many risk factors for OP which may include being non-ambulatory, lacking weight-bearing activity, taking medications that increase bone loss risk, or engaging in a lifestyle that does not provide enough exposure to vitamin D.

Improvements and modifications to the support and treatment of consumers with disabilities who are at risk for, or have OP, may need to be made, due to the high risk for fracture. These may include adjustments to how the consumers are lifted or therapeutically positioned. In addition, increased weight-bearing and outdoor activities for exposure to sunlight may be indicated. Schrager (2004) reviewed studies of OP in
people with disabilities and concluded that the rates of OP and fractures due to OP were significantly higher than in control groups of the same age and gender. She noted that, “Fractures in people with cognitive disabilities present a very difficult management dilemma” (p. 433) because they may not be able to verbally indicate to caretakers that they are in pain. She also stated that Down syndrome seems to be an independent predictor for loss of bone density as well as an increased risk of fracture (Schrager, 2004).

Given the likelihood of the prevalence of OP among persons with disabilities, including those with ID, OP training for caregivers of these at risk individuals is needed. Schrager (2004) argued that “both patients and providers need more education about osteoporosis prevention” (p.433). It is important that care providers at NVTC have the information necessary to make bone healthy choices for themselves. It is also important that OP evaluation, prevention and treatment be emphasized at NVTC for the individuals with disabilities supported there. “Primary care providers and specialists need to prioritize osteoporosis prevention strategies when taking care of women with disabilities”, (Schrager, 2004, p. 431).

It is essential that caregivers are aware of the risk factors and preventative measures that may impact this population group, therefore, the importance of developing effective OP training workshops for employees who support individuals with severe-profound ID cannot be understated. Not only must care staff be trained, but facility wide environmental support must be provided to staff and consumers to facilitate recommended lifestyle changes.
A limited number of studies have addressed the design and implementation of OP education programs, such as Sedlak, Doheny & Jones (2000), Turner et al. (2004), Blalock et al. (2000) and Chan et al. (2007). This study, involving the design and implementation of OP training, built upon the HBM and the SCT and utilizing evidence-based teaching techniques in the design of the training conditions, is unique in that it aims to gather knowledge about how to most effectively provide OP training to adult employees who are caregivers to individuals with ID. No other studies were located that have addressed the design and implementation of an OP education workshop for this particular population group.

The Health Belief Model

The basic premise of the Health Belief Model (HBM) is that a person’s health behavior is influenced by the perceptions and beliefs that the individual has regarding the potential health risks and how effective a particular action would be in reducing the risk (Shank & Coyle, 2002). The HBM was originally developed in the 1950s by two social psychologists working in public health (Hochbaum, 1958). It was initially developed to explain a lack of involvement in disease prevention programs and why potential participants did not take advantage of free programs in their community. The original model was based on four constructs that represent the perceptions of threat and benefits. These four constructs included: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. The concept of cues to action was added to the model in that it was believed that cues to action would trigger or activate readiness to perform a health related action. Other literature further explains that

“if individuals regard themselves as susceptible to a condition, believe that condition would have potentially serious consequences, believe that a course of
action available to them would be beneficial in reducing either their susceptibility
to or severity of the condition, and believe the anticipated benefits of taking action
outweigh the barriers to (or costs of) action, they are likely to take action that they
believe will reduce their risks” (Glanz et al., 2008, p47).

The construct of self-efficacy was later added to the HBM in 1988 by Rosenstock,
Strecher, and Becker and involved the belief that one can successfully accomplish a
specific behavior in order to produce the desired outcome (Glanz et al., 2008).

*Application and Research studies based on HBM*

The HBM is one of the most widely used theories regarding health behavior
research. Much literature exists regarding studies that have been conducted based on the
HBM, such as a review of studies conducted from 1974-1984 to assess the performance
of the HBM (Becker, 1974; Janz and Becker, 1984). HBM scales have been utilized or
developed for several health conditions such as breast cancer screening behaviors
(Champion, 1984; Champion, 1999), and colorectal cancer screening behaviors (Rawl et
al., 2000). Intervention programs have been developed and evaluated using HBM
principles for at risk youth in regard to reduction of HIV behaviors related to drug use
and sexual behavior (Booth, et al., 1999). Studies using the HBM to address OP
education are limited, however. Two studies, regarding OP and the HBM were
previously described in detail in the separate literature review subsection pertaining to
OP.

*Application of the HBM constructs to Health Education*

The knowledge that people have about a particular health issue is one of the
factors that will shape their perceptions regarding the issue. The HBM supports the
notion, that to change health behavior, facilitators must understand the importance of the individual’s perceptions and beliefs about the health issue in question, in addition to transferring knowledge and skills. Specific training strategies have been suggested to facilitate health belief and behavior change. These strategies can be easily applied to training that specifically addresses the topic of OP.

Table 2.2 shows each basic construct of the HBM and defines each construct. It also provides useful suggestions as to how each construct may be applied to health education interventions. The applications listed in Table 2.2 were adapted to specifically address each of the HBM constructs as they relate to this OP education study and were used in implementation of the multi-instruction method OP workshop.

Other helpful suggestions are available regarding health intervention research and the application of findings. Based on interventions that occurred in the 1980’s, Rosen & Solomon (1985) suggest it is possible that “behavioral skills training works better for the young, while cognitive skills training works better for adults, or for more deeply ingrained health practices” (p.220). Evidence also suggests that a “far greater percentage of people successfully initiate, complete, and maintain risk reduction” when it is self-initiated and not a result of a formal program (Rosen & Solomon, 1985, p. 220). These two thoughts support the importance of self-determination in adult health education and the importance of focus on a cognitive orientation within health education programs.

Social Cognitive Theory

The social cognitive theory (SCT) is a revised and expanded version of the social learning theory developed by Albert Bandura (1977). The SCT has incorporated the self-efficacy component that was not present in the original social learning theory. This
<table>
<thead>
<tr>
<th>Concept</th>
<th>Definition</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived susceptibility</td>
<td>Belief about the chances of experiencing a risk or getting a condition or disease</td>
<td>Define population(s) at risk, risk levels. Personalize risk based on a person’s characteristics or behavior. Make perceived susceptibility more consistent with individual’s actual risk.</td>
</tr>
<tr>
<td>Perceived severity</td>
<td>Belief about how serious a condition and its resulting secondary effects are</td>
<td>Specify consequences of risks and conditions.</td>
</tr>
<tr>
<td>Perceived benefits</td>
<td>Belief in efficacy of the advised action to reduce risk or seriousness of impact.</td>
<td>Increase awareness of and define the benefits &amp; basic actions to take; clarify the positive effects to be expected.</td>
</tr>
<tr>
<td>Perceived barriers</td>
<td>Belief about the tangible and psychological costs of the advised action</td>
<td>Identify and reduce perceived barriers through reassurance, correction of misinformation, incentives, assistance.</td>
</tr>
<tr>
<td>Cues to action (triggers to initiate action)</td>
<td>Strategies to activate “readiness”</td>
<td>Provide more detailed how-to information, promote awareness, use appropriate reminder systems, simulated negative event, personal stories and outreach.</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>Confidence in one’s ability to take action</td>
<td>Provide training and guidance in performing recommended actions. Increase competence so confidence will increase. Use progressive goal setting. Give verbal reinforcement. Demonstrate desired behaviors. Reduce anxiety.</td>
</tr>
</tbody>
</table>

Source: Adapted from Glanz, 2008, p48.

theory has been successful as the foundation for interventions in various areas targeting health knowledge, belief and behavior change. This theory is categorized as an interpersonal level theory indicating that it supports the importance of the social environment in influencing health beliefs and behaviors of an individual and the individual also affecting the people in his or her environment. This process, called
reciprocal determinism, suggests that personal, environmental and behavioral factors all influence one another. One strategy given for health behavior change regarding this concept is to promote behavior change in multiple ways, including establishing an environment that supports the behavior change and taking actions that influence personal attitudes (Glanz, 2005). The SCT suggests that “human behavior is the product of the dynamic interplay of personal, behavioral, and environmental influences” (Glanz, 2008, p.170), and this is why the SCT expands the understanding of why and how people make individual health behavior changes as well as the influence of the social and physical environments. (Glanz, 2008). Table 2.3 outlines concepts contained in the SCT.

*Application of SCT constructs to Health Education*

SCT (Bandura, 1986) is a frequently cited and utilized theory to guide the development of health promotion programs. Several studies conducted systematic reviews of literature related to SCT and Health Education (Baban & Craciun, 2007; Budd &Volpe 2006; Lutes & Steinbaugh, 2010; Muchiri, 2009; and Jang & Yoo, 2012). What was common to each of these literature reviews was the aim of examining health interventions, especially including SCT-based interventions, in light of their use and effectiveness in modifying health risk behaviors or increasing knowledge, skills, and/or self-efficacy to modify these behaviors. Jang & Yoo (2012) focused on SCT based self-management programs for Koreans with hypertension and diabetes mellitus. From the twenty studies they reviewed, the SCT strategies most often used were skill mastery development and social and verbal persuasion. The authors noted that observational learning, one of the SCT concepts, was not used in any of the reviewed studies. Lutes & Steinbaugh (2010) reviewed 10 studies based on SCT pertaining to pedometer use. They
indicated that “based on the evidence, self-monitoring, goal setting, and feedback (constructs from SCT) should be core elements of any interaction” (p.151).

Table 2.3: Social Cognitive Theory Concepts & Definitions

<table>
<thead>
<tr>
<th>Concept</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reciprocal Determinism</td>
<td>Environmental factors influence individuals and groups, but individuals and groups can also influence their environments and regulate their own behavior.</td>
</tr>
<tr>
<td>Outcome Expectations</td>
<td>Beliefs about the likelihood and value of the consequences of behavioral choices.</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>Beliefs about personal ability to perform behaviors that bring desired outcomes.</td>
</tr>
<tr>
<td>Collective efficacy</td>
<td>Beliefs about the ability of a group to perform concerted actions that bring desired outcomes.</td>
</tr>
<tr>
<td>Observational learning</td>
<td>Learning to perform new behaviors by exposure to interpersonal or media displays of them, particularly through peer modeling.</td>
</tr>
<tr>
<td>Incentive motivation</td>
<td>The use and misuse of rewards and punishments to modify behavior.</td>
</tr>
<tr>
<td>Facilitation</td>
<td>Providing tools, resources, or environmental changes that make new behaviors easier to perform.</td>
</tr>
<tr>
<td>Self-regulation</td>
<td>Controlling oneself through self-monitoring, goal setting, feedback, self-reward, self-instruction, and enlistment of social support.</td>
</tr>
<tr>
<td>Moral Disengagement</td>
<td>Ways of thinking about harmful behaviors and the people who are harmed that make infliction of suffering acceptable by disengaging self-regulatory moral standards.</td>
</tr>
</tbody>
</table>

(Adapted from Glanz, 2008, p. 171)

Baban & Cracium (2007) showed specific risk behaviors, including sexual behavior, alcohol abuse, eating habits and exercise, which have been successfully modified using SCT-based interventions. Change strategies recommended for use were social support
and incentives. Budd & Volpe (2006) reviewed randomized controlled studies pertaining to reducing school-based obesity. These articles reviewed cited the SCT as the theoretical basis most often used in interventions developed to address increasing exercise, increasing fruit and vegetable intake and decreasing risk behaviors. SCT strategies specifically noted in these studies included goal setting and self-monitoring. Muchiri (2009) reviewed articles pertaining to nutrition education interventions for use with people who have diabetes. Based on evidence from all the systematic reviews, specific constructs noted as being used in these studies included: self-monitoring, goal setting, cognitive restructuring, skill mastery development, social and verbal persuasion, and collaborative problem solving.

A study specific to SCT constructs and OP behaviors was Hsieh, et al. (2008) in which factors that influenced OP preventive behaviors were studied. Concepts tested included self-efficacy, social support and social capital. Results showed that self-efficacy predicted engagement in OP preventive behaviors more than social capital and social support; however, social capital had a statistically significant effect on OP preventive behaviors. The study also showed that self-efficacy directly affects calcium intake and exercise.

Examples of specific health education intervention studies that used SCT in the design, and provided information to help guide this study include Aronson, I.D. et al. (2012), who developed and implemented a video based health education program for HIV prevention and treatment; Huis, et al. (2013) who designed a study to test the effectiveness of two different types of hand hygiene education interventions for nurses; Locher, et al., (2011) who implemented a nutrition education intervention for seniors; and
Nelson, et al. (2011) who developed an intervention based on self-management for Veterans with Parkinson’s disease, and Eather (2013), who explored which variables associated with SCT were mediators of physical activity in school children.

From reviewing various studies, the co-investigator determined that researchers have used a basic overview of the SCT to design interventions and have incorporated a few of the SCT constructs into their intervention models; however, none of the studies reviewed integrated all of the SCT components into their programs.

Self-Efficacy

A concept to be separately addressed and highlighted in this research is that of self-efficacy. This concept is a component of the HBM and the SCT as well as other theories used in health education and health promotion interventions. The SCT incorporated the self-efficacy component that was not present in the original Social Learning Theory (Bandura, 1977). The very foundation of self-efficacy theory is that “the ability to secure desired outcomes and to prevent undesired ones, therefore, provides a powerful incentive for the development and exercise of personal control” (Bandura, 1997, p.2). For the purposes of this study, self-efficacy was addressed only as a component of both the HBM and the SCT. In the HBM Self-Efficacy is defined as confidence in one’s ability to take action. In the SCT, “perceived self-efficacy refers to beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997, p.3). The concept of self-efficacy is extremely important because if people do not believe they are able to make recommended changes in their lifestyles, they are unlikely to be motivated to try. Efficacy beliefs may impact the actions that people pursue, the amount of effort put forth,
“how long they will persevere in the face of obstacles and failures, their resilience to adversity, whether their thought patterns are self-hindering or self-aiding, how much stress and depression they experience in coping with taxing environmental demands, and the level of accomplishments they realize” (Bandura, 1997, p.3).

Application of Self-efficacy Construct in Health Education

As noted previously, both the HBM and the SCT recognize the importance of self-efficacy. Literature supports the view that self-efficacy impacts behavior (Bandura, 1986). One OP related research study developed and tested theoretical models of the effects of knowledge, attitude, and self-efficacy on exercise and calcium intake pre and post intervention, of college women in Thailand (Paiseu, N., et al. 2002). It was determined that “the final model supports the hypothesis that knowledge made statistically significant contributions to exercise and calcium intake behaviors both directly and indirectly, when mediated by self-efficacy” (p.373).

Other studies concluding that self-efficacy impacts health behavior included Kessler (2012), who studied the impact of self-efficacy on knowledge and behavior change related to recommended mammography and Pap test screening guidelines and Nokes (2012), who found that self-efficacy for HIV treatment adherence is a “robust predictor of ART adherence behavior, serving a partial mediating role between environmental influences and cognitive or personal factors” (p.408). Another way self-efficacy has been examined is in the use of interventions to increase subjects’ self-efficacy. Paiseu, 2002, suggested that “self-efficacy should be enhanced by targeting its source, which according to Bandura (1977) are: verbal persuasion, performance accomplishment, vicarious performance, and physiological arousal” (p. 373). In another
study, Lockwood & Wohl (2012), measured general self-efficacy, physical self-efficacy, physical fitness and nutrition in their study of the impact of a lifetime wellness course on behavior change and self-efficacy in college students. Results showed a significant change in all variables except for general self-efficacy. They concluded that “a lifetime wellness course can positively impact physical self-efficacy and help students successfully change behaviors in the areas of physical activity and nutrition” (636-637). Guillaumie (2012) noted that an “increase in self-efficacy can be achieved by means of different behaviour change techniques: to provide instruction, to model behaviour, to prompt barrier identification, to prompt practice and to provide general encouragement” (p.31). Rakauskiene & Dumciene (2013) specifically studied the alteration of self-efficacy of adolescents through use of brief school based counseling. Results indicated a significant impact of the counseling on student self-efficacy. Other studies reviewed that used interventions and then measured participant self-efficacy included Tung & Lee, 2006; Nieto-Vazquez et al., 2009; and Laslett et al., 2011. These three studies, however, did not report a significant increase in self-efficacy at post-test, as a result of their intervention. Hacihasanoglu & Gozum, 2011; did provide evidence of a significant increase in medication adherence self-efficacy in their experimental groups, at post-test. Olander, 2013; conducted a search to identify behavior change techniques that had been used to increase the self-efficacy and physical activity behavior of adults who are obese. They noted that “overall, a small effect of the interventions was found on self-efficacy” (p. 1).

While there are many articles pertaining to health education, health promotion or health behavior change, research studies were limited that specifically dealt with self-
efficacy and OP behaviors. Table 2.4 provides specific suggestions for how to increase self-efficacy as it pertains to OP prevention and treatment.

Although this study did not measure healthy lifestyle changes, efforts were made to encourage the participants and reinforce the idea that they are able to implement at least some of the recommended actions to promote their bone health and promote bone health in the individuals with disabilities that they support. The concept of self-efficacy is extremely important because if a person does not believe they are able to make recommended changes in their lifestyle, they are unlikely to be motivated to try. Therefore, within this study, impacting the health and perceived self-efficacy beliefs of the subjects is of key importance.

Table 2.4: Suggestions for increasing self-efficacy

<table>
<thead>
<tr>
<th>Mastery experience</th>
<th>Provide opportunities for the participants to succeed in tasks or performances that promote bone health. Task analysis can be done so tasks are presented in small sequential steps that increase in complexity.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Modeling</td>
<td>Showing the participants that others like themselves have accomplished bone healthy behavioral changes. Models should provide demonstrations of the small steps they have taken to attain their goals.</td>
</tr>
<tr>
<td>Improving physical and emotional states</td>
<td>Encouraging people to be well-rested and relaxed before attempting a new behavior. Take steps to reduce stress and build positive emotions. Provide calcium rich snacks during the workshop so participants are not hungry.</td>
</tr>
<tr>
<td>Verbal persuasion</td>
<td>Encouraging the participants by telling them that they can succeed in making positive health behavior changes. Encourage them strongly to boost their confidence and motivate them to take the first steps to implement recommended behavior changes.</td>
</tr>
</tbody>
</table>

(Adapted from Glanz, 2008, p.177)

Adult learning theory

Over the last few decades it has become widely accepted that adult learning is very
different than children’s learning. Because of this, it is important to understand why and how adults learn in order to facilitate effective learning and growth. For adults, learning is much more than the transfer of knowledge. The idea that adults learn differently than children began to evolve in the 1970’s with Malcolm Knowles introducing the term andragogy. Knowles defined andragogy as “the art and science of helping adults learn” (Knowles, 1970, p. 38). This construct is based upon certain beliefs about adults and their cognitive processes, emotions and motivations. Basic foundations of this model include the idea that adults want to learn in a self-directed way, have experience to draw on to aid in their learning, have a more problem-oriented or task oriented style of learning, typically will immediately apply what they learn, and that adults are intrinsically motivated to learn. (Brown, et al. 2006). Research and subsequent understanding of the ways that adults learn has continued to evolve from six assumptions developed by Malcolm Knowles. Table 2.5 summarizes Knowles’ six assumptions and also provides ideas for the practical application of these assumptions to learning environments.

*Research Based Teaching for Adults*

There is much emphasis on education in general as well as educational strategies for children; however, clear research-based teaching strategies for adults are much less prevalent. Another challenge is that while K-12 education is a field easily defined and understood, adult education is a broad concept that dovetails or intersects with several other professions. Fields related to adult education that may share many of the same theoretical foundations include human resource development, health education, development and training, and higher education.
There are many suggestions as to how adults may learn best, for example, McKeachie, (2006), provides a wealth of information regarding research-based teaching tips. He suggests using techniques such as discussion, cooperative learning and role play.


Table 2.5: Six Assumptions of Andragogy and Practical Applications

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Practical Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults need to know why it is important for them to know something before investing time in learning.</td>
<td>Trainers must ensure that learners know the purpose for the training as early as possible.</td>
</tr>
<tr>
<td>Adults enter any learning situation thinking of themselves as self-directing, responsible grown-ups.</td>
<td>Trainers must help adults identify their needs and allow them to direct their own learning experience.</td>
</tr>
<tr>
<td>Adults have a wealth of experience and much to contribute in a learning situation.</td>
<td>Trainers are successful when they identify ways to build on and make use of the experiences of the adult participants.</td>
</tr>
<tr>
<td>Adults have a strong readiness to learn things that help them cope with daily life effectively.</td>
<td>Training that relates directly to situations adults face is viewed as relevant.</td>
</tr>
<tr>
<td>Adults are willing to devote energy to learning things that they believe will help them perform a task or solve a problem.</td>
<td>Trainers who determine the needs and interests of participants and develop content in response to these needs are most helpful to adult learners.</td>
</tr>
<tr>
<td>Adults are more responsive to internal motivators such as increased self-esteem than external motivators such as higher salaries.</td>
<td>Trainers can ensure that this internal motivation is not blocked by barriers such as a poor self-concept or time constraints by creating a safe learning climate.</td>
</tr>
</tbody>
</table>

Source: Adapted from Biech, 2005

suggest utilizing a combination of lecture, problem-based learning, case studies, educational games, role-play and discussion. Other articles reviewed focused on specific techniques and their effectiveness or perceived benefits. A brief review of literature concerning specific evidence-based teaching techniques is provided in the subsections that follow.

*Stories and Personal Testimonies*
Stories or personal testimonies are a creative way to share information, engage listeners, and enhance learning through identification with the storyteller and personal reflection. Stories have been used in a variety of settings to enhance understanding, build support for programs or interventions, and encourage change in health beliefs and behaviors. Once such study, utilized success stories in an extensive health promotion campaign called the WISEWOMAN program (Lewis et al., 2004). Success stories can be used to communicate how a health condition, personal efforts, and interventions or programs have had an effect on an individual’s health. When storytelling was successfully used in a college biology course, it was reported by students that storytelling was useful to them when the story related to the student’s life and also encouraged engagement and/or used humor (Frish & Saunders, 2008). Cox (2001), described how stories can be utilized for training and development of medical staff. He notes that listening to stories of real life situations results in better retention of information and is more enjoyable than listening to a lecture. Stories have even been used in correctional settings to teach inmates, (Butcher, 2006). Stories were seen as a way to help the students cope with situations they encountered in life and to consider alternative ways of solving problems. “Based on prior research on the power of narrative in adult learning, storytelling showed to be a valuable teaching method in portraying daily life situations and how to deal with them” (Butcher, 2006, p.196). A story helps us to identify with the topic and the person telling the story and to see and consider their views. It is through the process of listening to stories and hearing the experiences and views of the storyteller that listeners tend to realize their own errors in terms of how they are thinking (Butcher, 2006).
Lecture

Lecture has been widely used and is still used in universities and other settings, although questions exist as to the effectiveness of lecture as a method, and how this method might be enhanced. Hartley & Davies (1978) reported that teachers may cover more information in lectures, but research indicates that the information is not remembered by the students. McKeachie (2006) indicated that “discussion methods are superior to lectures in student retention of information after the end of a course; in transfer of knowledge to new situations; in development of problem solving, thinking, or attitude change; and in motivation for further learning” (p. 58). He noted a value of lecture is that it is useful in presenting the most recent information, and in summarizing information from several sources. Lecture can also be used effectively to adapt the information taught so it is most applicable to the specific audience and to provide an orientation and framework for the topic, so students’ will focus on key ideas (McKeachie, 2006). Students’ reported that the enthusiasm of the teacher who is lecturing is a key factor that may affect students’ motivation to learn. (McKeachie, 2006). Changing vocal pitch and intensity, facial expressions, and using gestures may help to maintain students’ attention. Other recommendations to enhance the lecture technique include: modeling ways of viewing and dealing with problems, using metaphors, examples and demonstrations as a way of helping students organize and store information, using multimedia along with the lecture, and allowing time for students to ask questions (McKeachie, 2006). Analogies are another tool that can help to link new ideas to similar ones that participants already know (McKeachie, 2006). Hartley and Cameron (1967) found that the attention of students during lecture generally increases
starting at the beginning of the lecture and through the first 10 minutes, and then focus
decreases. Therefore, incorporating a variety of enhancements to the lecture seems
indicated. Diversity of participants also suggests the value of varying teaching
techniques. Other tools to help instructors enhance lecture include the use of an outline,
and using a whiteboard, overhead projector, or PowerPoint presentation, as they help the
students see how the lecture is organized. Four very practical suggestions for enhancing
learning during the lecture include: using examples that the students can relate to,
periodically summarizing what you have said, checking student understanding by asking
questions or looking for nonverbal cues, and including a conclusion activity such as
encouraging the students to ask questions or having them write a summary of what was
covered in the lecture (McKeachie, 2006).

Technology/Media

Technology can be used to enhance the learning environment. In this age of
technology “instructors use computers, the internet, CD-ROMS, interactive media,
satellites, teleconferencing, and other technology to support, enhance, inspire, and create
learning” (Kotrlik, 2005). Kotrlik (2005) shows mixed results as to whether the use of
technology has actually improved the performance of learners. Regardless, technology is
now considered an important resource in education. The trainer should be concerned
with whether the method being considered will help their students to learn more
effectively (McKeachie, 2006). Technology should not be used for its own sake but
because it will have a positive impact on student learning. Because there is student
diversity in knowledge, skills, beliefs, preferences, and learning styles, using multimedia
as a tool will help trainers reach all students more effectively (McKeachie, 2006).
Lawson et al. (2007) stated that limited research has addressed the use of educational videos in a classroom setting, but he notes that researchers are discovering that allowing students to passively watch educational media is not the most effective way of using this tool. Lawson, et al. (2006) and Lawson et al. (2007), addressed the goal of increasing the effectiveness of video-based learning by studying whether providing guiding questions would have a positive effect on learning outcomes. The earlier study involved the comparison of a treatment group that received guiding questions that they were to answer when watching a video and the control group that received no learning aids or special instructions, prior to watching an educational video. Both groups completed a post-treatment test to measure their learning and the results indicated that the treatment group, who had guiding questions to answer while watching the video, scored significantly higher on video based questions than the control group (Lawson et al, 2006). The later study sought to determine whether there was a difference in the learning outcome when using guiding questions versus self-guided manual note taking (Lawson et al., 2007). Results indicated that those students who received the guiding questions and wrote down the answers to the questions while watching the video, scored significantly higher than the control group or the other two treatment groups.

These results support the use of DVD training when it is combined with the use of guiding questions that participants answer while watching the instructional DVD. While other types of more sophisticated technology, such as interactive web-based learning, have been praised as teaching options, these methods are not always feasible in every learning situation. Therefore, the use of DVD’s while incorporating ways of enhancing learning outcomes, may be a viable teaching method.
Discussion

Discussion is concerned an effective adult teaching method, as it encourages engagement with the instructor as well as with peers. McKeachie (2006) notes that “students pay attention and think more actively” (p.36), when engaged in discussion. He also states that “discussion methods are superior to lectures in student retention of information after the end of a course; in transfer of knowledge to new situations, in development of problem solving, thinking or attitude change, and in motivation for further learning” (McKeachie, 2006, p.58).

Asking open-ended questions that stimulate thought and reasoning or presenting scenarios or case studies and asking for participant feedback, are a good way to start discussions. Cooperative discussions, in which participants feel safe to share their opinions, encourage more work and connection with peers. Discussions can be combined with other teaching methods such as small group activities. For instance, participants within small groups may be asked to discuss how the information learned through lecture may be applied. Discussion may also effectively be combined with the use of case-studies or problem solving. Visschers-Pleijers (2006), investigated the perceptions of medical students regarding what constitutes an effective discussion. It is interesting to note the students’ input that “disagreements, opposing views, unclear information or different interpretations are beneficial, as they: stimulate in-depth discussion, and force students to think carefully and support their views with convincing arguments” (p.928). Suggestions to help leaders implement discussions include: “stimulate discussion by focused, goal-oriented questions; keep the classroom structured and focus on main issues
and details; keep to a time schedule” and “balance the scope and depth of the discussion” and “summarize the discussion at several points” (Visschers-Pleijers, 2006, p.929).

Costa, et al. (2007), examined the difference between the teaching styles of group discussion versus lectures. The results of this study indicated that the interactive small group discussion method was more popular among the students than was the lecture, and what is most interesting is that the students who participated in the discussion group received significantly higher scores on their written test than the participants who received the lecture format. This suggests that retention of information may be enhanced, by implementing a group discussion during training.

Small group problem solving

Using smaller focus groups to collaboratively discuss a problem or scenario and work as a group to suggest solutions is a common adult teaching technique but practical suggestions about how to effectively facilitate small group instruction are few. Armstrong (2004) developed a list of seven keys for effective small groups. His keys for success include: establish ground rules, beware of the leader’s halo effect, use the social-microcosm effect, focus on progress, encourage a conflict of ideas, challenge ideas, and use silence. He believes that implementing these keys will result in increased effectiveness of small group learning as in group learning, participants may learn from their peers. Johnson et al. (1981) found that peer learning is effective to achieve goals and to appeal to a variety of students. Miller & Groccia (1997) found that cooperative learning produced positive results in their ability to work with others as well as better cognitive outcomes. Combining the small group learning technique with problem solving or case studies may enhance the learning outcomes. One of the best ways to produce
focus is to use a problem or case study as the primary topic within a discussion (McKeachie, 2006) so the participants get practical opportunities to apply the information they have learned. (Steinert, 2004), found that students’ believed that small groups should include: effective small group tutors, a positive group atmosphere, active student participation and group interaction, adherence to small group goals, clinical relevance and integration, and cases that promote thinking and problem solving.

Summary

It has been established that OP is a serious health concern affecting millions of Americans, resulting in limitations in their quality of life, and projected to increase if no action is taken (U.S. Department of Health and Human Services, 2004; Gueldner et al., 2008; US Bone and Joint Decade, 2008). The statistics regarding prevalence of this disease refer to the general population of Americans. While these general statistics are staggering in themselves, it is even more alarming when OP studies and literature are reviewed that focus specifically on the underserved population of people with disabilities. Literature supports the findings that individuals with disabilities are at higher risk for developing OP than the general population (Center, et al., 1998; Jaffe, et al., 2005; Lohiya, et al. 2004; Schrager, 2004; Schrager, 2006; and Wagemans et al. 1998).

Because individuals with severe-profound ID, who often have secondary physical disabilities as well, generally rely on the support of care-givers to ensure that their daily needs are met, it is essential that caregivers are aware of the risk factors and preventative measures that may impact this population group. Therefore, the importance of developing effective OP workshops for employees who support individuals with severe-profound ID cannot be understated. This study, aims to gather knowledge about how to most effectively provide OP training to adult employees who are caregivers to individuals
with ID. While a limited number of studies have addressed the design and implementation of OP education programs, such as Sedlak, Doheny & Jones (2000); Turner et al. (2004); and Blalock et al. (2000); no other studies were located that have addressed the design and implementation of an OP education workshop for this particular population.
CHAPTER 3-PROCEDURES

The purpose of this study was to examine whether the provision of OP related training to employees’ resulted in increased employee knowledge and beliefs regarding OP. Two different types of employee OP training were provided in a comparison group design to examine if significant differences in OP knowledge and beliefs resulted and whether those results can be attributed to the type of training received.

This study included the following steps: (a) Making arrangements for conducting the study; (b) Selecting the subjects; (c) Selecting test instruments (d) Determining procedures for gathering data (e) Designing the study (f) Developing the training program and (g) Making decisions about the treatment of the data.

Arrangements for Conducting the Study

This study was conducted at NVTC, a residential facility for adults with severe to profound ID, which is located in Fairfax, Virginia. A description of the purposes and design of the study was presented to the Director of Residential Services at NVTC as well as the Director of Training and the NVTC Facility Director. After their support was obtained, coordination and approval was gained by documents submitted to the NVTC Research Committee, as well as the author’s thesis advisor, and the Indiana University Institutional Review Board (IRB: see appendix A). Once approval was granted from the IRB, and the NVTC Research Committee approved the study, the scheduling of the OP training sessions were coordinated with the Director of Residential Services at NVTC and the group home managers.

Selection of Subjects
The population for this study was all day shift direct care employees at NVTC (a training facility for adults with ID), who work directly with individuals with ID. From the entire population, four group homes were chosen for participation in this study. This was based on the fact that these homes had adults with ID who either already had been diagnosed with OP or who possessed many of the risk factors for the condition. It was determined to be most feasible to implement the training workshops during the day between the morning and afternoon shifts. Therefore, the subjects for this study were limited to direct care staff who worked on either the morning or afternoon shift on homes 3A, 3C, 3D, and 7C. These homes also had a majority of their residents with ID involved in day programs or work in the community which made it more feasible for these staff to be able to attend the workshop and for managers to arrange for alternative staff to help supervise the residents with ID who were remaining on the group homes at the time of the workshops. Group homes 3A, 3C, 3D, and 7C, were randomly assigned, by draw, to one of two training conditions as described below. By organizing the implementation of the study this way, it was feasible from a facility coverage standpoint, from a financial standpoint, and from a time management standpoint.

The prospective subjects from homes 3A, 3C, 3D, and 7C were invited through written invitation to participate in the study and were informed that participation was voluntary (see Appendix A). They were instructed to call or e-mail the investigator if they wished to register for the OP education workshop and were given a deadline for registration. Subjects were also asked to complete and sign a consent form which was provided with the written invitation, either prior to the workshop or at the beginning of
the workshop. Although the training and participation in the study was voluntary, participation was supported and encouraged by managers on the residential homes.

*Random assignment by intact work groups*

Because NVTC is structured based upon residential homes and clinical departments, this study was designed based upon intact groupings of employees as it relates to their specific worksite. Home supervisors effectively ensured that alternative care arrangements were made for the individuals with ID, who lived in the group homes, for the duration of the 1.5 hour training so that the care staff from the intact groups could participate in the OP training. Participants were assigned by intact groups to one of the two interventions by draw. After the drawing occurred to determine which homes would receive which type of training, and after the researcher had received registration calls or e-mails from staff who committed to participate in the research project, invitations were then prepared to mail to each prospective participate.

*Letters of invitation*

The approved IRB invitation letter (see Appendix A) was prepared for each prospective participant and they were mailed through interoffice mail to each staff member who had contacted the co-investigator to register. The letter invited the staff to the workshop and a specific date, time and location for the training was provided so that the intact groups of home staff would participate in the same workshop. The IRB approved consent form (see Appendix A) was enclosed in the envelopes along with the invitation letter. The invitation letter content reminded participants to bring their signed consent forms with them to the workshop. Home 3C and 7C staffs were randomly selected to receive one training format and staffs who worked on Homes 3D and 3A were
selected to receive the other training format. Table 3.1 shows the intact groups and the numbers of staff from each group home that could potentially volunteer to participate in the study.

The NVTC campus includes six residential homes. Each residential home (with the exception of one) is divided into at least two different residential suites or living areas. Homes 3A, 3C, 3D, and 7C daytime direct care staffs were chosen to be invited to participate based on reasons previously explained. Therefore, the total number of possible subjects was 75. The target participation level hoped for was a total of 30 of caregivers to complete the OP training and complete both pre and post intervention surveys.

Table 3.1: Table of Intact Groups

<table>
<thead>
<tr>
<th>Work Location</th>
<th>Shift</th>
<th>Total # of Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home #3A</td>
<td>AM</td>
<td>9</td>
</tr>
<tr>
<td>Home #3A</td>
<td>PM</td>
<td>9</td>
</tr>
<tr>
<td>Home #3C</td>
<td>AM</td>
<td>11</td>
</tr>
<tr>
<td>Home #3C</td>
<td>PM</td>
<td>9</td>
</tr>
<tr>
<td>Home #3D</td>
<td>AM</td>
<td>9</td>
</tr>
<tr>
<td>Home #3D</td>
<td>PM</td>
<td>7</td>
</tr>
<tr>
<td>Home #7C</td>
<td>AM</td>
<td>12</td>
</tr>
<tr>
<td>Home #7C</td>
<td>PM</td>
<td>9</td>
</tr>
</tbody>
</table>

Total # Possible Subjects | 75

Selection of Test Instruments

The test instruments chosen for this particular study included the Osteoporosis Knowledge Test (Kim, et al, 1991), the Health Belief Scale (Kim et al., 1991), and the Osteoporosis Self-Efficacy Scale (Kim, et al., 1998). These tools are all self-reporting surveys and gather information about OP related issues such as risks factors, seriousness
of the disease, calcium intake, exercise, preventative measures and self-efficacy to engage in recommended health behaviors.

**Osteoporosis Knowledge Test**

The Osteoporosis Knowledge Test (OKT) consists of 24 questions, which pertain to the subject’s knowledge of OP. It is a multiple choice tool with a range of scores from 1-24, representing the number of correct responses. Two specific areas of OP knowledge are addressed which include knowledge pertaining to calcium and knowledge pertaining to exercise. The reliability scores pertaining to internal consistency were reported as being .72 for the calcium subscale and .69 for the exercise subscale (Kim, et al., 1991).

**Osteoporosis Health Belief Scale**

The Osteoporosis Health Belief Scale (OHBS) consists of 42 items. Each item is manually scored by the participant, by indicating whether they strongly disagree, disagree, are neutral, agree, or strongly agree. Scores range from 1-5 for each item with 5 corresponding with the answer of “strongly agree”. There are seven different subscales within this tool. The range of possible scores for the entire instrument is 42 to 210. Each subscale and its internal reliability statistic (Chronbach $a$) are as follows: susceptibility .82, seriousness .71, health motivation .73, benefits of calcium .80, barriers calcium .74, benefits of exercise .81, barriers exercise .82 (Kim, K. et al., 1991).

**Osteoporosis Self-Efficacy Scale**

The Osteoporosis Self-Efficacy Scale (OSES) contains 12 items pertaining to behaviors that address exercise and calcium intake. Participants indicate their degree of confidence in their ability to follow through with completing the specific activities that promote bone health. The scoring for this instrument ranges from 0-10 per item with 0...
corresponding with “least confident” and 10 corresponding with “most confident”. The OSES contains two subscales measuring self-efficacy as it relates to exercise and self-efficacy as it relates to calcium intake. Each subscale has a possible score of 0-600, but the total subscale score is created by dividing the raw score by the number of items in the subscale (six). The internal consistency score is reported as .90. Reliability coefficients of the subscales are reported as .90. (Horan et al., 1993).

Procedures for Gathering Data

A consent form was mailed to each prospective subject who called or e-mailed the investigator to register for participation. Subjects either used interoffice mail to submit the signed consent form prior to the workshop, or brought the signed consent form with them to the workshop. On the day of the workshop, subjects arrived, were greeted by the researcher, and signed in at the registration desk. Upon signing in they were given a number corresponding to their name on the sign-in sheet. The investigator checked to make sure there was a signed consent for each subject attending the specific training workshop and that their corresponding subject number was written on their consent form. If a subject did not have a signed consent they were immediately asked to read and sign a consent form and their subject number was written on the form. Each subject was handed a clipboard with a demographics form attached and subjects were asked to complete this form prior to entering the room for the workshop. After subjects had submitted their consent forms and their completed demographics forms to the investigator, they were invited to proceed to the conference room where the training was to be held. The investigator served as the training facilitator and began the training with an introduction
to the workshop content and introduced the professional staff who helped to develop the workshop.

*Pre-workshop OP surveys*

Pre-training OP surveys, placed in a separate manila folder for each subject, were then distributed to each participant along with pens and pencils. The surveys were briefly explained, subjects were asked to write their subject number on the surveys rather than their names, and subjects were asked to complete the survey tools. Subjects were told to approach the investigator if they had questions or needed assistance. The subjects were given approximately 10 minutes to complete both pre-training survey tools. The facilitator collected the manila folders labeled with the subject’s number, which contained the pre-training surveys pertaining to OP knowledge and OP beliefs. After all surveys were collected, the speakers/facilitator continued with the training workshop.

*Post-workshop OP surveys*

At the end of each of the training workshops, subjects were asked to complete post-intervention surveys. The post-workshop surveys included the OKT, the OHBS, and the OSES. Just as was done with the pre-workshop surveys, the post-workshop surveys were placed in manila folders, for confidentiality purposes, and the surveys and folders were numbered to correspond with the subjects name on the sign-in/registration form and their pre-test surveys. This helped to ensure confidentiality by making it possible for the researchers to compare the results of the pre and post-tests for each individual without requiring that the subjects write their names on the tests. Participants were asked to remain in the training room until they had completed all surveys and the facilitator collected the manila folders containing the post-workshop surveys when the participants
finished. After a subject completed and submitted their post-workshop surveys to the facilitator, the subject was then provided with incentives which included a healthy gourmet lunch and a bottle of calcium supplements.

Design of the Study

A quasi-experimental design with multiple interventions using intact employee groupings was used for this study. This design was strengthened by randomly assigning intact groups of employees to one of two training opportunities. One OP education intervention involved a multi-training method enhanced employee workshop (multi-method enhanced workshop). The other training intervention involved a training intervention primarily consisting of watching an OP education DVD, paired with completing an outline that provides leading questions (DVD-based/leading question workshop).

The quasi-experimental design of this study was necessary because random assignment of individual staff to either of the intervention groups is not feasible at this facility given the responsibility for the caregivers to provide constant supervision of the consumers that they serve. The logistics of providing coverage for each of the residential homes to permit individual employees to attend various training sessions is a daunting task. In addition, the concept of assigning individual employees to a specific workshop or training method is inconsistent with some of the adult learning theories and techniques. Specifically, the value of participating with worksite peers in the same workshop and/or training methods and being able to choose to volunteer to attend may provide participants with the perception that their learning opportunity is more self-directed and of team value. This model also reduces the possibility of poor morale occurring should staff who
work side by side on a daily basis not being able to receive what may be viewed as the same quality of training. In addition, if random assignment of individuals were used, it would be difficult to control for cross contamination due to the fact that employees work together on the same building and may share information about each other’s different training experiences.

*Application of SCT components to the Multi-Method Enhanced Workshop*

For the purposes of this particular OP Education Program, components of the SCT were used to provide guidance in the development of the structure and content of the Multi-Method Enhanced workshop and also in consideration of any follow-up support that employees may need.

*Reciprocal Determinism*

Regarding the concept of reciprocal determinism, although we did not measure health behavior change in this study, we planned to make environmental changes to help support bone healthy behaviors, knowing that according to the SCT, the environment does influence the individual participants. An example is to encourage and provide time in the work day for employees to take walks, use the facility weight room, and purchase calcium rich snacks. This should also involve reevaluating what is provided in the vending machines at the work site and making changes to the items purchased to stock them.

*Outcome Expectations*

Another component of the SCT which was used to develop the Multi-Method Enhanced Workshop was outcome expectations. This concept was used by working to positively change the participants’ expectations of the outcomes of increased calcium
intake and increased weight-bearing exercise. We provided evidence of the positive outcomes that may result from choosing to make bone healthy lifestyle changes.

**Observational Learning**

Observational learning was also utilized in developing the workshop. This was accomplished through the use of storytelling and personal testimony by a peer who learned that they have OP or osteopenia and successfully implemented health behavior changes, resulting in positive outcomes. Hearing these success stories may positively affect the subjects’ self-efficacy beliefs. Recommended exercises to build bone strength were also demonstrated or modeled and participants were encouraged to practice the exercises as well.

**Facilitation**

The concept of facilitation was used by providing free calcium and vitamin D samples to the participants. Participating with peers in the training provided social support to encourage participants to make healthy lifestyle choices. While each of these concepts is important, the SCT stresses the importance of the interplay of various concepts. For instance, if we want a person to put new OP knowledge and beliefs into action, their environment must support the recommended behavioral changes in order to sustain healthy change.

**Content of the Multi-Method Enhanced Workshop**

The Multi-Method Enhanced Workshop included the same core informational content as the non-enhanced training opportunity but also included additional supplemental information and differed in that it utilized the following teaching methods and strategies that are supported through research: lecture (with creative
demonstrations/illustrations), discussion and small group problem solving or scenarios, and demonstrations with interactive subject participation. The enhanced workshops were led by three clinical professionals whose qualifications are: Registered Dietitian (RD), Certified Recreation Therapist (CTRS), and Licensed Physical Therapist (PT). The co-investigator was the facilitator, a CTRS, and was responsible for collecting the informed consent forms, providing a brief introduction to the workshop, facilitating the ice-breakers/contests, administering and collecting the pre-tests, providing a personal testimony, implementing the DVD-based training, assisting with the implementation of the training, administering and collecting the post-tests, and distributing incentives at the conclusion of the workshop.

The PT’s responsibilities were to discuss OP, bone formation, bone breakdown, demographics, risk factors for OP, and exercises that may help to maintain or improve bone density, which are supported by research. The PT also led a demonstration of exercises and participants were invited to practice the exercises if they wished to. It was noted that they should not participate if they had any medical condition for which these exercises would be contraindicated.

The responsibilities of the RD pertained to the role of nutrition in preventing OP, maintaining current bone density or improving bone density. She specifically discussed the importance of Calcium and Vitamin D intake. Handouts were distributed which showed Vitamin D metabolism and which listed foods rich in Calcium. The Dietician discussed the importance of exposure to natural sunlight as a way for the body to naturally produce vitamin D through the skin. She demonstrated to participants how to read and interpret a food label. A small group activity was facilitated during which
participants were to review three different recipes and choose the one they thought had the highest calcium content. They were to report their decision to the entire group of workshop participants.

Content of the DVD/leading question training method

The alternative intervention involved watching an osteoporosis education DVD and completing an outline that contains leading questions as the primary method of teaching. The DVD utilized for this study is commercially available and is entitled *Healthy Body Healthy Mind: Treating and Preventing Osteoporosis*. The benefits of using this option for the DVD based training were that this DVD is professionally produced, is interesting to watch, it can be purchased commercially by those who wish to replicate the program, and it also provides an effective overview of OP. The negative aspect of using this product for the DVD based training is that unfortunately a few of the items on the Osteoporosis Knowledge Test (OKT) and the Osteoporosis Health Belief Scale (OHBS) are not clearly addressed in the DVD. Due to the concern that participants may not have received some key information they needed to accurately complete the measurement tests, the decision was made to verbally highlight, at the end of the DVD based training, the additional information that may not have been clear to the subjects who watched the DVD. We provided an outline that contained leading questions to each of the participants in the DVD-based training. This decision was based upon studies that have supported the findings that adding an outline, which contains leading questions, improves the test performance of the participants (Lawson et al. 2006; Lawson et al. 2007). Results of the 2006 study indicated that the treatment group, who had guiding questions to answer while watching the video, scored significantly
higher on video based questions than the control group (Lawson et al., 2006). This DVD based training was facilitated by a Certified Therapeutic Recreation Specialist, and lasted approximately one hour. The introductory slide, which showed the title of the presentation, as well as a few additional opening slides and the closing slides that provided a review or wrap-up of the training, were also included in the DVD-based training.

Overall Training Program Content

This section provides an overview of the training program design and also provides a detailed description of the content of both workshops. This will aid other researchers or trainers who may wish to replicate the OP workshops.

The intact groups of employees from four residential homes were randomly assigned by intact group to attend one of the sessions of either the multi-method enhanced workshop or DVD/leading questions workshop (based upon random assignment by site). The DVD/leading questions training session lasted approximately 1 hour. The multi-method enhanced training session lasted approximately one and one half hours. The difference in length of sessions is due to the incorporation of multiple evidenced-based teaching activities within the Multi-Method enhanced training, which included demonstrations and interactive learning modules.

It was imperative to the study that both groups of subjects be exposed to the same key information regarding OP even though the style of training would be different. The key OP related information included in both the DVD based training and the enhanced training consisted of: definition of osteoporosis, seriousness of osteoporosis, risk factors for osteoporosis, foods rich in calcium and vitamin D, importance of weight-bearing exercise, preventative measures, and treatment options. The presenters covered the topics
on the OKT and OHBS that corresponded with their areas of expertise and to ensure that each item on the surveys was thoroughly discussed.

During the beginning of both the DVD/leading questions training and the Multi-Method Enhanced workshop, subjects were told that this training workshop is part of a research project involving employee health attitudes and awareness. Consent forms previously distributed were collected by the facilitator after being signed by the subjects. Subjects were told that participation in the training as well as participation in the research study are both voluntary.

*Comparison of delivery and specific content of workshops*

The format of the Multi-Method Enhanced workshop involved multiple training methods that are supported by research evidence. These methods included: personal testimonies or stories (modeling), lecture with Power Point presentation and note taking, creative illustrations, discussion, small group problem solving or scenarios and demonstrations (modeling) with subject participation. While both workshops contained the same core information, the enhanced version provided a much more comprehensive training experience with additional information covered. Table 3.2 provides an overview of the content and order of the training slides and topics covered by type of training method. This table also indicates which of the speakers presented the information in the slide and whether the specific slide was used for the enhanced workshop, the DVD-based workshop, or both workshops. Detailed descriptions of the content and delivery of the two different workshops are located in Appendix C, as a resource for clinicians who wish to replicate the training. Several commercially available materials such as brochures and flyers about OP were made available to all the participants at an information/resource
Table 3.2: Outline of Osteoporosis Workshop Slides

<table>
<thead>
<tr>
<th>Slide</th>
<th>Content</th>
<th>Enhanced</th>
<th>DVD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>“Title slide: Osteoporosis Education Workshop:</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Promoting Strong Bones for You and the Individuals with Disabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>that You Support,” (Facilitator/Co-investigator/CTRS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Introduction of Presenters (or professional staff who developed the</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>workshop- for DVD-based workshop) (Facilitator/Co-investigator/CTRS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>“Pre-Workshop Forms and Surveys” (plus explanation of research study,</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>voluntary participation and consent forms) (Facilitator/Co-investigator/CTRS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Workshop Outline (Facilitator/Co-investigator/CTRS) (Note-condensed</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>outline used for the DVD-based workshops)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Continued…Workshop Outline-(Facilitator/Co-investigator/CTRS) (Note-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>condensed outline used for the DVD-based workshops)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>“Tell Us About You” –(Facilitator/Co-investigator/CTRS)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7</td>
<td>“Promoting Strong Bones: How many bones are in the adult human body?”</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>(Facilitator/Co-investigator/CTRS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Contest Answer: 206 (Facilitator/Co-investigator/CTRS)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>9</td>
<td>“Definition of Osteoporosis” (Facilitator/Co-investigator/CTRS)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>10</td>
<td>“Why is it important to learn about osteoporosis” (Facilitator/Co-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>investigator/CTRS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>“Personal Success Story” (Facilitator/Co-investigator/CTRS)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>12</td>
<td>Introduction to DVD presentation (Facilitator/Co-investigator/CTRS) “</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Healthy Body Healthy Mind. Treating and Preventing Osteoporosis”</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>“Osteoporosis basics” [Physical Therapist(PT)]</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>More “Osteoporosis basics” (PT)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>“Demographics” (PT)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>“Spine changes showing Osteoporosis” (PT)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>“Osteoporotic and Normal Vertebrae” (PT)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>“Bone Architecture” (PT)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>“Uncontrollable Factors” (PT)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>“Controllable Factors” (PT)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Exercise: A Key to Prevention (PT)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>“Exercise Frequency and Duration” (PT)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>“LIVE: Load, Intensity, Vary, Enjoy” and Exercise demonstrations with active participation (PT)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>“RDA-Calcium &amp; Vitamin D” [Registered Dietitian (RD)]</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>“Bone loss increases as humans age” (RD)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>“Lifespan Bone Loss” (RD)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>“Foods rich in calcium” (RD)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>“Dairy products: very good source of calcium” (RD)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>“How much calcium is in the body?” (RD) (Creative demonstration)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>“Sources of Vitamin D” (RD)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>“Vitamin D metabolism” (RD)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>“How to read a food label” (RD)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>“Choose the Best Recipe” (RD)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>13 &amp; 33</td>
<td>“Review: Osteoporosis Treatment Options” (PT-Enhanced; Facilitator/Co-investigator/CTRS-DVD-based)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>14 &amp; 34</td>
<td>“Practical ways to promote bone health for yourself and the individuals with disabilities who live here” (PT-Enhanced, Facilitator/Co-investigator/CTRS-DVD-based)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>15 &amp; 35</td>
<td>“Wrap-up!” (Facilitator/Co-investigator/CTRS)</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Table along the rear side walls of the conference room where participants could browse after the conclusion of both the enhanced workshop and DVD-based workshop.

Participants were not invited to access these resources until the very end of the workshops so as to not impact the results of the pre and/or post-workshop surveys.

**Treatment of the Data**

The subsections within this treatment of data section include treatment of the demographic information, creation of variable sets for analysis, and hypothesis testing.

*Treatment of Demographic Data*

Chi-Square Tests of independence were conducted using the demographic data to determine if the groups of participants based on the two different active treatments.
(workshop types) were independent. This is important as it indicates whether the groups were similar in terms of demographics prior to the active treatment being provided. If they were not the same, this may indicate that the demographic variables were confounding variables such that significant differences between the treatment groups in terms of demographics could have impacted the pre and post-treatment survey results.

Variables from the categories included in the demographics survey, having more than 2 possible answers (age range and race), were collapsed into variable sets with just two different answer possibilities per demographic category. The variables for race/ethnicity were transformed to the two variables of minority race, or not a minority race. The age range variables were transformed into age 50 and under, or age over 50. This was done due to the small sample size, in order to conduct the Chi-square analysis using a 2x2 table, which then met the Chi-Square test assumption that each cell should have a numerical value of at least 5. This helps to ensure the accuracy of the Chi-square analysis.

Creation of Variables for Analysis

Data obtained from the pre-workshop and post-workshop survey tools were initially entered into SPSS-20 Statistical Analysis Software (IBM Corp., 2011) according to subject number. These surveys included subscales that were to be scored separately. The OKT included the OKT Calcium Subscale and the OKT Exercise Subscale. These two subscales hold items #1-#9 in common, thus the exercise subscale contained the sum of items #1-16 and the calcium subscale was comprised of the sum of items #1-9 plus items #17-24. The same procedures were used to create new variables according to subscales of the OHBS. The OHBS has 7 different subscales which pertain to:
susceptibility (6 items), seriousness (6 items), benefits of calcium (6 items), benefits of exercise (6 items), barriers-calcium (6 items), barriers-exercise (6 items), and health motivation (6 items). Each OHBS subscale was created as the sum of relevant items. This procedure was also utilized for creating the exercise and calcium subscales of the OSES; however, OSES subscales were averaged across the total number of items (6) in the subscale.

The last task regarding the creation of new variables involved creating difference scores. This was necessary in order to compare change scores for the two independent groups from the pre-workshop surveys to the post workshop surveys. These were created based upon each specific subscale post-test score minus the corresponding subscale pre-test score. This provided the variables necessary to complete identified statistical analysis procedures.

_Hypothesis Testing_

Nonparametric tests were identified as being most appropriate for use due to the sample size being smaller than anticipated (n=23), (Pett, 1997). It has been asserted that “parametric tests are more powerful than nonparametric tests only if the assumptions of the parametric test under consideration have been met” (p.17), although it is also noted that data rarely meets all the assumptions of a statistical test. The increased use of nonparametric tests in health care related research seems to be appropriate in that these tests accept small sample sizes, can use ordinal level data, and can accommodate sampling distributions that are irregular.

The Wilcoxon Signed Ranks Test was chosen to address research questions one and two, which dealt with the question of whether the specific workshops had a
statistically significant impact from pre to post workshop. This nonparametric rank based test has been recommended for use in evaluating an intervention’s effectiveness from pre to post test. It is an effective test to use when there is a small sample size and when the data is continuous and there are paired observations (Pett, 1997). It is noted that “the Wilcoxon signed ranks test has been used widely in the health care research literature” (p.113). It is known as a test that is flexible given “a variety of situations and with different sample sizes and few restrictions” (p.113).

The Mann-Whitney U Test was chosen as the most appropriate statistical test to utilize for comparing the effect of the two different training approaches, one to another. This test was developed for use when there are two samples that are independent of one another. The Mann-Whitney U Test is similar to the parametric t-test in that it “compares measures of central tendency between two independent groups” (p.169). The two tests differ however, in that the Mann-Whitney U Test compares median scores while the t-test compares mean scores; however, both can be used to compare change scores (Pett, 1997). In our case, we wanted to compare the differences in changes between pre and post workshop survey scores, by type of treatment group.

The three test assumptions (Pett, 1997, p.173-174) of the Mann-Whitney U Test include:

- The independent variable is the same in both conditions and the dependent variable’s scale of measurement is ordinal or higher.
- The data collected are from two independent groups that were randomly selected and from which independent observations occurred.
• The distributions of the dependent variable in the independent groups has a
similar shape but the shape does not need to be identified as a normal bell curve
and there can also be difference in regard to the measures of central tendency.

To test the assumption that the two independent groups have similar shapes of
distributions, the Kolmogorov-Smirnov test was used. This test confirmed that the two
independent groups did in fact have similar shapes of distributions. No significant
difference in the shape of the distributions was found. Because our data and subject
groups better met the assumptions of the Mann-Whitney U Test than the t-test, the Mann-
Whitney U Test was used. Our treatment group size was smaller than anticipated (n ≤ 13)
and when considering a parametric test “a minimum sample size of 30 subjects per group
has been recommended” (Pett, 1997, p.13). The Mann-Whitney U-test was used the
compare the median difference scores of pre and post- test subscales on the Osteoporosis
Knowledge Test and the Osteoporosis Health Belief Scale, by type of training provided.
In addition, the Mann-Whitney U Test was used to compare the median scores between
groups for the Osteoporosis Self-Efficacy Scale, which was administered at the
conclusion of the training sessions.

To determine the overall effectiveness of the Osteoporosis Education Workshops
from pre-workshop to post-workshop, a single sample t-test was used to analyze the OKT
and OHBS data without regard to treatment type. We decided to use the t-test in this
situation as the entire sample was used for this calculation (n=23) so we were closer to
meeting the assumptions for use of this parametric test.
CHAPTER 4-ANALYSIS OF DATA AND DISCUSSION OF RESULTS

The purpose of this study was to examine whether the provision of osteoporosis (OP) related training to employees resulted in increased employee knowledge and accurate beliefs regarding OP. Two different types of employee OP training were provided in a comparison group design to examine if significant differences in OP knowledge and beliefs resulted and whether those results can be attributed to the type of training received.

This chapter is organized according to the following topics: a) recruitment and confirmation of subjects, b) demographics and descriptive statistics, c) survey treatment of data, d) inferential statistics, and e) discussion of findings.

Recruitment and Confirmation of Subjects

The convenience sample of 75 possible staff members who work day shifts on one of four identified group homes (3C, 3D, 3A, 7C) all received a letter from the co-investigator inviting them to participate in the OP education research study (see appendix A). The letters were sent, through interoffice mail, in sealed envelopes. An approved consent form was also included in each envelope. These potential participants were asked to either call or e-mail the co-investigator to indicate that they wished to register for the training. They were told that the co-investigator would contact those who had registered for the training to provide specifics as to the date and time of the training workshop that would be held for their group home. It was clearly indicated that they would participate in the same training as their coworkers from their group home. They were asked to either send signed consent forms to the co-investigator through interoffice mail or to bring their signed consent forms with them to the training.
Of the 75 invitations that were mailed, the following numbers of staff pre-registered by the original deadline established: 4 from Home 3C, 7 from Home 3D, 1 from Home 3A, and 5 from Home 7C. The co-investigator called these individuals to provide the day and time of the training and to confirm their registration. The co-investigator reminded them of the requirement to read and sign the consent form and to either mail that to the co-investigator in advance or to bring the form with them to their workshop.

Due to fewer overall responses than anticipated, it was decided to extend the deadline for registration, to facilitate a larger sample size. The co-investigator went to each home, and arranged to speak to the day shift staff members to talk to them about the OP workshops and invite them to participate if they wished to. They were asked to contact the co-investigator if they wished to register and were told about the requirement to read and sign the consent form if they wished to participate in the research project. This resulted in additional subjects registering for the workshops.

All subjects were contacted by the co-investigator for the purpose of confirming the day and time of the workshops and to ensure they understood that this is a research project and that participation is totally voluntary. They were also informed about the forms they would need to complete. The type of treatment each intact group would receive (Multi-method enhanced workshop or DVD-based/leading question workshop) was determined by draw after each workshop date and time was established. The final count of subjects who registered and completed the workshops was: 5 from Home 3C, 6 from Home 3D, 6 from Home 3A, and 6 from Home 7C. Therefore, the total number of subjects who participated in the training was 23.
Homes 3C and 7C were randomly chosen by draw to receive the enhanced training workshop while Homes 3A and 3D were randomly chosen by draw to receive the DVD-based training. The draw was conducted by the co-investigator and the physical therapist who was a workshop co-presenter. The order of the workshops conducted were Workshop #1-Home 3C (July 24, 2012), Workshop #2-Home 3D (July 26, 2012), Workshop #3-Home 3A (August 8, 2012) and Workshop #4-7C (August 15, 2012).

Demographics and Descriptive Statistics

The composition of the subject sample, in terms of the demographic variables of gender, ethnicity/race, whether English is their second language, age range, whether they had received bone density testing, and whether they had received OP training previously, is presented in the frequency Table 4.1 below.

<table>
<thead>
<tr>
<th></th>
<th>Enhanced n=11</th>
<th>DVD-based n=12</th>
<th>Chi-Sq,df,p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Females</td>
<td>9</td>
<td>12</td>
<td>2.39, 1,.12</td>
</tr>
<tr>
<td>English as Second Language</td>
<td>8</td>
<td>10</td>
<td>3.79, 1,.538</td>
</tr>
<tr>
<td>Minority Race/Ethnicity</td>
<td>10</td>
<td>11</td>
<td>1.14, 1,.286</td>
</tr>
<tr>
<td>Age 50 or less</td>
<td>5</td>
<td>5</td>
<td>.034, 1,.855</td>
</tr>
<tr>
<td>Previous OP education</td>
<td>0</td>
<td>2</td>
<td>2.008, 1,.156</td>
</tr>
<tr>
<td>Previous bone density scan</td>
<td>4</td>
<td>4</td>
<td>.00, 1,1.00</td>
</tr>
</tbody>
</table>

The intact groups who received the enhanced training were from Homes 3C and 7C. Using SPSS-20 Statistical Analysis Software, the data for these groups were combined to create a single grouping variable (Enhanced Training Group) composed of eleven subjects representing 47.8% of total subjects. Intact groups that received the DVD-based training were from Homes 3D and 3A and these were also collapsed into a single group (DVD/leading question Group) comprised of twelve subjects representing 52.2% of total subjects.
Statistical Analysis was conducted using SPSS-20 to determine if the two groups were independent of each other, prior to the active treatment. The Chi Square Test of independence was conducted on these categorical demographic variables, to test the null hypothesis that there were no significant differences between groups on subject background characteristics. An alpha level of .05 was established. The results of the Chi-Square tests of independence are provided in Table 4.1.

Treatment of Survey Data

Once variables were created, all available raw survey data was transferred from the hardcopies of the survey tools and entered into the SPSS-20 Statistical Analysis Software to prepare for data analysis. It was determined that some subjects had missed items on some survey tools. The lowest number of data points missing was 1 item on the OHBS post-test for the enhanced group. The highest number of data points missing were a total of 7 for both the OKT pre-test and for the OHBS Post-test, for one subject in the DVD/leading question group. It was determined that mean replacement was an acceptable method of handling missing data when only one or two data points were missing from a subject’s survey subscale. In this study, data were replaced using mean replacement when no more than two data points were missing for any individual survey tool subscale completed by a specific subject. Therefore, the investigator manually calculated the mean replacement scores when no more than two data points were missing from the survey subscale of subjects on an individual basis. This was calculated by taking the scores of the questions from that specific subsection and survey that were answered by the subject, and dividing that score by the total number of items answered.
by the subject in that subscale of the survey. The result was the mean replacement value for the missing item on the subscale.

**Summary of Replacement of Data Points**

The number of data points replaced for each survey tool and by training group are indicated in table 4.2 below. A total of 32 data points were replaced. The range of total data points replaced per subject is 0 to 9 out of a total of 144 data points per subject calculated from the combination of data point totals of the OKT-Pre-test, OKT Post-test, OHBS Pre-test, OHBS Post-test and the OSES. The range of data points replaced per subject for any one of the specific survey subscales is 0-2.

**TABLE 4.2- Table of Mean Replacement Points**

<table>
<thead>
<tr>
<th>Survey Tool</th>
<th>Enhanced</th>
<th>DVD-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osteoporosis Knowledge Test (OKT)-Pre test</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Osteoporosis Knowledge Test (OKT)-Post test</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Osteoporosis Health Belief Scale (OHBS)-Pre test</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Osteoporosis Health Belief Scale (OHBS)-Post test</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Osteoporosis Self-Efficacy Scale (OSES)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>6</strong></td>
<td><strong>26</strong></td>
</tr>
</tbody>
</table>

**Missing Data Reporting**

Another issue was how to handle missing data in one case where a subject had missed an entire page of items on a subscale. To be specific, subject #33 missed an entire page of the OHBS-pre-test. Subject #33 received the DVD/leading questions training. In this case, we reported these data as missing, and the affected subscales of the corresponding survey tool of this particular subject were not utilized for data analysis.

There were a few cases where an entire survey was missing. The missing surveys were the OKT-Pretest and the OHBS Pre-test for subject #22. This subject received the DVD/leading questions training. In this case we reported these data as missing, and we only utilized the OSES of this subject in data analysis.
Surveys Completed Incorrectly

The last issue related to handling data had to do with two instances where subjects completed the OSES survey incorrectly. The OSES surveys of subjects #26 and #41 could not be utilized for data analysis because the OSES surveys were not completed according to the directions provided at the top of the test. Subject #26 received the DVD/leading questions training while subject #41 was in the enhanced training group. Rather than placing an “x” on each line corresponding to a question or statement on the survey, the subjects circled the statement at the right side of this visual analog type survey which said “very confident”. As a result we could not score these surveys accurately and they were not utilized.

Table 4.3 Descriptive Statistics for the OKT, OHBS, and OSES.

<table>
<thead>
<tr>
<th></th>
<th>Enhanced</th>
<th>DVD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Test</td>
<td>Post Test</td>
</tr>
<tr>
<td></td>
<td>Mean (sd)</td>
<td>Mean (sd)</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>OKT--Exercise</td>
<td>9.83(3.45)</td>
<td>11</td>
</tr>
<tr>
<td>OKT-Calium</td>
<td>9.82(3.99)</td>
<td>11</td>
</tr>
<tr>
<td>OHBS-Susceptibility</td>
<td>14.58(6.37)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>17.1(3.31)</td>
<td>10</td>
</tr>
<tr>
<td>OHBS-Seriousness</td>
<td>25.8(4.37)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>13.1(3.18)</td>
<td>10</td>
</tr>
<tr>
<td>OHBS-Benefits Exercise</td>
<td>14.6(3.81)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>23.6(4/03)</td>
<td>10</td>
</tr>
<tr>
<td>OHBS-Health Motivation</td>
<td>75(18.06)</td>
<td>11</td>
</tr>
<tr>
<td>OSES-Exercise</td>
<td>79.68(13.90)</td>
<td>11</td>
</tr>
</tbody>
</table>
Descriptive Statistics

Mean scores for each survey subscale were calculated using SPSS, by training type. The mean scores for the OKT and OHBS are provided in Table 4.3 and these reflect both pre and post workshop means for each of the subscales in these tests. The mean scores for the OSES, which are also included in Table 4.3, reflect only the post-workshop means for both OSES subscales. In addition, the mean scores and standard deviations of the difference scores on the OKT and the OHBS were calculated. The results are presented in table 4.4.

Table 4.4-Descriptive Statistics for Difference Scores

<table>
<thead>
<tr>
<th></th>
<th>Group 1-Enhanced</th>
<th>Group 2-DVD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (sd) N</td>
<td>Mean (sd) n</td>
</tr>
<tr>
<td>OKT-Exercise</td>
<td>1.62(2.65) 11</td>
<td>4.51(3.01) 11</td>
</tr>
<tr>
<td>OKT-Calcium</td>
<td>2.36(1.91) 11</td>
<td>4.11(2.55) 11</td>
</tr>
<tr>
<td>OHBS-Susceptibility</td>
<td>.72(3.24) 10</td>
<td>2.07(3.59) 11</td>
</tr>
<tr>
<td>OHBS-Seriousness</td>
<td>3.90(1.29) 10</td>
<td>1.34(3.93) 10</td>
</tr>
<tr>
<td>OHBS-Benefits Exercise</td>
<td>.40(3.37) 10</td>
<td>2.42(2.59) 10</td>
</tr>
<tr>
<td>OHBS-Benefits Calcium</td>
<td>3.26(2.84) 10</td>
<td>2.82(2.26) 10</td>
</tr>
<tr>
<td>OHBS-Barriers Exercise</td>
<td>.70(2.36) 10</td>
<td>-.58(3.48) 11</td>
</tr>
<tr>
<td>OHBS-Barriers Calcium</td>
<td>-.30(4.14) 10</td>
<td>-.68(2.95) 11</td>
</tr>
<tr>
<td>OHBS-Health Motivation</td>
<td>.30(2.11) 10</td>
<td>1.09(3.96) 11</td>
</tr>
</tbody>
</table>

Inferential Statistics

The purpose of this study was to examine whether the provision of OP related training to employees’ resulted in increased employee knowledge and health beliefs regarding OP. Two different types of employee OP training were provided in a
comparison group design to examine if significant differences in OP knowledge and beliefs resulted and whether those results can be attributed to the type of training received. Statistical tests were chosen, based on their appropriateness or the assumptions of the particular test, to address research questions one through four.

**Research Questions One and Two**

The non-parametric Wilcoxon Signed Rank test was chosen to answer research questions one and two:

1. “Will an enhanced OP education workshop for professional care staff, which is built upon the Health Belief Model (HBM) and Social Cognitive Theory (SCT), and using multiple evidenced-based instruction methods and teaching techniques, have a significant positive impact on staff’s OP knowledge and beliefs?”

2. Will OP education consisting of a DVD presentation paired with an outline containing leading questions have a significant positive impact on staff’s OP knowledge and beliefs?

The Wilcoxon Signed Rank test is recommended for use when you wish to compare medians of a distribution, when you have pre-treatment and post-treatment data, and when there is a small sample size. In this case, we compared the difference scores between the pre-workshop and post-workshop surveys for the enhanced workshop and for the DVD-based workshop to determine whether the separate workshops had a significant positive impact on the OP knowledge and beliefs of the participants. The test statistics for the Wilcoxon Signed Rank Test are provided in Table 4.5. Based on an established alpha level of .05 we are instructed to reject the null hypothesis, that the
median difference between the pairs of scores is zero, in three subscales for the enhanced group and in four subscales or the DVD-based group. The enhanced training seemed to have a significant positive impact in the OKT-Calcium, OHBS-Seriousness, and OHBS-Benefits of Calcium Subscales. The effectiveness of the enhanced training approached significance in the OKT-exercise subscale. The DVD-based training had a significant positive impact in the OKT exercise, OKT Calcium, OHBS Benefits of Exercise and OHBS Benefits of Calcium subscales. The results of this test will be discussed and interpreted further in the following chapter.

Table 4.5: Wilcoxon Signed-Rank Test Statistics (b=positive, c=negative)

<table>
<thead>
<tr>
<th>Variables-Difference Scores</th>
<th>Research Question 1 Enhanced Group</th>
<th>Research Question 2 DVD-Based Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Z Value</td>
<td>P Value</td>
</tr>
<tr>
<td>OKT-Exercise</td>
<td>-1.840(b)</td>
<td>.066</td>
</tr>
<tr>
<td>OKT-Calcium</td>
<td>-2.820(b)</td>
<td>.005</td>
</tr>
<tr>
<td>OHBS-Susceptibility</td>
<td>-.892(b)</td>
<td>.372</td>
</tr>
<tr>
<td>OHBS-Seriousness</td>
<td>-2.825(b)</td>
<td>.005</td>
</tr>
<tr>
<td>OHBS-Benefits Exercise</td>
<td>-.524(b)</td>
<td>.600</td>
</tr>
<tr>
<td>OHBS-Benefits Calcium</td>
<td>-2.527(b)</td>
<td>.012</td>
</tr>
<tr>
<td>OHBS-Barriers Exercise</td>
<td>-.736(b)</td>
<td>.461</td>
</tr>
<tr>
<td>OHBS-Barriers Calcium</td>
<td>-.351(c)</td>
<td>.726</td>
</tr>
<tr>
<td>OHBS-Health Motivation</td>
<td>.512(b)</td>
<td>.609</td>
</tr>
</tbody>
</table>

Research Question Three

To examine research question three “Is there a difference in the impact of the two training approaches?”, an independent samples Mann-Whitney U test was utilized to analyze the difference scores (pre and post workshop tests) for each subscale of the OKT, and the OHBS, by type of training group. The independent samples Mann-Whitney U Test statistics are provided in Table 4.6.

The results of the Mann-Whitney U test failed to reject the null hypothesis that no significant difference exists between the difference scores of the subjects receiving
Table 4.6 Mann-Whitney U statistics for Difference Scores

<table>
<thead>
<tr>
<th>Variables-Difference Scores</th>
<th>Mann-Whitney U Value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OKT- Exercise</td>
<td>27.5</td>
<td>.030</td>
</tr>
<tr>
<td>OKT-Calcium</td>
<td>33.0</td>
<td>.069</td>
</tr>
<tr>
<td>OHBS-Susceptibility</td>
<td>37.5</td>
<td>.215</td>
</tr>
<tr>
<td>OHBS-Seriousness</td>
<td>27.0</td>
<td>.079</td>
</tr>
<tr>
<td>OHBS-Benefits Exercise</td>
<td>32.0</td>
<td>.166</td>
</tr>
<tr>
<td>OHBS-Benefits Calcium</td>
<td>47.0</td>
<td>.819</td>
</tr>
<tr>
<td>OHBS-Barriers Exercise</td>
<td>36.5</td>
<td>.186</td>
</tr>
<tr>
<td>OHBS-Barriers Calcium</td>
<td>51.5</td>
<td>.804</td>
</tr>
<tr>
<td>OHBS-Health Motivation</td>
<td>43.0</td>
<td>.392</td>
</tr>
</tbody>
</table>

enhanced training and those who received the DVD/leading question training, in all but
the OKT exercise subscale. We were instructed to reject the null hypothesis for the OKT
exercise subscale based on the statistical analysis. The established significance level
was .05, the p value for the OKT-exercise difference score calculation was .030, and the
Mann-Whitney U test statistic was 27.5.

*Research Question Four*

Research question four “What OP self-efficacy scores will be reported at the
conclusion of the employee training and is there a significant difference in the self-
efficacy scores of the different treatment groups?” was addressed by performing a Mann-Whitney U test on the OSES calcium and exercise subscales which were completed at the
end of the training sessions. This was done to determine if there was a statistical
difference between the enhanced training group and the DVD-based training group.
Table 4.6 presents the Mann-Whitney U statistic and corresponding significance level (p-
value) for the two different OSES scales by type of training group. For the OSES
exercise subscale, statistical analysis instructed us to reject the null hypothesis that there
was no statistical difference between the survey results of the group that received the
Multi-Method Enhanced Workshop and the group that received the DVD/leading
question based training. Because the OSES exercise and calcium subscales were only administered after the workshops, the OSES survey only compared the scores by type of training provided and did not compare pre and post workshop scores.

Table 4.7: Mann-Whitney U Test Results for Self-Efficacy Scales

<table>
<thead>
<tr>
<th>Variables</th>
<th>Enhanced Mean Rank</th>
<th>DVD Mean Rank</th>
<th>Mann-Whitney Statistic</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSES Exercise</td>
<td>8.05</td>
<td>13.68</td>
<td>25.5</td>
<td>.036</td>
</tr>
<tr>
<td>OSES Calcium</td>
<td>9.65</td>
<td>12.23</td>
<td>41.5</td>
<td>.349</td>
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Comparison of the mean scores indicated that the significant differences in the two subscales (OKT exercise and OSES exercise) were not in the expected direction. Calculations indicate that the DVD/leading question training resulted in significantly greater improvement in the OKT exercise subscale. A comparison of mean scores on the OSES exercise subscale appear to indicate that the subjects who attended the DVD/leading question training reported themselves as having a higher exercise self-efficacy than the subjects who attended the enhanced training. Due to the fact that the OSES was not administered prior to the training workshops, we cannot infer whether or not the training actually impacted the self-efficacy of the subjects.

*Overall effect of training workshops*

To test whether the OP training had a significant impact on the knowledge and health beliefs of the entire group of subjects, without regard to the type of training received by the subjects, a single group t test was used to analyze the difference scores between the post and pre surveys, by subscale. The test statistics are provided in Table 4.8. The information presented in Table 4.8 indicates that both training approaches created significant effect in some areas. To be more specific, significant increases in
accurate employee knowledge and health beliefs pertaining to OP were confirmed through the T-test calculation, for the OKT calcium subscale, the OHBS seriousness subscale, and the OHBS benefits of calcium subscale. This supports the hypothesis that the OP training resulted in a significant improvement in employee osteoporosis knowledge and accurate health beliefs, in these specific areas. In addition, analysis of the difference scores between post-test and pre-test indicated that the results were approaching the significance level for the OHBS Benefits of Exercise and the OHBS Susceptibility Subscales. For these two subscales there appears to be a difference but that difference does not quite reach a level of statistical significance. These findings support an indication of the success of the overall training to increase accurate employee knowledge and health beliefs in several areas pertaining to OP. Further review of the above analysis shows that neither method of training had an effect on the barrier scale or the beliefs about health motivation scale.

Table 4.8: t-test results

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<tr>
<th>Variables-Difference Scores</th>
<th>Mean difference</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
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<td>OHBS-Susceptibility</td>
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<td>1.92</td>
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<td>OHBS-Seriousness</td>
<td>2.62</td>
<td>3.74</td>
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<td>3.04</td>
<td>5.42</td>
<td>19</td>
<td>.00</td>
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<td>2.03</td>
<td>19</td>
<td>.06</td>
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<td>-.66</td>
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<tr>
<td>OHBS-Health Motivation</td>
<td>.71</td>
<td>1.03</td>
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</table>
CHAPTER 5- SUMMARY, FINDINGS, CONCLUSIONS, & RECOMMENDATIONS

Summary

The purpose of this study was to examine whether the provision of OP related training to employees resulted in increased employee knowledge and accurate beliefs regarding OP. Two different types of employee OP training were provided in a comparison group design to examine if significant differences in OP knowledge and beliefs resulted and whether those results can be attributed to the type of training received.

The subjects of this study were 21 adult female staff and 2 adult male staff that provided direct care to individuals with ID who resided in the group homes where the staff worked during the summer of 2012. Subjects participated in the research project in their intact groups based on the group home in which they worked. The convenience sample included staff from Homes 3A, 3C, 3D, and 7C at the Northern Virginia Training Center, in Fairfax, Virginia, who volunteered to participate.

Staff members were randomly assigned by intact group to either the Multi-Method Enhanced OP workshop or the DVD/leading question OP workshop. Both types of training incorporated some evidence-based teaching techniques, although the enhanced training featured three speakers who incorporated a variety of evidenced based teaching techniques and information into their sessions. Examples include modeling, creative demonstrations, group participation, etc. In addition, more components of the SCT were incorporated into the strategies of the Multi-Method Enhanced Workshop. Details about the teaching techniques and content of the workshops, is included in chapter 3. Appendix C includes more specific descriptions of both workshops.
Findings

Data analysis indicated the findings as follows:

1. The background characteristics of the two groups of participants were relatively the same prior to the OP workshops being provided. There were no significant differences in the group demographics prior to treatment.

2. Statistically significant improvement was seen in some subscales for both the enhanced workshop group and the DVD-based workshop group, from pre to post workshop survey, based on the results of the Wilcoxon Signed-Rank test. The enhanced group seemed to show a statistically significant difference on the OKT-Calcium, OHBS-Seriousness and OHBS-Benefits of Calcium scales. The DVD based group seemed to show a statistically significant difference on the OKT-Exercise, OKT-Calcium, OHBS-Benefits of Exercise and the OHBS-Benefits of Calcium scales.

3. When the Mann-Whitney U test was utilized to examine the difference between the effectiveness of the two trainings, a significant difference was found between the pre workshop and post workshop scores (difference scores) on only the OKT exercise subscale. The significant difference between the pre workshop and post workshop scores (difference scores) on the OKT exercise subscale, were not in the expected direction. The participants of the DVD-based training showed a significant improvement in their OKT exercise scores when compared to the participants in the enhanced training group.

4. A significant difference was found in the post-workshop OSES exercise scores between the DVD-based training group and the enhanced training group. Review
of mean scores indicates that the subjects who attended the DVD-based training self-reported a higher level of exercise self-efficacy than the subjects who received the enhanced training.

5. Aside from group differences noted above, there were significant differences in the pre to post scores (difference scores) on the OKT calcium, the OHBS seriousness, and the OHBS benefits of calcium subscales, when analyzed for the entire sample using the t-test.

6. Differences in the pre to post scores (difference scores) on the OHBS benefits of exercise and the OHBS susceptibility subscales approached significance, when analyzed for the entire sample. There appeared to be a difference but that difference did not reach statistical significance.

Limitations

Several limitations existed within this study. A key limitation was the small sample size. This was dealt with effectively by utilizing a relatively robust non-parametric test which is acceptable for use with small sample sizes, to determine if significant differences in scores on the survey tools existed based on the type of training received. This was also dealt with by combining demographic variables to create fewer cells for more accurate Chi-square analysis. Another limitation was the lack of randomization on an individual basis. One manner of improving this was to randomly assign intact groups to the type of treatment provided. Although this study could not be considered a true experimental study, a quasi-experimental design was utilized as effectively as possible. Unfortunately, because individual randomization was not utilized, the conclusions of the study cannot be generalized to the wider population.
group. Other possible limitations that may have impacted results included a few overall missing data points, approximately one fourth of the subjects in one group arriving very late for their training workshop, two survey tools not completed according to instruction (for two different subjects), an entire page of one subscale missing, and two entire surveys missing (for one subject).

Another concern regarding limitations has to do with three items on the OKT survey instrument and the fact that the presenters were not in total agreement with the wording and accuracy of these items. This may have impacted how the material for these specific items was presented in the enhanced workshop with the three presenters. If a presenter is not in full agreement with an item on a survey, they will be less likely to emphasize that information. It was essential to the presenters that the information presented be accurate based on current research findings. While we liked the survey tools in general, updates of some items are indicated. The concerns had to do with items numbered 11 and 13 on the OKT exercise subscale and item number 23 on the calcium subscale.

In regard to item number 11 of the OKT exercise scale, the correct answer, according to the scoring key, is that bicycling is the most appropriate exercise to increase bone density, out of three possible choices. The physical therapist did not agree that bicycling should be encouraged for prevention of OP or for increasing bone density, especially for those who already have been diagnosed with bone loss. She stated that there are many other exercises that should be emphasized, because they are more beneficial. Also, in cases where people already have bone loss, the flexion of the osteoporotic part of the spine, that occurs when riding a bicycle, may be contraindicated.
Research evidence to support this position was provided in (Sinaki, 2007), which indicated that people who had engaged in regular exercises involving extension of the osteoporotic spine, had seen significant improvement when compared to those subjects who had engaged in flexion exercises or a combination of flexion and extension exercises. It was suggested that flexion of the osteoporotic spine may result in more vertebral compressions or fractures. Sinaki also stressed that muscle strengthening as well as focus on increasing bone density is important. She stated that “optimal exercise programs differ according to an individual’s cardiovascular health, bone density, muscle strength, and history of involvement in sports activity” (p.600). Additional review of literature was conducted by the co-investigator, after the OP workshops had been conducted to further investigate specific exercise programs shown to maintain or increase bone density. The International Osteoporosis Foundation (IOF) provided several recommendations available on their website at http://www.iofbonehealth.org in the document titled exercise recommendations. They also confirmed the view that bicycling is not a recommended exercise for increasing bone density. They state that “while virtually all physical activity reduces the risk of cardiovascular disease, swimming and cycling, for example, will rarely augment bone mineral density (BMD)” (IOF, p. 2). They went on to say that “with increasing age, however, the emphasis of exercise should switch gradually from bone loading to muscle loading in order to improve parameters of muscle function such as strength and coordination. This also holds true for patients with advanced osteoporosis (characterized by multiple fractures and severely reduced
bone mineral density) to help them avoid further fractures, prevent falls, and to facilitate daily activities” (IOF, p.2).

The other exercise scale item with which there were concerns had to do with question number 13. Here the participant is asked to indicate the minimal length of time that people should engage in exercise to strengthen their bones. According to the scoring key, the correct answer is 20-30 minutes. The presenters agree that it is beneficial to engage in exercise for at least 20-30 minutes, however, they disagree that 20-30 consecutive minutes are necessary to improve bone density. This length of exercise is typically recommended for cardiovascular conditioning purposes, which is confirmed by the American Heart Association (AHA). Their document entitled American Heart Association Recommendations for Physical Activity in Adults (nd) recommends “at least 30 minutes of moderate intensity aerobic activity at least 5 days per week for a total of 150, or at least 25 minutes of vigorous aerobic activity at least 3 days per week for a total of 75, and moderate to high intensity muscle strengthening activity at least 2 or more days per week for additional health benefits” (p. 1). The physical therapist argued that weight-bearing exercises to increase bone density can be done in increments and do not have to necessarily be done for 20-30 uninterrupted minutes. This lead to additional literature review to confirm the recommended exercise time for cardiovascular conditioning, and for increasing bone density. Quinn (2011) noted that it is possible to see an increase in bone density in as little as 12 to 20 minutes of weight-bearing exercise, when done only three days a week. The NOF also supports this view that 30-minute sessions on most days of the week, or the alternative of participating in several sessions that take place throughout the day are recommended. They go on to say that whether you
complete a 30 minute long session or several shorter sessions throughout the day, the resulting benefits do not differ. (NOF, retrieved July 7, 2013).

The last concern with the OKT survey had to do with the calcium scale and specifically dealt with item number 23. This item asks the participant to indicate the number of glasses of milk a person should drink to have the recommended amount of calcium needed. The correct answer is 2 or more glasses. The basic concerns with this item are that the recommended amount of calcium varies based upon the person’s age and gender (Ross et al., 2011).

Conclusions

Within the limitations of this study, the following conclusions were drawn which are believed to be warranted.

1. The enhanced group showed statistically significant gains on the OKT-Calcium, OHBS-Seriousness, and OHBS-Benefits of Calcium subscales from pre to post workshop.
2. The DVD-based group showed statistically significant gains on the OKT-Exercise, OKT-Calcium, OHBS-Benefits of Exercise, and OHBS-Benefits of Calcium subscales from pre to post workshop.
3. When compared to each other, the DVD-based group showed statistically greater gain in OP knowledge related to exercise, then did the enhanced group.
4. When compared to each other, the DVD-based group reported self-efficacy related to exercise, at post-training only, significantly higher than the enhanced group.
5. Both OP education workshops had a significant positive effect on the OP knowledge and beliefs of participants, in the areas of OKT calcium, OHBS seriousness and OHBS benefits of calcium, when the entire single sample was used in analysis.

6. Both OP education workshops approached a level of statistical significance in the areas of OHBS benefits of exercise and OHBS susceptibility, when the entire single sample was used in analysis.

7. Since the sample group appears to be representative of the entire population of caregivers at NVTC, we believe that similar results would occur if the OP training was replicated using other group home staff at NVTC. However, due to lack of randomization, we cannot make inferences about possible population results.

8. When analyzed based on the type of training provided, statistically significant results that both types of training held in common were for the OKT-Calcium and the OHBS-Benefits of Calcium subscales. The results differed in that significant change was found in the OHBS-Seriousness scores for the enhanced group but not for the DVD-based group while the DVD-based group showed significant change from pre to post workshop in the OKT-exercise and OHBS-Benefits of Exercise scores.

9. Analysis based upon type of training received provides evidence that the DVD/leading question training was more effective in regard to the OKT exercise scale scores from pre to post workshop. This effect was not in the expected direction. The issues explained earlier, in the limitations section, may explain these results. In addition:
a. The Multi-method Enhanced Workshops included much more information and activities and therefore, it may have been more difficult for participants to process and retain information about the key items that would be covered on the survey tools. In addition, the expanded amount of information and participatory activities may have resulted in increased knowledge that was not included or tested in the surveys.

b. A review of key points was incorporated at the end of the DVD/leading question based training due to the concern by the co-investigator, that participants may not have received some key information they needed to accurately complete the measurement tests. Additional information that may not have been clear to the subjects who watched the DVD was therefore reviewed with those subjects at the end of the DVD/leading question training sessions.

c. The DVD actually showed pictures of individuals bicycling, which may have prompted participants in the DVD-based training to choose that answer on the survey.

d. The DVD-based workshops were facilitated only by the co-investigator (Recreation Therapist). The RT was more aware of the survey tools and designed and taught the DVD-based training based on the content of the survey tools.

Recommendations

The following recommendations are made in regard to improving the organization and/or order of the OP workshops and administration of survey instruments for possible replications of this study and/or replication of the OP training workshops.
1. Spend more time explaining to participants how to score the survey tools. This is especially important if a researcher plans to use the OSES with visual analog scale. This is also important if a majority of the participants speak English as a second language. In our study, 18 out of 23 participants spoke English as a second language which is 78% of the sample.

2. Allow the participants more time to complete the survey tools. Also, consider using a shorter version of the scales if available and possible. This may help participants stay more focused and interested. Perhaps we asked the participants to complete too much paperwork.

3. Stress ahead of time to participants, the importance of arriving on time and contact the participants to confirm the start and end time of the workshops. We had difficulty in one workshop where staff who worked the pm shift starting at 2:00 pm was supposed to come to the workshop 1 hour earlier to participate, and staff who worked the Am shift was supposed to stay 1 hour later than their normal shift ended in order to complete the training. Unfortunately, the Pm staff arrived late and the Am staff wanted to leave the training early. This may have impacted the results of the training.

4. All presenters should review the items on the survey tools in detail and discuss any concerns or disagreements about the survey items in advance. Then, any revisions to the tools or revisions in workshop content should be agreed upon and should be based upon research findings.

5. Someone other than the primary presenter or co-investigator should be assigned to collect all the pre and post workshop surveys and ensure they are clearly marked.
with the participant number and whether they are pre or post workshop surveys.

In the case of the DVD/leading question training, the co-investigator was the only person present at the training workshops. Therefore, it was difficult to facilitate the training and also ensure that all surveys were collected and that each participant had correctly and entirely completed each survey.

6. Determine the most appropriate dates to schedule the workshops and take care to make sure they do not occur during religious holidays. During this study, two of the workshops occurred during a religious holiday that lasted several weeks. Some of the participants were fasting and could not partake of the free gourmet lunch or snacks that were incentives for coming to the workshop.

Recommendations are also made in regard to revisions to the survey instruments.

These recommendations include:

1. Revise OKT exercise scale item number 11, to include the correct answer being an exercise recommended for increasing bone density and preventing OP that is supported by recent research and is not contraindicated for people with OP. We recommend eliminating “bicycling” and replacing it with “jumping rope”.

2. Revise OKT exercise scale item number 13, so that it is clear that 20-30 minutes of exercise is recommended, but that to build bone density, weight-bearing activity is key and it does not necessarily have to be done for 20-30 straight minutes. Weight-bearing activity can be done in smaller increments of time.

3. Revise OKT calcium scale item number 23, so it indicates the number of ounces of the two glasses of milk recommended, in order for to have the correct calcium intake according to the RDA of calcium. Consideration should also be given to
adding the gender and age of the person who would be drinking the milk, in the survey item. This is important because the RDA of calcium varies by gender and age.

4. Revise the OSES scales so they are measured by another method other than visual analog. Our experience with this survey was that some participants did not understand how to score the survey and as a result, they completed it incorrectly.

The following recommendations pertain to further research in the area of providing OP training to staff members and other people who provide direct care to people with ID/DD and/or pertaining to the prevalence of OP in the population of people with ID/DD and methods of preventing OP in persons with ID/DD. Based on previously discussed issues, limitations and conclusions it is recommended that:

1. Further research should be conducted, replicating the workshop formats in the this study to further test the results of the two different formats, on the OP knowledge and beliefs of people who provide care to people with ID/DD.

2. Further research should be conducted, using larger sample sizes to determine if similar results occur.

3. Workshop content and methods should continue to be improved and made available to community group homes and other living environments where staffs provide direct support to people with ID/DD.

4. Research studies should be conducted where the bone density of people with ID/DD are tested to gather specific prevalence data about OP in this population.
5. RT and/or multidisciplinary treatment programs should be developed and tested to determine their effectiveness in increasing the bone density of people with ID/DD or maintaining current bone density.

Implications for Staff OP Education

Administrative implications for planning and conducting OP education workshops and training for staff members who provide direct care to people with ID/DD are discussed in closing. The original purposes of this research project were to determine if OP education provided to direct care staffs that support people with ID/DD would be effective in increasing the staffs OP knowledge and accurate OP health beliefs, and to determine whether there would be a significant difference in OP knowledge and OP health beliefs from pre to post workshop by type of training provided. In addition, we planned to examine the self-efficacy scores after the training was provided to determine any difference between the two groups in self-efficacy scores and to explore areas where additional training or support may be needed to increase staffs self-efficacy beliefs.

The exercise related self-efficacy concerns identified by participants, could possibly be addressed by providing practical suggestions on exercises that are easy to fit into one’s normal schedule and may not even be recognized as exercises to build bone density. Examples are walking up steps, parking at the far end of the parking lot when walking into a store, carrying groceries in a backpack, doing exercises during TV commercials, etc. Also, since it has been established that exercises to build bone density can be performed in small increments of time throughout the day rather than in one long session, stressing that fact could serve to increase the exercise self-efficacy of staff.
Calcium self-efficacy concerns of participants could be addressed by providing environmental supports such as making calcium rich snacks readily available at the workplace, teaching participants the number and size of servings of calcium rich foods to eat each day, or providing more information about the variety of foods that are rich in calcium and where they can be purchased.

Based on the statistical analysis conducted for the subscales of the OKT and the OHBS, it appears that both types of training resulted in significant improvements in the OP knowledge and accuracy of OP health beliefs of the subjects on several subscales. These significant improvements were in the areas of the OP calcium knowledge, OP health beliefs concerning seriousness of the condition, and beliefs about the benefits of calcium for OP. Results approached the level of statistical significance in terms of beliefs about the benefits of exercise and beliefs about susceptibility to the condition of OP, when analysis was conducted for the entire sample. Of course, these improvements were only those measured by the scores on each of the items which comprise the subscales of the survey tools. This substantiates the value of the OP training in that it effectively provided needed information and resulted in changes in critical health knowledge and beliefs of staff. The results also indicate that both types of training were effective in some areas, which appears to show that administrators do not necessarily have to choose a training workshop that involves multiple staff resulting in additional costs, or expensive equipment. There are ways to incorporate evidence-based enhancements to trainings conducted by one person which also use DVD or other types of electronic presentations.
When the two types of training were examined to one another, the OKT-exercise subscale demonstrated a significantly different outcome. The differences were not in the expected direction. Therefore, it appears that the DVD-based training was more effective in increasing the exercise knowledge of the subjects than the enhanced training. It is important to keep in mind however, that this is based only on the scores of the items on the subscales. The actual items surveyed and the way they are worded may impact results. Some of the concerns about items on the exercise and calcium subscales were discussed previously. It is entirely possible that subjects who attended the enhanced training with professional PT and RD gained additional knowledge and increased their accurate health beliefs on topics or in specific ways that were not surveyed because they were not included on the survey tools. For instance, participants in the enhanced workshops learned a variety of helpful information and engaged in experiential learning exercises that taught them how to correctly read and interpret a food label, how to choose recipes that are rich in calcium, and how to safely perform specific exercises that have been shown to improve bone density. Participants in the enhanced training also received additional opportunities to discuss and learn about ways to promote bone health for the individuals who live at NVTC. These skills and knowledge were not specifically tested by the survey tools.

*Informed OP training development for direct care staff*

This study provides foundational information to help inform future OP workshop development for direct care staffs that support people with intellectual disabilities. It also helps to identify the need for bone density screening and testing for people with disabilities who may be more at risk for OP. For instance, tracking the risk factors for
OP of people with ID/DD, on an individualized basis, to determine whether bone density testing may be recommended, seems to be indicated, due to the increased number of risk factors often present in people with ID/DD. The information gathered for this study and results of statistical tests have indicated the success of both workshop models in increasing aspects of the participants’ accurate OP knowledge and beliefs. What has yet to be developed is a follow-up course to these workshops that will focus more specifically on further development of the workshop content and transfer and practical application of this content to benefit people with ID/DD. As indicated in this study, using a multi-disciplinary model is beneficial as it brings the value of expertise from varied clinical disciplines. As there is some evidence that suggests that people with ID/DD may be at greater risk for developing OP, designing OP prevention and bone density maintenance interventions for this population, that involve exercise and diet are indicated. Widespread dissemination of information regarding the risks, prevalence, and seriousness of OP, as well as the benefits of exercise and diet seem overdue, especially for this population.

Another area for future development is a workshop that incorporates behavior change components, with pre and post workshop surveys. Although there was some original intention to include a behavior change component in this study, logistics prevented the implementation of such a component. Perhaps a future workshop could incorporate a survey regarding actual behavioral changes that occur and are sustained at various intervals post workshop.

The information learned from this study also shows the importance of keeping abreast of the constantly changing medical information and clinical recommendations
determined through research. OP, exercise and nutritional recommendations may change and therefore, it is important to make research informed revisions to survey tools, training techniques, and treatment interventions on an annual basis. A need for products to be specifically developed for use by individuals with disabilities may also be indicated. An example might be a pedometer that verbally reinforces individuals with limited cognitive ability to walk.

Results of the statistical tests seem to indicate the need for further revision of the enhanced workshop to ensure participants are aware of the seriousness of OP, their susceptibility to developing OP, and the possible positive impact of daily weight-bearing exercise in OP prevention.

In closing, the view of the co-investigator is that the outcome measures utilized for this study were more related to basic OP knowledge and beliefs and therefore, they effectively measured basic OP information. The results of this study, supported by the statistical analysis of the survey items scored, indicate that both training types were mainly equal in effectiveness in improving basic OP knowledge and beliefs. The co-investigator and other presenters speculate that were more advanced OP knowledge, beliefs, and practices examined, differences may have been found between the DVD and enhanced versions of the training. Both types of training can be used effectively when evidenced based teaching techniques and current OP prevention information is incorporated into the training. Through the use of the enhanced training format, however, instructors were able to teach additional skills and information important to the accurate understanding of nutrition and exercise guidelines and routines for the prevention of OP.
REFERENCES


Doerksen, S.E., & Estabrooks, P.A. (2007). Brief fruit and vegetable messages

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INDIANA UNIVERSITY INSTITUTIONAL REVIEW BOARD (IRB)
DOCUMENTATION OF REVIEW AND APPROVAL (DRA)

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Behavioral: □ IRB-01 □ IUB IRB

Please type only in the gray boxes. To mark a box or checked, double-click the box, select “checked”, and click “OK”.

SECTION I: INVESTIGATOR INFORMATION

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☒ Student: □ Fellow ☐ Resident
☐ Undergraduate ✓ Gradate

Additional Study Contact:
Name: □ Phone: ______ E-Mail: ______

Project Title: The Impact of Osteoporosis Training on Professional Care Staff's Osteoporosis Knowledge and Beliefs
Anticipated Project Completion Date: April 2013

Sponsor/Funding Agency: NONE PI on Grant: ______
Sponsor Protocol #/Grant #: ______ Period: from ______ to ______
Sponsor Type: ☐ Federal ☐ State ☐ Industry ☐ Not-for-Profit ☐ Unfunded ☐ Internally Funded
Funding Status: ☐ Funding ☐ Funded ☐ N/A
Grant Title (if different from project title): ______

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☐ Biomedical: ☐ IRB-02 ☐ IRB-03 ☐ IRB-04 ☐ IRB-05

SECTION III: DOCUMENTS INCLUDED WITH RESEARCH SUBMISSION
☒ Assent, dated: ______
☒ Authorization, dated: ______
☒ Number of consent documents: ______
☒ Request form(s) for vulnerable population(s) (please list and date): ______
☒ Surveys, questionnaires (please list and date): ______
☒ Clinical Investigator's Brochure, dated: ______
☒ Exempt Research Checklist, dated: ______
☒ IRBAA & Recruitment Checklist, dated: ______
☒ Informed Consent, dated: 3/13/12
☒ Number of consent documents: 1
☒ Investigator List, dated: 3/27/12
☒ Protocol, dated: ______
☒ Recruitment materials (please list and date): ______

Other (please list and date): Demographics Form 4/12, Research- Related Financial Interest Disclosure Form 3/19/12, DRA Form 4/5/12.

IRB Form v01/01/2012
By submitting this form, the Principal Investigator assures that all information provided is accurate. He/she assures that procedures performed under this project will be conducted in strict accordance with federal regulations and Indiana University policies and procedures that govern research involving human subjects. He/she acknowledges that he/she has the resources required to conduct research in a way that will protect the rights and welfare of participants, and that he/she will employ sound study design which minimizes risks to subjects. He/she agrees to submit any changes to the project (e.g., change in principal investigator, research methodology, subject recruitment procedures, etc.) to the Board in the form of an amendment for IRB approval prior to implementation.

This research project, including all documents included with the submission (e.g., informed consent statement, authorization, and/or waiver of authorization) has been reviewed and approved by the Indiana University IRB for a maximum of a one year period unless otherwise indicated as follows:

☐ Exempt Category(ies), if applicable:
☐ Expedited Category(ies), if applicable:

Authorized IRB Signature: ____________________________  IRB Approval Date: 5/23/2012

Printed Name of IRB Member: ____________________________

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IRB Study #: 1204008416
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APPLICABILITY:
(A) Research activities that: (1) present no more than minimal privacy, psychological and/or physical risk to human subjects, and (2) involve only procedures listed in one or more of the following categories, may be reviewed by the IRB through the expedited review procedure authorized by 45 CFR 46.110 and 21 CFR 56.110. The activities listed should not be deemed to be of minimal risk simply because they are included on this list. Inclusion on this list merely means that the activity is eligible for review through the expedited review procedure when the specific circumstances of the proposed research involve no more than minimal risk to human subjects.

(B) The categories in this list apply regardless of the age of the subjects, except as noted.

(C) The expedited review procedure may not be used where identification of the subjects and/or their responses would reasonably place them at risk of criminal or civil liability or be damaging to the subjects’ financial standing, employability, insurability, reputation, or be stigmatizing, unless reasonable and appropriate protections will be implemented so that risks related to invasion of privacy and breach of confidentiality are no greater than minimal.

(D) The expedited categories outlined below do not apply to research involving prisoners or to classified research involving human subjects.

(E) The standard requirements for informed consent and authorization (or their waiver, alteration, or exception) apply regardless of the type of review.

Check the appropriate category(ies) that applies to your research project:

☐ 1. Clinical studies of drugs and medical devices only when condition (a) or (b) is met.
   (a) Research on drugs for which an investigational new drug application (21 CFR Part 312) is not required. (Note: Research on marketed drugs that significantly increases the risks or decreases the acceptability of the risks associated with the use of the product is not eligible for expedited review).
   or
   (b) Research on medical devices for which (i) an investigational device exemption application (21 CFR Part 812) is not required; or (ii) the medical device is cleared / approved for marketing and the medical device is being used in accordance with its cleared / approved labeling.

☐ 2. Collection of blood samples by finger stick, heel stick, ear stick or venipuncture, as follows:
   (a) From healthy, nonpregnant adults who weigh at least 110 pounds. For these subjects, the amounts withdrawn may not exceed 550 ml in an 8 week period and collection may not occur more frequently than 2 times per week; or
   (b) From other adults and children, considering the age, weight, and health of the subjects, the collection procedure, the amount of blood to be collected, and the frequency with which it will be collected. For these subjects, the amount drawn may not exceed the lesser of 50 ml or 3 ml per kg in an 8 week period and collection may not occur more frequently than 2 times per week.
3. Prospective collection of biological specimens for research purposes by noninvasive means. Examples:
(a) Hair and nail clippings in a nondisfiguring manner;
(b) Deciduous teeth at time of exfoliation or if routine patient care indicates a need for extraction;
(c) Permanent teeth if routine patient care indicates a need for extraction;
(d) Excreta and external secretions (including sweat);
(e) Uncannulated saliva collected either in an unstimulated fashion or stimulated by chewing gumbase or wax by applying a dilute citric solution to the tongue;
(f) Placenta removed at delivery;
(g) Amniotic fluid obtained at the time of rupture of the membrane prior to or during labor;
(h) Supra- and subgingival dental plaque and calculus, provided the collection procedure is not more invasive than routine prophylactic scaling of the teeth and the process is accomplished in accordance with accepted prophylactic techniques;
(i) Musosal and skin cells collected by buccal scraping or swab, skin swab, or mouth washings;
(j) Sputum collected after saline mist nebulization.

4. Collection of data through noninvasive procedures (not involving general anesthesia or sedation) routinely employed in clinical practice, excluding procedures involving x-rays or microwaves. Where medical devices are employed, they must be cleared/approved for marketing. Examples:
(a) physical sensors that are applied either to the surface of the body or at a distance and do not involve input of significant amounts of energy into the subject or an invasion of the subject’s privacy;
(b) weighing or testing sensory acuity;
(c) magnetic resonance imaging;
(d) electrocardiology; electroencephalography, thermography detection of naturally occurring radioactivity, electoretinography, ultrasound, diagnostic infrared imaging, doppler blood flow, and echocardiography;
(e) moderate exercise, muscular strength testing, body composition assessment and flexibility testing where appropriate given the age, weight and health of the individual

5. Research involving materials (data, documents, records or specimens) that have been collected or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis). NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(4). This listing refers only to research that is not exempt. Check below, as appropriate.

Provide a list of all data points that will be collected below or attach a data collection sheet.

(a)

6. Collection of data from voice, video, digital or image recordings made for research purposes. If the data collected is considered individually identifiable health information, the data must be protected from inappropriate use and disclosure. Either an authorization must be obtained from the subject or a waiver of authorization must be obtained from the IRB.

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects (45 CFR 46.101(b)(2) and (b)(3). This listing refers only to research that is exempt.

If the data collected is considered individually identifiable health information, the data must be protected from inappropriate use and disclosure. Either an authorization must be obtained from the subject or a waiver of authorization must be obtained from the IRB.
INDIANA UNIVERSITY INFORMED CONSENT STATEMENT FOR

The Impact of Osteoporosis Training on Professional Care Staff's Osteoporosis Knowledge and Beliefs

You are invited to participate in a research study about the Osteoporosis Knowledge and Beliefs of Direct Support Professionals. We want to provide education about osteoporosis that will provide you with important information you need to know that may positively impact your bone health. You were selected as a possible subject because you work on one of the four homes that have been identified to have access to Osteoporosis Training through a workshop, and share your knowledge and beliefs about Osteoporosis. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

The study is being conducted by Bryan McCormick (primary investigator), Professor, Indiana University and Joy Felegie (co-investigator), Grants & Special Projects Coordinator, Northern Virginia Training Center. It is funded by Joy Felegie, with some support from the Dunlop Scholarship Fund.

STUDY PURPOSE

The purpose of this study is to gain information about the most effective ways to provide osteoporosis education to Direct Support Professionals. We want to provide you with education about osteoporosis that will give you the information you need to know in order to positively impact your bone health. We also want to help you to be more aware of how to encourage bone healthy behaviors in the individuals with disabilities that you support.

NUMBER OF PEOPLE TAKING PART IN THE STUDY:

If you agree to participate, you will be one of approximately 30 Direct Support Professionals from a total of four homes that have been invited to participate. The intact group of employees from each individual home will have the opportunity to participate together in a separate workshop for each home. We are hoping for the participation of about seven or eight staff participants from each home.

PROCEDURES FOR THE STUDY:

If you agree to be in the study, you will do the following things:

1. Review and sign this informed consent form.
2. Attend a scheduled osteoporosis education workshop with your co-workers from the NVTC Home on which you work. (The workshop will be held at NVTC).
3. Complete a very brief questionnaire asking some basic questions about you, such as gender, age, etc. (This personal information will be kept confidential).
4. Complete two brief survey forms prior to the beginning of the educational workshop that will ask you questions about your osteoporosis knowledge and beliefs.
5. Participate in the osteoporosis workshop with your co-workers.
6. Complete three brief surveys at the conclusion of the osteoporosis education workshop.

*Please note that this osteoporosis workshop will last approximately one and one half hours and you will only participate in one workshop, held on one day.

RISKS OF TAKING PART IN THE STUDY:

While participating in this study, the risks are considered to be minimal and may include such things as:
* You may find out that you are at risk for osteoporosis and this may cause you some emotional discomfort.
* You may feel uncomfortable answering questions and completing the survey forms.
* While we will make every effort to preserve your confidentiality, there is a possible risk of loss of confidentiality.
These things may not happen to you. Nothing negative may happen to you. Things may happen that the researchers don’t know about yet. If they do, we will make sure you get help to deal with anything that may happen.

To minimize the risks of participating, we will make every effort to provide support and assist you. For instance, if you do not understand a question or need help to complete the surveys, the co-investigator and/or a speaker will be available to help you. If you find out you are at risk for osteoporosis, we will also provide you with information about practical things you can do to positively impact your bone health. We will also model recommended exercises that you can do, as well as discuss the value of a healthy diet that is rich in calcium and vitamin D to maintain or improve your bone health.

*Please note that if you are uncomfortable, you can tell the researcher that you feel uncomfortable and wish not to answer a particular question or participate in a particular exercise or activity.

**BENEFITS OF TAKING PART IN THE STUDY:**

The benefits to participation that are reasonable to expect are that you will:
1. Gain valuable information about osteoporosis and practical things you can do to positively impact your bone health!
2. Receive social support from your co-workers to help each other to make bone healthy lifestyle changes!
3. Decide to make lifestyle changes that will positively impact your health!

**CONFIDENTIALITY**

Efforts will be made to keep your personal information confidential. We cannot guarantee absolute confidentiality. Your personal information may be disclosed if required by law. Your identity will be held in confidence in reports in which the study may be published as well as in databases in which results may be stored. Videotaping of the speakers may occur but videotaping of participants will not occur. Because we will coordinate for you to receive a certificate of participation and coordinate with your supervisor for you to receive an "Acknowledgement of Extraordinary Contribution", supervisors at NVTC will need to be notified of which of their employees does and does not participate in the training workshop.

Organizations that may inspect and/or copy your research records for quality assurance and data analysis include groups such as the study investigator and his/her research associates, the Indiana University Institutional Review Board or its designees, the study sponsor, The Northern Virginia Training Center, and (as allowed by law) state or federal agencies, who may need to access your research records.

**PAYMENT**

You will not receive any money for participation in this study but you will receive incentives which will include:

1. A free gourmet lunch provided for you during the osteoporosis workshop!
2. A free bottle of calcium supplements that you can take with you!
3. Being entered into a door prize drawing for a basket of healthy calcium rich snacks/foods, with a 1 to 8 chance of winning!
4. A certificate of participation/completion of osteoporosis training!
5. Coordination with supervisors to provide "Acknowledgement of Extraordinary Contribution" that may be reflected on your performance evaluation!

**COMPENSATION FOR INJURY**

While injury is not anticipated as a result of participation in this study, in the event of physical injury resulting from your participation in this research, you will be responsible for seeking medical care and for the expenses associated with any care received. Costs not covered by your health care insurer will be your responsibility.

Also, it is your responsibility to determine the extent of your health care coverage. There is no program in place
for other monetary compensation for such injuries. However, you are not giving up any legal rights or benefits to which you are otherwise entitled.

CONTACTS FOR QUESTIONS OR PROBLEMS

For questions about the study, contact the researchers, (Primary Investigator, Bryan McCormick, Professor, Indiana University) at 812-855-4711 or bmccormi@indiana.edu, or (Co-investigator, Joy Felegie), at 703-323-2009 or joy.felegie@dbhds.virginia.gov. If you cannot reach the researchers during regular business hours (i.e. 8:00AM-5:00PM), please contact Joy Felegie at her alternative phone 571-969-0176, or contact Indiana University at (800) 696-2949.

For questions about your rights as a research participant or to discuss problems, complaints or concerns about a research study, or to obtain information, or offer input, contact the IU Human Subjects Office at (800) 696-2949.

VOLUNTARY NATURE OF STUDY

Taking part in this study is voluntary. You may choose not to take part or may leave the study at any time. Leaving the study will not result in any penalty or loss of benefits to which you are entitled. Your decision whether or not to participate in this study will not affect your current or future relations with the researchers or with NVTC. If you choose to withdraw from the study by leaving the workshop early, you may not receive the information you need to know to positively impact your bone health.

SUBJECT'S CONSENT

In consideration of all of the above, I give my consent to participate in this research study.

I will be given a copy of this informed consent document to keep for my records. I agree to take part in this study.

Subject's Printed Name: __________________________

Subject's Signature: ____________________________ Date: ____________________________

(must be dated by the subject)

Printed Name of Person Obtaining Consent: __________________________

Signature of Person Obtaining Consent: __________________________ Date: __________________________

For IRB Office Use ONLY
IRB Approval Date: May 22, 2012
Expiration Date: May 21, 2013
INDIANA UNIVERSITY INSTITUTIONAL REVIEW BOARD (IRB)

INVESTIGATOR LIST

PRINCIPAL INVESTIGATOR: Bryan McCormick
IRB STUDY NUMBER: 
STUDY TITLE: The Impact of Osteoporosis Training on Professional Care Staff’s Osteoporosis Knowledge and Beliefs
DOCUMENT DATE: March 27, 2012

Co-Investigators (key personnel): key investigators responsible for the conduct and/or reporting of research, including:
- Investigators making decisions regarding eligibility of subjects.
- Investigators obtaining consent for a study which is greater than minimal risk (full Board).
- Investigators listed on the FDA 1372 form
- Students who have designed a research project and are conducting it in order to complete an education requirement and who are conducting the research under the mentorship of a principal investigator

Research Personnel (non key): non-key research personnel who carry out study procedures but who are not considered responsible for the conduct and/or reporting of research, including:
- Research personnel who are collecting data under the instruction of key personnel
- Students working on a project designed by another under the instruction of key personnel

NOTE: Investigators who do not interact with subjects or access subjects’ identifiable data are not engaged in human subjects research and should not be listed as co-investigators on this form.

### SECTION I: INVESTIGATORS

List the principal investigator and study personnel and their respective departments. (If there are multiple investigators, please indicate only one person as the principal investigator; others should be designated as either key or non-key personnel).

A. Principal Investigator: Bryan McCormick

<table>
<thead>
<tr>
<th>Name: Last, First MI</th>
<th>Department</th>
<th>IU Username and/or Email Address</th>
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<tbody>
<tr>
<td>Joy Telegie</td>
<td>HPER/RPTS</td>
<td><a href="mailto:jtelegie@indiana.edu">jtelegie@indiana.edu</a></td>
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<td>jtelegie</td>
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B. Co-Investigators (Key Personnel): Provide the name, department, and IU username and email address for all key personnel who are employed or otherwise affiliated with Indiana University and affiliated institutions. Affiliated institutions include Indiana University Health (Clarian), Roushbash Veterans Affairs Medical Center, Regenstrief, and Wishard Hospital, among others.

These individuals are required to complete the investigator education requirement (CITI) and have a Conflict of Interest (COI) disclosure form on file with the appropriate IU Conflicts of Interest Office.

To add rows for additional investigators, place cursor in the last cell (bottom right) and use the Tab key to create a new row.

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C. Research Personnel (non-key): Provide the name, department, and IU username and email address for all non-key personnel who are employed or otherwise affiliated with Indiana University and affiliated institutions. Affiliated institutions include Indiana University Health (Clarian), Roudabush Veterans Affairs Medical Center, Regenstrief, and Wishard Hospital, among others.

These individuals are required to have a Conflict of Interest (COI) disclosure form on file with the appropriate IU Conflicts of Interest Office. Individuals who are directly interacting with subjects must also complete the investigator education requirement (CITI).

<table>
<thead>
<tr>
<th>Name: Last, First MI</th>
<th>Department</th>
<th>IU Username and/or Email Address</th>
<th>Directly Interacting with Subjects: Yes/No</th>
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D. Non-affiliated Investigators. Non-affiliated investigators who do not have local IRB approval for this protocol from their own facilities must enter into a non-affiliated investigator agreement and be listed below. For additional guidance, refer to the IU IRB Guidance on Collaborations in Research available on the IU Human Subjects Office Website. Non-affiliated investigators listed below who are directly interacting or intervening with subjects must complete the IU investigator education requirement and complete a COI disclosure form.

<table>
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<tr>
<th>Name of Non-Affiliated investigator</th>
<th>Email Address</th>
<th>Institution/Employer</th>
<th>Description of Procedures Performed</th>
<th>Is the non-affiliated investigator directly interacting or intervening with subjects? (yes/no)</th>
<th>Key personnel? (yes/no)</th>
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SECTION II: CONFLICT OF INTEREST

Federal regulations and Indiana University policy require that all investigators participating in human subjects research disclose and manage (potential) conflicts of interest. Disclosed conflicts relating to this study must be disclosed to potential subjects in the informed consent document.

1. Are any of the investigators listed in above aware of an institutional conflict of interest which could affect or be affected by this research?

☐ No.  ☑ Yes. Please explain: __________

2. Do any of the investigators listed above (or their immediate family members) have a (potential) financial interest which could affect or be affected by this research?

Potential financial interests could include: stock ownership in the sponsor or manufacturer of the investigational item, compensation from the sponsor or manufacturer of the investigational item (excluding payments for conducting as outlined in the clinical trials agreement), patent or proprietary interest in the investigational item, employment relationship with the sponsor or manufacturer or the investigational item, proprietary interest related to the research including, but not limited to, a patent, trademark, copyright or licensing agreement, any arrangement, ownership interest, or compensation that could be

IRE Form v02/01/2012
affected by the outcome of the research, and/or any other interest which may be perceived to interfere with the investigator’s ability to protect subjects.

☑ No.
☐ Yes. The following investigators have a financial interest in this research: ______

If any of the investigators listed above have a financial interest in this research, the informed consent document must include the financial interest statement. Please see the Informed Consent Template for more information.

3. Have all potential financial interests listed in Question 1 above been disclosed and managed by the appropriate IU Conflicts of Interest Office?

☑ N/A. None of the investigators listed above (or their immediate family members) have a potential financial interest which relates to this research.
☐ No. Please contact the appropriate IU Conflicts of Interest Office immediately. Research may not be approved until all disclosures have been reviewed and managed, if necessary. Please visit http://researchadmin.iu.edu/COI/coi_home.html for more information.
☐ Yes. The disclosure has been approved by the appropriate IU Conflicts of Interest Office OR a copy of the management plan is on file.

SECTION III: INVESTIGATOR ACKNOWLEDGEMENT

By submitting this form, the Principal Investigator affirms all investigators submitted on this form have agreed to participate in this project, are aware of their status and role, and have been adequately trained to participate in the project.
INDIANA UNIVERSITY
OFFICE OF RESEARCH ADMINISTRATION

To: BRYAN P. MCCORMICK
RECREATION, PARK AND TOURISM STUDIES

From: IU Human Subjects Office
Office of Research Administration – Indiana University

Date: May 23, 2012

RE: NOTICE OF EXPEDITED APPROVAL

Protocol Title: The Impact of Osteoporosis Training on Professional Care Staff’s Osteoporosis Knowledge and Beliefs
Protocol #: 1204008416
Funding Agency/Sponsor: None
IRB: IRB-IUB, IRB00000222

Expiration Date: May 21, 2013

The above-referenced protocol was reviewed by the Institutional Review Board (IRB-IUB). The protocol meets the requirements for expedited review pursuant to 46.110, Category (7). The protocol is approved for a period of May 22, 2012 through May 21, 2013. This approval does not replace any departmental or other approvals that may be required.

If you submitted and/or are required to provide participants with an informed consent document, study information sheet, or other documentation, a copy of the enclosed approved stamped document is enclosed and must be used.

As the principal investigator (or faculty sponsor in the case of a student protocol) of this study, you assume the following responsibilities:

1. CONTINUING REVIEW: Federal regulations require that all research be reviewed at least annually. You may receive a “Continuing Renewal Reminder” approximately two months prior to the expiration date; however, it is the Principal Investigator’s responsibility to obtain review and continued approval before the expiration date. If continued approval is not received by the expiration date, the study will automatically expire, requiring all research activities, including enrollment of new subjects, interaction and intervention with current participants, and analysis of identified data to cease.

2. AMENDMENTS: Any proposed changes to the research study must be reported to the IRB prior to implementation. Only after approval has been granted by the IRB can these changes be implemented. An amendment form can be obtained at:
http://researchadmin.indiana.edu/HumanSubjects/hs_forms.html

3. UNANTICIPATED PROBLEMS AND NONCOMPLIANCE: Unanticipated problems and noncompliance must reported to the IRB according to the policy described in the Unanticipated Problems and Noncompliance SOP, which can be found at http://researchadmin.indiana.edu/HumanSubjects/hs_policies.html. NOTE: If the study involves gene therapy and an event occurs which requires prompt reporting to the IRB, it must also be reported to the Institutional Biosafety Committee (IBC).

4. ADVERTISEMENT: Only IRB-approved advertisements may be used to recruit participants for the study. If you submitted an advertisement with your study submission, an approved stamped copy is provided with the approval. To request approval of an advertisement in the future, please submit an amendment, explaining the nature of communication and information to be contained in the advertisement.

5. COMPLETION: Prompt notification must be made to the IRB when the study is completed (i.e. there is no further subject enrollment, no further interaction or intervention with current participants, including follow-up, and no further analysis of identified data). To notify the IRB of study closure, please obtain a close-out form at http://researchadmin.indiana.edu/HumanSubjects/hs_forms.html.

6. LEAVING THE INSTITUTION: The IRB must be notified of the disposition of the study when the principal investigator (or faculty sponsor in the case of a student project) leaves the institution.

7. VULNERABLE POPULATION: Please note that there are special requirements for the inclusion of prisoners in research. You may not enroll or otherwise include as individual who is or becomes a prisoner while enrolled in the research. For additional information on the requirements for including prisoners in research, please refer to http://researchadmin.indiana.edu/HumanSubjects/hs_policies.html.

IU c/o IU Human Subjects Office (317) 278-7189 | irb@iu.edu
Note: SOPs exist covering a variety of topics that may be relevant to the conduct of your research. For more information on the relevant policies and procedures, go to http://researchadmin.iu.edu/HumanSubjects/hs_policies.html.

You should retain a copy of this letter and any associated approved study documents (e.g. informed consent or information sheet) for your records. Please refer to the project title and number in future correspondence with our office. Additional information is available on our website at http://researchadmin.iu.edu/HumanSubjects/index.html. Please contact our office if you have questions or need further assistance.

Thank you.
INDIANA UNIVERSITY INSTITUTIONAL REVIEW BOARD (IRB) REVIEW
SUMMARY SAFEGUARD STATEMENT

IRB STUDY NUMBER: 1204008416
PRINCIPAL INVESTIGATOR: McCormick, Bryan
DOCUMENT DATE: 4/17/12

THIS FORM MUST BE NEATLY TYPED. (DO NOT TYPE ON THE REVERSE SIDE OF ANY FORMS). Note: To check a box on this form, double-click the box and select “Checked” under “Default Value.”

STUDY TITLE: The Impact of Osteoporosis Training on Professional Care Staff’s Osteoporosis Knowledge and Beliefs

Please type only in the gray boxes. To mark a box as checked, double-click the box, select “checked”, and click “OK.”

<table>
<thead>
<tr>
<th>SECTION I: STUDY DESCRIPTION</th>
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<tbody>
<tr>
<td>A. Please describe (in lay terms) the general objective(s) of the proposed research, including research question(s), hypothesis, and a short summary of the main interactions/interventions. If appropriate, describe any usual methods, that were considered, but not chosen, and why.</td>
</tr>
<tr>
<td>The purpose of this study is to examine the impact of osteoporosis (OP) training on the knowledge and beliefs of employees who are caregivers to adults with moderate to profound intellectual disabilities. The primary focus is to determine whether the provision of OP training for these staff will result in greater and more accurate employee knowledge and beliefs about osteoporosis. A comparison group design will be utilized in order to examine two different models of employee OP training and to gain understanding as to which model may be most effective in contributing to increased employee knowledge and accurate beliefs regarding OP. General objectives are to:</td>
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<td>1. Gain information as to how to efficiently and effectively facilitate accurate osteoporosis health knowledge and beliefs among direct care staff.</td>
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<tr>
<td>2. Help employees understand that the individuals with disabilities they support may be a greater risk for developing OP then the general population.</td>
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<tr>
<td>3. Provide direct care staff with basic knowledge of ways they can promote bone health for themselves and the individuals they support.</td>
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<tr>
<td>Research questions:</td>
</tr>
<tr>
<td>1. Will an enhanced OP education workshop for professional care staff, which is built upon the Health Belief Model and Social Cognitive Theory, and using multiple evidenced-based instruction methods and teaching techniques, have a positive impact on staff’s OP knowledge and beliefs?</td>
</tr>
<tr>
<td>2. Will OP education consisting of a DVD presentation, paired with an outline containing leading questions, have a positive impact on staff’s OP knowledge and beliefs?</td>
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<tr>
<td>3. Is there a difference in the impact of the two training approaches?</td>
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<tr>
<td>4. What levels of OP self-efficacy will be reported at the conclusion of the employee training?</td>
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<td>5. What barriers will be identified that prevent or limit bone healthy behavioral changes?</td>
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<tr>
<td>Hypotheses:</td>
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<tr>
<td>1. There is no significant difference in the test results of the subjects in the DVD/leading question instruction method, and the test results of the subjects who received the multi-instruction method enhanced OP workshop.</td>
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<tr>
<td>*See explanation under “Main interventions”</td>
</tr>
<tr>
<td>2. Test results of subjects who received the multi-instruction enhanced employee OP workshop, indicate greater employee health knowledge and belief change then the test results of subjects who received the DVD/leading question instruction method.</td>
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<tr>
<td>*See explanation under “Main interventions”</td>
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<td>Main interventions:</td>
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<tr>
<td>Two different types of OP training will be provided in a comparison group design to examine if there are significant differences in OP knowledge and beliefs that can be attributed to the type of training received. The study will be conducted at the Northern Virginia Training Center (NVTC) Scheduling of the training will be coordinated with the Director of Residential Services at NVTC and will occur during the normal work hours and during the daytime shift of caregivers. The subjects work on residential homes according to various shifts, and these intact groups from four different group homes will be randomly assigned (by intact group), through a drawing, to one of two different training conditions. Staff (intact groups) from two of the homes will be randomly assigned to the enhanced live OP workshop. Staff (intact groups) from two other homes will be randomly assigned to the DVD/leading question style training.</td>
</tr>
</tbody>
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I chose to use the intact group design rather than a fully randomized study due to the fact that the employees on each of the group homes work closely together and if they attended different trainings, it is likely that they would share information with each other that could impact the results of the study. *Please note that if one method of training is determined to be more effective than the other, a follow-up osteoporosis workshop will be made available to all employees, at a later date, using the most effective training method.

SECTION II: HIPAA

A. Are you part of a covered entity or are you involving a covered entity in your research? Please review the Covered Entity Checklist for guidance.

☑ NO. You are not subject to HIPAA. For additional information, please see the Covered Entity Checklist available on the IU Human Subjects Office website. Proceed to Section III.

☐ YES. Continue below:

B. Will protected health information (PHI) be utilized, accessed, collected, or generated as part of the study? For additional guidance on PHI, please refer to the definitions in the Standard Operating Procedures document.

☑ NO. Your research is not subject to HIPAA. However, will health information (that is not PHI) be used that is:

☐ De-identified?
☐ Part of a Limited Data Set?
☐ Health information will be received from a separate covered entity from that of the investigator. You must establish a data use agreement with the entity providing the health information.
☐ Health information will be obtained from within the investigator's own covered entity. No data use agreement is required.
☐ No health information will be utilized in any form.

☐ YES. Your research is subject to HIPAA. Complete the HIPAA & Recruitment Checklist.

SECTION III: PERFORMANCE SITE

☑ Indiana University
☐ IUB Campus. Please state school/department/location(s): HPER
☐ JUP/UI Campus. Please state school/department/location(s): ____
☐ Bradford Woods
☐ Center for Survey Research
☐ Center for Evaluation & Education Policy (CEEP)
☐ Indiana CTSI Clinical Research Center*
☐ Indiana Institute on Disability and Communication
☐ IU Simon Cancer Center*
☐ Krannert Institute of Cardiology*
☐ Kinsey Institute
☐ Oral Health Research Institute
☐ Other:

☐ Health & Hospital Corporation of Marion County
☐ Bell Flower Clinic
☐ Midtown Mental Health*
☐ Wishard Memorial Hospital*
☐ Community Health Clinics/Centers
☐ Hospital/ER
☐ Non-primary care
☐ Wishard Specialty Clinics
☐ OB/GYN Clinics

☑ Indiana University Health (Clarian) Facilities
☐ Bloomington Hospital
☐ Beltway Centers
☐ Methodist Hospital
☐ Methodist-Affiliated Centers/Private Practices
☐ North Hospital
☐ Riley Hospital for Children
☐ University Hospital
☐ West Hospital
☐ Other: 
☐ IU Health Clinics. Please list location: 
☐ IU Medical Group Specialty Clinic (IUMG-SC). Please list location: 
☐ Larue Carter Hospital
☐ Monroe County Community School Corporation. Please list school: 
☐ Regenstrief Institute
☐ Rehabilitation Hospital of Indiana
☒ Richard L. Roudebush Veterans Affairs Medical Center*. (Complete the Request Form for VA Research)
☒ Other: The Northern Virginia Training Center. A residential facility for adults with intellectual disabilities.

* Additional information and/or approvals may be required prior to submitting and/or initiating the research. Please see the IU Human Subject Review Office website and check with the specific performance site for additional information.

B. Please list other facilities not under the direct supervision of the investigator where research-related procedures will be performed (e.g. pathology, nursing, pharmacy, radiology, counseling). *

You must ensure these persons/facilities are kept adequately informed about the study and their research-related duties and functions as they relate to the protection of human participants.

### SECTION IV: SUBJECT POPULATION

A. Subject Population. Check all subject population categories below for which there is a reasonable expectation of enrollment into this research study:

☐ Children (Complete the Request Form for the Inclusion of Children in Research)
☐ Cognitively Impaired (Complete the Request Form for the Inclusion of Cognitively Impaired Individuals in Research)
☐ Economically/Educationally Disadvantaged
☐ Pregnant Women, Human Fetuses, or Fetal Material (Complete the Request Form for the Inclusion of Pregnant Women, Human Fetuses, and Neonates in Research)
☐ Prisoners (Complete the Request Form for the Inclusion of Prisoners in Research)
☐ Subjects Outside of U.S. Targeted for Enrollment (Complete the Transnational Research Information Form)
☐ Veterans or research funded by the VA, utilizing VA effort, property or resources, or enrolling VA patients. (Complete the Request Form for VA Research)
☐ Students. When there is a teacher-student relationship dynamic or when using a student subject pool, complete the following questions:

1. Clarify the necessity for involving students in the research:
2. Explain how the possibility of coercion or undue influence will be minimized when informed consent is being sought:
3. Explain what genuinely equivalent alternatives are available for students who wish not to participate:

B. Inclusion/Exclusion. List specific eligibility requirements for subjects, including those criteria which would exclude otherwise acceptable subjects (e.g. inclusion/exclusion criteria).

Subjects to be included are professional direct care employees who provide support to adults with intellectual disabilities, at the Northern Virginia Training Center (NVTC). Employees from four different group homes on the campus of NVTC will be invited to participate in this study. These four homes have been chosen because of staff availability during midday when the training is being scheduled to occur. Therefore staff from other homes, although otherwise acceptable as subjects, would be excluded from this study as they will be responsible for supervision of individuals with disabilities during the time of implementation of the OP workshops.

C. Number of Subjects. State the number of subjects to be involved in the research (i.e. number of subjects who will receive research intervention, or amount from whom information or specimens will be collected) both locally and nationally (if a multicenter study).
NOTE: The number provided will be the maximum number of subjects approved to participate in this research.

SECTION V: RECRUITMENT

NOTE: Study information will be released to the Clinical and Translational Science Institute (CTSI) for the research study listing. To opt out of this listing requirement you will need to get opt-out approval from Dr. Anantha Shekhar, PhD, MD, Director of Indiana CTSI, prior to IRB submission. For additional information or to request opt-out approval, please contact Patrick McGuire at (317) 278-2176 or pacmcgui@iupui.edu.

A. Is this research subject to HIPAA? (refer to Section II above)

☐ YES. Do not answer questions 1-3 below. Instead, complete the HIPAA & Recruitment Checklist.

☒ NO. Answer questions 1-3 below.

1. Describe how potential subjects will be initially identified (include specific source, e.g. databases, medical records, advertisements, newsletters, self-referral, physician referral, from clinics, etc.).

Residential Service Department records and meeting with the Director of Residential Services at NVTC.

2. Describe how potential subjects who are identified will be contacted (e.g. letter, phone call, face-to-face) and who will be contacting them (e.g. their physician, research coordinator, nurse, etc.). Include a copy of all information to be shared with or intended to be seen by potential subjects.

I will first meet with the supervisor of each of the group homes to present a general overview of the project to them. The supervisor will not be directly involved in recruiting employees from their group home. I will directly contact all employees (who work in a direct care role with individuals with IDD). I will send a letter/flyer to each of the potential subjects to invite them to participate in the research study.

3. Is the investigator currently conducting competing studies? Competing studies refers to two or more studies which utilize overlapping or very similar eligibility criteria.

☒ No. Please describe the plan to ensure fair and unbiased recruitment:

NOTE: Allowing the Principal Investigator or the subject to choose one study over another is rarely acceptable. Consider randomization procedures or exclusive enrollment in one study at a time.

SECTION VI: STUDY PROCEDURES

List all methods by which information or data about or from subjects will be obtained, including any drugs or devices to be used on human subjects and all procedures/interventions that are being performed that would not otherwise be performed outside of the research study [e.g. an investigational drug, a blood draw that is taken purely for research (not treatment purposes) or a standardized survey that is being completed solely for the purposes of this research]. Describe the frequency and duration of the procedures.

Pen and pencil surveys will be completed by subjects, which are related to OP knowledge and OP beliefs, as pre and post workshop data collection tools. A demographics survey will also be completed at the beginning of each workshop, which will last approximately 1.5 hours, during 1 day. A total of 4 workshops will be held, two of which will be live interactive workshops with presenters who will use evidenced based teaching techniques and current information about osteoporosis and its prevention and treatment. The other two workshops will involve a self-directed DVD based training which will use a commercially made Ostoporosis DVD for training, and will be paired with a worksheet that will provide leading questions and “fill in the blanks” for responses. The intact group of employees from specific homes will be randomly assigned, by intact group, to the workshops. Both treatment groups will have the same basic osteoporosis content information taught. The outline for the live workshop is attached. Each of the 1.5 hour workshops may occur on a different day, however all will occur within a one month period.

Table 3.3: Outline of Enhanced Training Workshop

| 1. Registration, Introductions, Ice-Breaker |

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2. Explanation of Research Study, Voluntary Participation and Consent Forms
3. Distribution, Completion and Collection of Pre-tests
4. Personal osteoporosis testimonies or osteoporosis stories
5. Lecture with Power point presentation, note taking, and creative demonstrations/illustrations.
6. Discussion and/or participation activity
7. Stretch break
8. Small group problem solving or scenarios
9. Group presentation and summary
10. Closing/Post-test completion and collection and distribution of incentives
11. Calcium Rich Gourmet Lunch

NOTE: Please include all surveys, instruments, survey/focus group questions, etc. that will be used for this research.

<table>
<thead>
<tr>
<th>SECTION VII: RISK/BENEFIT RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. State the potential risks – for example, physical, psychological, social, legal, loss of confidentiality or other – connected with the proposed procedures.</td>
</tr>
<tr>
<td>There is a risk that subjects will learn that they are susceptible to osteoporosis and that knowledge could cause some discomfort. While every effort will be made to protect confidentiality, it cannot be 100% guaranteed that confidentiality will be 100% protected at all times.</td>
</tr>
<tr>
<td>B. State the potential benefits to be gained by the SUBJECT.</td>
</tr>
<tr>
<td>The training will provide helpful information and skills to facilitate bone health for themselves and for the individuals that they support. It is possible that if they implement health behavior changes, that their bone health could improve. They will be more knowledgeable about a subject that may impact the individuals that they support and this may help the staff to provide better care to those individuals.</td>
</tr>
<tr>
<td>C. State the potential benefits or information which may accrue to SCIENCE or SOCIETY, in general, as a result of this work.</td>
</tr>
<tr>
<td>The information learned from this study could be replicated to other community group home staff. This workshop could be taken to other sites to train more staff and have a broader impact on bone health in the region.</td>
</tr>
<tr>
<td>D. Explain how the potential risks to subjects are reasonable in relation to anticipated benefits.</td>
</tr>
<tr>
<td>The potential risks are viewed as minor while the benefits have the potential to be very great if implementation of the information learned in the workshop occurs consistently.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECTION VIII: PROTECTION PROCEDURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Describe procedures for protecting against, or minimizing, the potential risks described in Section VII, including using procedures that are already being performed on subjects for diagnostic, treatment, or standard purposes, when appropriate.</td>
</tr>
<tr>
<td>While a subject may learn that they are susceptible to osteoporosis, we will ensure that we share practical ways that the subjects can make health behavior changes to enhance their bone health. We will teach the skills and knowledge needed to make bone healthy lifestyle changes. We will use disclosures when indicated so staff will know that not everyone will respond to specific bone health lifestyle changes in the same way or with the same success rate.</td>
</tr>
<tr>
<td>B. Explain provisions to protect privacy interests of subjects. This refers to how access to subjects will be controlled (e.g. time, place, etc. of research procedures).</td>
</tr>
</tbody>
</table>
The implementation of this study will occur within a one month timeframe. Each workshop will last approximately 1.5 hours and the survey instruments will be completed during that 1.5 hour period. No names will be on the survey instruments as subjects will be assigned a number upon arriving at the workshop. Once data analysis is complete, all information with the name of the employee will be destroyed.

C. Is this a multi-center clinical trial?
☐ No. Continue to the next section.
☐ Yes. Is the PI the lead investigator?
☐ No. Continue to the next section
☐ Yes. Describe the plan for the management and communication of multi-site information that may be relevant to the protection of participants (e.g. unanticipated problems, adverse events, interim analysis, modifications, etc.).

SECTION IX: DATA SAFETY MONITORING PLAN

For all research that is greater than minimal risk, a Data Safety Monitoring Plan (DSMP) must be developed. This is a plan to assure the research includes a system for appropriate oversight and monitoring of the conduct of the study to ensure the safety of subjects and the validity and integrity of the data.

☐ N/A. The research is minimal risk.
☐ The DSMP is contained in the protocol. State where in the protocol the description is located:
NOTE: Ensure that all points outlined below are addressed in the description in the protocol. If any points are not addressed, within the protocol, they should be addressed below.
☐ The DSMP is NOT contained in the protocol; however, this is a repository/database protocol and the primary risk is that of loss of confidentiality; thus, I do not need to complete this section.
☐ The DSMP is NOT contained in the protocol. Complete the questions below.

A. Who will be responsible for the data and safety monitoring? (Examples include: a DSMC or DSMB, medical monitor, investigator, independent physician) Clarify if this individual or committee is independent from the sponsor and/or investigator.

B. What will be monitored. (Examples include: data quality, subject recruitment, accrual, and retention, outcome and adverse event data, assessment of scientific reports or therapeutic development, results of related studies that impact subject safety, procedures designed to protect the privacy of subjects)

C. What are the procedures for analysis and interpretation of data, the actions to be taken upon specific events or endpoints, the procedures for communication from the data monitor to the IRB and site, and other reporting mechanisms?

D. What is the frequency of monitoring? (The appropriate frequency of data and safety monitoring will be dependent on the nature and progress of the research; however, monitoring must be performed on a regular basis (e.g. at least annually).

E. What information will be reported to the IRB? (Minimally, the IRB requires the following information at the time of continuing review: 1) frequency and date(s) of monitoring; 2) summary of cumulative adverse events; 3) assessment of external factors (e.g. scientific reports, therapeutic developments, results of related studies) that impacted the safety of subjects; 4) summary of subject privacy and research data confidentiality outcomes; and 5) any changes to the risk-benefit ratio.

SECTION X: PAYMENT FOR PARTICIPATION

A. Will subjects be paid for participation in the study (e.g. monetary, free services, gifts, course credit, including extra credit)?
☐ No. Proceed to next section.
☐ Yes. Complete items 1-3 below.

1. Explain the payment arrangements (e.g. amount and timing of payment and the proposed method of disbursement), including reimbursement of expenses. NOTE: Payments must accrue and not be contingent upon completion of the study. However, a small payment (bonus) for completion of the study may be approved by the IRB if it is found to not be persuasive for the subjects to remain in the study.
Subjects will receive a free gourmet lunch during the OP workshop that they will participate in. Each subject will also receive calcium supplement samples, and a certificate of participation. The residential services director at NVTC would like participants to receive an NVTC "Certificate of Extraordinary Performance" which is an approved NVTC incentive for employees that complete work above and beyond the normal job requirements that will enhance their knowledge and ability. In addition, at each workshop, there will be a drawing for a door prize which will be a basket of non-perishable, healthy, calcium rich snacks. Please note that a door prize (food basket) will be awarded for each of the 4 groups. The odds of winning are 1 in 8, or better, depending upon the number of participants in the group. The approximate value of each door prize basket is $15.00.

2. Justify the proposed payment arrangements described in section B. (e.g., how this proposed payment arrangement is not considered to be coercive).

   Proposed non-monetary payments/incentives are valued at $15.00 and are being used also as educational aids in that the calcium samples, calcium rich lunch, and gift baskets for door prizes are all examples of products that can be used to enhance bone health.

3. Explain if there will be any partial payment if the subject withdraws prior to completion of the study (e.g. prorated). Note: This payment may be paid at the end of the subject’s participation or at the end of the study.

   The subjects may receive some free snacks if they attend a portion of the training workshop and then decide to leave. The lunch, calcium samples, certificate of participation and door prize drawing will all occur at the end of each workshop after the completion of the survey tools.

### SECTION XI: INFORMED CONSENT PROCESS

☐ Check here if this study will only enroll children and the parental/guardian permission (consent) process has already been explained on the Request Form for the Inclusion of Children in Research. You do not need to complete section A below.

☐ A. I WILL be obtaining informed consent from all subjects.

1. When (in what timeframe) and where (what setting) will consent take place? Indicate any waiting period between informing the subject and obtaining consent. The timeframe and any waiting should ensure the prospective subjects or their legally authorized representatives are provided sufficient opportunity to consider whether or not to participate in the study.

   The subjects will be notified of their invitation to attend the OP Training approximately one month prior to the actual training. The informed consent forms will be read and signed within one week of the OP training. The setting will be either in the group homes, or at the beginning of the actual training workshop at NVTC.

2. Who will be responsible for obtaining initial and ongoing consent? (check all that apply)

   - Principal Investigator
   - ☒ Co-Investigator
   - Other (specify):

   NOTE: Individuals who will be obtaining consent must be listed on the Investigator List.

   a. Explain how these individuals will be adequately trained to conduct the consent interview and answer subject’s questions (check all that apply):

   - ☒ Passed the required Collaborative Institutional Training Initiative (CITI) modules
   - ☒ Attended the Research Coordinator Education Program (RCEP)
   - Attended the Research Coordinator Certification Program (RCCP)
   - Received study-specific training from study personnel
   - ☒ Other (specify): Will request briefing from Dr. McCormick at IU

   b. Indicate in what language(s) the consent interview will be conducted.

   - ☒ English
   - ☐ Spanish

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c. If the consent interview will be conducted in a language other than English, state how the interview will be conducted (e.g. use of an interpreter):

NOTE: Ensure that language-appropriate consent documents are submitted with this application.

3. Explain how subjects’ privacy will be protected during the consent process. This refers to how access to subjects will be controlled (e.g., time, place, etc. of consent procedures). Subjects will either complete the consent process in private at NVTC or at the beginning of the OP workshop. Assistance will be offered if needed due to subjects having questions or needing assistance. It will be emphasized that participation is voluntary.

4. Indicate any factors that might result in the possibility of coercion or undue influence. (check all that apply)

☐ the research will involve students of the investigator(s)
☐ the subjects will be recruited through institutions with which the PI has a close relationship
☒ Other (please specify): Subjects may feel that their supervisor wants them to attend.

Describe steps taken to mitigate the possible coercion: Emphasize that participation is voluntary and that if they choose not to participate it will not negatively impact their relationship with their supervisor.

☐ B. I am requesting a waiver of the informed consent process (i.e., no consent document) for (check all that apply):

☐ the entire study.
☐ recruitment only (VA requirement: please see the sample language provided in VA Waivers for Recruitment located on the IU Human Subjects Office website).
☐ a specific minimal risk research activity or procedure that is part of the study: ______.

For the IRB to grant a waiver of informed consent, the below criteria must be satisfied. Please provide a response to each criterion.

1. The research involves no more than minimal risk to the subject. If you are requesting a waiver of informed consent for part of the study (e.g., recruitment or a specific minimal risk activity or procedure), please state to which activity/procedure the waiver request applies and explain how this criterion is satisfied.

2. Explain how the waiver will not adversely affect the rights and welfare of the subjects.

3. Explain how the research could not be practicably carried out without the waiver.

4. Explain how, if appropriate, subjects will be informed of pertinent results at the conclusion of the study.

5. The research is NOT FDA-regulated (i.e., the activity is NOT an experiment or does NOT involve one or more of the following test articles: foods or dietary supplements that bear a nutrient content claim or a health claim, infant formulas, food and color additives, drugs for human use, medical devices for human use, biological products for human use, electronic products. Additionally, NONE of the following can be true, the research involves using the test article with one or more participants, the research is being done as part of an IND or IDE submission, the data may be submitted to the FDA, or the data may be held for inspection by the FDA).

6. ONLY COMPLETE FOR RESEARCH AND DEMONSTRATION PROJECTS CONDUCTED BY OR SUBJECT TO THE APPROVAL OF STATE OR LOCAL GOVERNMENT OFFICIALS. In order for the IRB
to approve a waiver of informed consent for a research or demonstration project, conducted by or subject to the approval of state or local government officials, it must NOT be FDA-regulated and be designed such that it studies, evaluates, or otherwise examines one of the following (check all that apply):
☐ public benefit or service programs;
☐ procedures for obtaining benefits or services under those programs;
☐ possible changes in or alternatives to those programs or procedures; or
☐ possible changes in methods or levels of payment for benefits or services under those programs.

☐ C. I am requesting a waiver of written documentation of informed consent (i.e. a consent process will occur, but no signature will be obtained from the subject).

☐ Written statement regarding the research has been attached. Statement will be provided to subjects upon their request. Please explain:

For the IRB to grant a waiver of written documentation of informed consent, EITHER of the following criteria must be met. Please indicate which criterion is met and provide an appropriate response below.

☐ 1. The only record linking the subject and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality, and the research is not FDA-regulated. Each subject will be asked whether the subject wants documentation linking the subject with the research and the subject's wishes will govern. Please explain:

OR

☐ 2. The research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context. Please explain:

☐ D. I am requesting modification to the required elements for informed consent document for:
☐ the entire study
☒ a specific minimal risk research activity or procedure that is part of the study

Check all of the required elements below that you are requesting to modify or omit from the informed consent document:

☐ Statement that the study involves research
☒ Explanation of the purposes of the research
☐ Expected duration of subject participation
☐ Description of procedures to be followed
☐ Identification of any procedures that are experimental
☐ Description of any reasonably foreseeable risks or discomforts to subjects
☐ Description of benefits (to subjects or others) that may reasonably be expected from the research
☐ Disclosure of appropriate alternative procedures or courses of treatment
☐ Statement describing the extent to which confidentiality of records identifying subjects will be maintained
☐ Explanation regarding any compensation
☐ Explanation of available medical treatments if injury occurs
☐ Contact information for questions about the research, research-related injury, or subject rights
☐ Statement that participation is voluntary

For the IRB to grant a modification to the required elements of informed consent, the below criteria must be satisfied. Please provide a response to each criterion.

1. The research involves no more than minimal risk to the subject. If you are requesting a waiver of informed consent for part of the study (e.g. a specific minimal risk activity or procedure), please state to which activity/procedure the waiver request applies and explain how this criterion is satisfied
This modification applies only to providing the specifics regarding the purpose of the study. The explanation of the purpose of the study is intentionally not detailed so as to not influence participant behavior. Full information will be provided to participants at the conclusion of the study.

2. Explain how the modification will not adversely affect the rights and welfare of the subjects.

Neither of the training methods involves more than minimal risk. Knowledge or lack of knowledge of which group the participants are in will not increase risk.

3. Explain how the research could not be practically carried out without modification of informed consent.

Foreknowledge of an experimental design may cause participants to anticipate which group they are in and cause behavior to change.

4. Explain how, if appropriate, subjects will be informed of pertinent results at the conclusion of the study.

At the full conclusion of data collection, all participants will be sent a short accurate explanation of the purposes of the study. Subsequently, once results are available, a short description of the results will also be provided.

5. The research is NOT FDA-regulated (i.e. The activity is NOT an experiment or does NOT involve one or more of the following test articles: foods or dietary supplements that bear a nutrient content claim or a health claim, infant formulas, food and color additives, drugs for human use, medical devices for human use, biological products for human use, electronic products. Additionally, NONE of the following can be true: the research involves using the test article with one or more participants, the research is being done as part of an IND or IDE submission, the data may be submitted to the FDA, or the data may be held for inspection by the FDA).

SECTION XII: ADDITIONAL REVIEWS

☑ N/A. This research does not require any additional institutional reviews. Proceed to next section.

A. Will this study specifically enroll cancer patients (e.g. is the study focused on cancer treatment or care or does the study include a control group of cancer patients) or involve cancer-related gene therapy?

☐ No.
☐ Yes. You must first obtain approval from the Scientific Review Committee (SRC) prior to submitting to the IRB. Please include that approval with your IRB study submission. Please contact the SRC at (317) 274-0930 or crosrch@iupui.edu for additional information.
☐ Check here if this study is a retrospective chart review involving cancer patients; SRC approval is NOT necessary.

B. Does the study involve recombinant DNA (e.g. gene therapy)?

☐ No.
☐ Yes. IBC or BHC protocol number:

C. Does the study involve radiation / radioactivity (e.g. x-rays, nuclear medical scans) in addition to what is used for standard clinical treatment?

☐ No.
☐ Yes. Radiation Safety approval must be obtained if radiation beyond standard of care is involved. Concurrent IRB and radiation safety review is permissible; however, final IRB approval will not granted until documentation of radiation safety approval is provided.

D. Does this study involve the use of non-cancer-related gene therapy?

☐ No.
☐ Yes. Has the proposal been submitted to the Indiana CTSI Clinical Research Center (CRC) Advisory Committee? (NOTE: It is a requirement of the School of Medicine for all non-cancer related gene therapy studies to be reviewed by the CRC Advisory Committee. Additionally, it is the CRC’s requirement that approval be granted from them prior to IRB submission.)

☐ No. You must submit to the CRC Advisory Committee before you can submit to the IRB. Please call (317) 278-3446 for more information.
☐ Yes. Include a copy of that approval with this study submission.
SECTION XIII: FEDERAL FUNDING

A. Is this research funded by a federal agency (e.g. DHHS, NIH, VA, CDC, ICTSI, etc.), or has it been submitted to a federal agency for funding?
   ☒ No. Proceed to the next section.
   ☐ Yes. Please ensure copies of the entire funding proposal and DHHS-approved sample informed consent (if applicable) are available to the IRB.

NOTE: If this is a federally-funded study, you will be required to track the race and ethnicity of subjects enrolled. This is reported to the IRB at the time of continuing review.

SECTION XIV: INVESTIGATIONAL TEST ARTICLES

☒ N/A. No investigational drugs or devices are being studied in this research.

☐ This study involves a device that is exempt from the IDE requirements. Please submit the IDE Checklist or notification from the FDA confirming status of this device.

If you are studying an investigational drug or device, an IND or IDE may be required. Please see the IND Checklist or IDE Checklist for more information.

INVESTIGATIONAL DRUGS

A. Name of Drug Sponsor: __________________________
   Name of Drug: __________________________

   Study Phase: □ I □ II □ II/III □ III □ III/IV □ IV

   ☐ An IND is not required. Please submit the IND Checklist or notification from the FDA confirming exempt status.

   ☐ An IND is required and has been obtained for this drug. IND Number: __________________________

1. Provide verification of the IND number (choose all that apply):
   ☐ Documentation from the FDA provided
   ☐ IND number included in the sponsor protocol, list the page number where the IND number is located

2. Does the investigator hold the IND?
   ☐ No
   ☑ Yes. Before approval can be granted, the investigator must meet with the Office of Research Administration staff to discuss the additional responsibilities as a sponsor of an IND. Please contact the IU Human Subjects Office at (317) 274-8289 and submit documentation from them verifying this discussion has taken place.

3. Will services of the Investigational Drug Services (IDS) be used?
   ☐ Yes
   ☒ No. The investigator must demonstrate understanding of the handling and control of investigational test articles by reviewing the SOP for Investigational Test Articles. Check here ☐ to confirm the investigator has read the SOP and agrees to comply with the policies and procedures outlined.

INVESTIGATIONAL DEVICES

B. Name of Device Manufacturer: __________________________
   Name of Device: __________________________

   The IRB is required to determine whether or not the device is significant risk. To help in this determination, please provide the sponsor's documentation on the risk assessment and the rationale used in making the risk determination. Please provide the investigator's assessment of the device risk below:

   ☐ Nonsignificant Risk (NSR) Device. Please provide a risk assessment and rationale for this risk determination:

   ☐ Significant Risk (SR) Device
   ☐ An IDE has been obtained for this device. IDE Number: __________________________
1. Provide verification of the IDE number (choose all that apply):
   - [ ] Documentation from the FDA provided
   - [ ] IDE number included in the sponsor protocol, list the page number where the IDE number is located

2. Does the IU affiliated investigator hold the IDE?
   - [ ] No
   - [ ] Yes. Before approval can be granted, the investigator must meet with the Office of Research Administration staff to discuss the additional responsibilities as a sponsor of an IDE. Please contact the IU Human Subjects Office at (317) 274-8289 and submit documentation from them verifying this discussion has taken place.

3. The investigator must demonstrate understanding of the handling and control of investigational test articles by reviewing the SOP for Investigational Test Articles. Check here [ ] to confirm the investigator has read the SOP and agrees to comply with the policies and procedures outlined.
APPENDIX B- SURVEY INSTRUMENTS
OSTEOPOROSIS KNOWLEDGE TEST

Osteoporosis (os-te-o-po-ros-is) is a condition in which the bones become very brittle and weak so that they break easily.

Below is a list of things which may or may not affect a person's chance of getting osteoporosis. After you read each statement, think about if the person is:

MORE LIKELY TO GET OSTEOPOROSIS, or

LESS LIKELY TO GET OSTEOPOROSIS, or

IT HAS NOTHING TO DO WITH (NEUTRAL) GETTING OSTEOPOROSIS, or

YOU DON'T KNOW.

When you read each statement, circle one of the 4 choices for your answer.

ML = MORE LIKELY

LL = LESS LIKELY

NT = NEUTRAL

DK = DON'T KNOW

1. Eating a diet LOW in milk products

2. Being menopausal; "change of life"

3. Having big bones

4. Eating a diet high in dark green leafy vegetables

5. Having a mother or grandmother who has osteoporosis

6. Being a white woman with fair skin

7. Having ovaries surgically removed

8. Taking cortisone (steroids e.g. Prednisone) for long time

9. Exercising on a regular basis

Developed by Katherine Kim, Ph.D., Mary Horan, Ph.D., and Phyllis Gendler, Ph.D. (1991). Grand Valley State University, with support from the Grand Valley State University Research Grant-in-Aid. Reproduction without authors’ express written consent is not permitted. Permission to use this scale may be obtained from Phyllis Gendler at Grand Valley State University, Grand Rapids, MI 49503.
For the next group of questions, choose one answer from the 4 choices. Be sure to choose only one answer. If you think there are more than one answer, choose the best answer. If you are not sure, circle D.

10. Which of the following exercises is the best way to reduce a person's chance of getting osteoporosis?
   
   A. Swimming  
   B. Walking briskly  
   C. Doing kitchen chores, such as washing dishes or cooking  
   D. Don't Know

11. Which of the following exercises is the best way to reduce a person's chance of getting osteoporosis?
   
   A. Bicycling  
   B. Yoga  
   C. Housecleaning  
   D. Don't Know

12. How many days a week do you think a person should exercise to strengthen the bones?
   
   A. 1 day a week  
   B. 2 days a week  
   C. 3 or more days a week  
   D. Don't Know

13. What is the LEAST AMOUNT OF TIME a person should exercise on each occasion to strengthen the bones?
   
   A. Less than 15 minutes  
   B. 20 to 30 minutes  
   C. More than 45 minutes  
   D. Don't Know

14. Exercise makes bones strong, but it must be hard enough to make breathing:
   
   A. Just a little faster  
   B. So fast that talking is not possible  
   C. Much faster, but talking is possible  
   D. Don't Know

15. Which of the following exercises is the best way to reduce a person's chance of getting osteoporosis?
   
   A. Jogging or running for exercise  
   B. Golfing using golf cart  
   C. Gardening  
   D. Don't Know

16. Which of the following exercises is the best way to reduce a person's chance of getting osteoporosis?
   
   A. Bowling  
   B. Doing laundry  
   C. Aerobic dancing  
   D. Don't Know
Calcium is one of the nutrients our body needs to keep bones strong.

17. Which of these is a good source of calcium?
   A. Apple    D. Don't Know
   B. Cheese
   C. Cucumber

18. Which of these is a good source of calcium?
   A. Watermelon   D. Don't Know
   B. Corn
   C. Canned Sardines

19. Which of these is a good source of calcium?
   A. Chicken    D. Don't Know
   B. Broccoli
   C. Grapes

20. Which of these is a good source of calcium?
   A. Yogurt     D. Don't Know
   B. Strawberries
   C. Cabbage

21. Which of these is a good source of calcium?
   A. Ice cream  D. Don't Know
   B. Grapefruit
   C. Radishes

22. Which of the following is the recommended amount of calcium intake for an adult?
   A. 100 mg - 300 mg daily   D. Don't Know
   B. 400 mg - 600 mg daily
   C. 800 mg or more daily

23. How much milk must an adult drink to meet the recommended amount of calcium?
   A. 1/2 glass daily   D. Don't Know
   B. 1 glass daily
   C. 2 or more glasses daily

24. Which of the following is the best reason for taking a calcium supplement?
   A. If a person skips breakfast   D. Don't Know
   B. If a person does not get enough calcium from diet
   C. If a person is over 45 years old
DEMOGRAPHIC INFORMATION:
Please answer the following about yourself:

What is your gender?
○ Male
○ Female

What is your ethnicity/race?
○ White
○ African American
○ Hispanic American
○ Other

Do you speak English as a second language?
○ Yes
○ No

What is your age range?
○ Under 30
○ 31-40
○ 41-50
○ 51-60
○ 61-70
○ 71 or over

Have you ever had your bone density tested?
○ Yes
○ No

Have you ever received training about Osteoporosis in the past?
○ Yes
○ No

PLEASE CHECK TO SEE YOU HAVE ANSWERED ALL QUESTIONS.

(Adapted from Edmonds, 2009)
OSTEOPOROSIS HEALTH BELIEF SCALE

Osteoporosis (os-te-o-po-ro-sis) is a condition in which the bones become excessively thin (porous) and weak so that they are fracture prone (they break easily).

Below are some questions about your beliefs about osteoporosis. There are no right or wrong answers. We all have different experiences which will influence how we feel. After reading each statement, circle if you STRONGLY DISAGREE, DISAGREE, or NEUTRAL, AGREE, or STRONGLY AGREE with the statement.

It is important that you answer according to your actual beliefs and not according to how you feel you should believe or how you think we want you to believe. We need the answers that best explain how you feel.

Read each statement. Circle one best option that explains what you believe.

SD = STRONGLY DISAGREE

D = DISAGREE

N = NEUTRAL

A = AGREE

SA = STRONGLY AGREE

1. Your chances of getting osteoporosis are high.
2. Because of your body build, you are more likely to develop osteoporosis.
3. It is extremely likely that you will get osteoporosis.
4. There is a good chance that you will get osteoporosis.
5. You are more likely than the average person to get osteoporosis.
6. Your family history makes it more likely that you will get osteoporosis.
7. The thought of having osteoporosis scares you.
8. If you had osteoporosis you would be crippled.

K. Kim, M. Horan, P. Gendler, 1991. Reproduction without authors’ express written consent is not permitted. Permission to use this scale may be obtained from Phyllis Gendler at Grand Valley State University, Grand Rapids, MI 49503.
SD = STRONGLY DISAGREE  
D = DISAGREE  
N = NEUTRAL  
A = AGREE  
SA = STRONGLY AGREE

<table>
<thead>
<tr>
<th>SD</th>
<th>D</th>
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<th>Statement</th>
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<tbody>
<tr>
<td></td>
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<td>9. Your feelings about yourself would change if you got osteoporosis.</td>
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<td>10. It would be very costly if you got osteoporosis.</td>
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<td>11. When you think about osteoporosis you get depressed.</td>
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<td>12. It would be very serious if you got osteoporosis.</td>
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<td>13. Regular exercise prevents problems that would happen from osteoporosis.</td>
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<td>14. You feel better when you exercise to prevent osteoporosis.</td>
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<td>15. Regular exercise helps to build strong bones.</td>
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<td>16. Exercising to prevent osteoporosis also improves the way your body looks.</td>
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<td>17. Regular exercise cuts down the chances of broken bones.</td>
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<td>18. You feel good about yourself when you exercise to prevent osteoporosis.</td>
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<td>19. Taking in enough calcium prevents problems from osteoporosis.</td>
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<td>20. You have lots to gain from taking in enough calcium to prevent osteoporosis.</td>
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<td>21. Taking in enough calcium prevents painful osteoporosis.</td>
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<td></td>
<td>22. You would not worry as much about osteoporosis if you took in enough calcium.</td>
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<td></td>
<td>23. Taking in enough calcium cuts down on your chances of broken bones.</td>
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<td></td>
<td>24. You feel good about yourself when you take in enough calcium to prevent osteoporosis.</td>
</tr>
</tbody>
</table>
SD = STRONGLY DISAGREE  
D = DISAGREE  
N = NEUTRAL  
A = AGREE  
SA = STRONGLY AGREE

25. You feel like you are not strong enough to exercise regularly.
26. You have no place where you can exercise.
27. Your spouse or family discourages you from exercising.
28. Exercising regularly would mean starting a new habit which is hard for you to do.
29. Exercising regularly makes you uncomfortable.
30. Exercising regularly upsets your every day routine.
31. Calcium rich foods cost too much.
32. Calcium rich foods do not agree with you.
33. You do not like calcium rich foods.
34. Eating calcium rich foods means changing your diet which is hard to do.
35. In order to eat more calcium rich foods you have to give up other foods that you like.
36. Calcium rich foods have too much cholesterol.
37. You eat a well-balanced diet.
38. You look for new information related to health.
39. Keeping healthy is very important for you.
40. You try to discover health problems early.
41. You have a regular health check-up even when you are not sick.
42. You follow recommendations to keep you healthy.

Please check to see that you have answered all items.
OSTEOPOROSIS SELF-EFFICACY SCALE

We are interested in learning how confident you feel about doing the following activities. Everyone has different experiences which will make each person more or less confident in doing the following things. Thus, there are no right or wrong answers to this questionnaire. It is your opinion that is important. In this questionnaire, EXERCISE means activities such as walking, swimming, golfing, biking, aerobic dancing.

Place your "X" anywhere on the answer line that you feel best describes your confidence level.

If it were recommended that you do any of the following THIS WEEK, how confident or certain would you be that you could:

1. begin a new or different exercise program
   Not at all -------- Very confident
   Confident

2. change your exercise habits
   Not at all -------- Very confident
   Confident

3. put forth the effort required to exercise
   Not at all -------- Very confident
   Confident

4. do exercises even if they are difficult
   Not at all -------- Very confident
   Confident

5. exercise for the appropriate length of time
   Not at all -------- Very confident
   Confident

6. do the type of exercises that you are supposed to do
   Not at all -------- Very confident
   Confident

OSES12

1
If it were recommended that you do any of the following THIS WEEK, how confident or certain would you be that you could:

7. increase your calcium intake
   Not at all confident | Very confident

8. change your diet to include more calcium rich foods
   Not at all confident | Very confident

9. eat calcium rich foods as often as you are supposed to do
   Not at all confident | Very confident

10. select appropriate foods to increase your calcium intake
    Not at all confident | Very confident

11. stick to a diet which gives an adequate amount of calcium
    Not at all confident | Very confident

12. obtain foods that give an adequate amount of calcium even when they are not readily available
    Not at all confident | Very confident

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Osteoporosis Education Outline

Leading Questions to Complete During the Educational Workshop

1. Osteoporosis means (porous) bones. This disease results in bones that have reduced strength.

2. Osteoporosis is a serious health threat. It is estimated that (10) million Americans have osteoporosis.

3. Osteoporosis is often called a “silent disease” because you may not know you have Osteoporosis or have any signs of the disease until the first warning sign which is often a (fracture).

4. Without adequate (exercise), as well as (calcium), and vitamin D intake, Osteoporosis could become a risk for you and for the individuals with disabilities that you support.

5. Recommended amounts of calcium vary by age but all adults should have an intake of at least (800) mg. of calcium daily. *See the charts provided for more information about the recommended amount of calcium and Vitamin D for you!

6. An adequate diet to help prevent osteoporosis includes a diet rich in (calcium) and vitamin (D).

7. (Milk) products have high calcium content.

8. In order to get the recommended amount of daily calcium from milk alone, an adult must drink (2) or more glasses of milk per day.

9. Examples of other foods that are rich in calcium include dark green leafy (vegetables) and canned sardines.

10. Exposure to (sunlight) in the out-of-doors is one way we can help the body to naturally produce vitamin D.

11. Taking certain drugs for an extended period of time can also lead to an increased risk of osteoporosis because they may deplete the body of calcium. Some of these drugs are (cortisone) or other steroids, and drugs often prescribed for epilepsy.

12. Certain health conditions such as having a (hyperactive) thyroid may lead to bone loss due to the depletion of calcium from the bones.

13. A risk factor for Osteoporosis is heredity, this means that having a (mother) or grandmother who has osteoporosis may increase your likelihood of developing Osteoporosis.

14. (Exercising) on a regular basis may make a person less likely to develop Osteoporosis.
15. (Weight-bearing) exercises such as brisk (walking), jogging or aerobic dancing are good choices to help prevent Osteoporosis.
16. Because the hormone estrogen helps to keep bones strong, women who have reduced estrogen due to (menopause) or who are post-menopausal have an increased likelihood of having bone loss.
17. The hormone testosterone helps to keep men's bones strong. With aging, men generally experience a reduction in (testosterone) levels which can result in bone (loss).
18. A woman who has had her (ovaries) surgically removed also has an increased likelihood of developing bone loss, due to the loss of estrogen.
19. Osteoporosis tends to be more prevalent in (white) women with (fair) skin and in women who have a (small) bone structure.
20. Exercises such as (bicycling) can help you to build bone strength by providing resistance as you press on the pedals.
21. It is recommended that you exercise (3) or more days per week to strengthen your bones.
22. In order for exercise to be most effective in strengthening your bones, you should exercise for at least (20-30 minutes) per session.
23. To be most effective in increasing bone strength, you should exercise hard enough so that your breathing is (much faster) but you are still able to talk.
24. You can help the individuals with disabilities you support to maintain their bone strength by providing bone healthy (choices) and encouraging healthy behaviors.
25. Examples of bone healthy behaviors that are recommended for you and the individuals you support include eating and drinking calcium rich foods and drinks, engaging in (weight-bearing) exercise at least 3 times per week, and going outside on (sunny) days for about 15 minutes. Walking outside is an excellent activity choice!
Osteoporosis Overview

Print  Close Window

Reviewed January 2011

Osteoporosis, or porous bone, is a disease characterized by low bone mass and structural deterioration of bone tissue, leading to bone fragility and an increased risk of fractures of the hip, spine, and wrist. Men as well as women are affected by osteoporosis, a disease that can be prevented and treated. In the United States, more than 40 million people either already have osteoporosis or are at high risk due to low bone mass.

- What Is Bone?
- Risk Factors
- Prevention
- Symptoms
- Detection
- Treatment
- Fall Prevention

What Is Bone?

Bone is living, growing tissue. It is made mostly of collagen, a protein that provides a soft framework, and calcium phosphate, a mineral that adds strength and hardens the framework.

This combination of collagen and calcium makes bone both flexible and strong, which in turn helps bone to withstand stress. More than 99 percent of the body’s calcium is contained in the bones and teeth. The remaining 1 percent is found in the blood.

Throughout one’s lifetime, old bone is removed (resorption) and new bone is added to the skeleton (formation). During childhood and teenage years, new bone is added faster than old bone is removed. As a result, bones become larger, heavier, and denser. Bone formation outpaces resorption until peak bone mass (maximum bone density and strength) is reached around age 30. After that time, bone resorption slowly begins to exceed bone formation.

For women, bone loss is fastest in the first few years after menopause, and it continues into the postmenopausal years. Osteoporosis—which mainly affects women but may also affect men—will develop when bone resorption occurs too quickly or when replacement occurs too slowly. Osteoporosis is more likely to develop if you did not reach optimal peak bone mass during your bone-building years.

Risk Factors

Certain risk factors are linked to the development of osteoporosis and contribute to an individual’s likelihood of developing the disease. Many people with osteoporosis have several risk factors, but others who develop the disease have no known risk factors. Some risk factors cannot be changed, but you can change others.

Risk factors you cannot change:

- Gender. Your chances of developing osteoporosis are greater if you are a woman. Women have less bone tissue and lose bone faster than men because of the changes that happen with menopause.

Osteoporosis Overview

- Age. The older you are, the greater your risk of osteoporosis. Your bones become thinner and weaker as you age.
- Body size. Small, thin-boned women are at greater risk.
- Ethnicity. Caucasian and Asian women are at highest risk. African American and Hispanic women have a lower but significant risk.
- Family history. Fracture risk may be due, in part, to heredity. People whose parents have a history of fractures also seem to have reduced bone mass and may be at risk for fractures.

Risk factors you can change:

- Sex hormones. Abnormal absence of menstrual periods (amenorrhea), low estrogen level (menopause), and low testosterone level in men can bring on osteoporosis.
- Anorexia nervosa. Characterized by an irrational fear of weight gain, this eating disorder increases your risk for osteoporosis.
- Calcium and vitamin D intake. A lifetime diet low in calcium and vitamin D makes you more prone to bone loss.
- Medication use. Long-term use of certain medications, such as glucocorticoids and some anticonvulsants can lead to loss of bone density and fractures.
- Lifestyle. An inactive lifestyle or extended bed rest tends to weaken bones.
- Cigarette smoking. Smoking is bad for bones as well as the heart and lungs.
- Alcohol intake. Excessive consumption of alcohol increases the risk of bone loss and fractures.

Prevention

To reach optimal peak bone mass and continue building new bone tissue as you age, you should consider several factors.

Calcium: An inadequate supply of calcium over a lifetime contributes to the development of osteoporosis. Many published studies show that low calcium intakes appears to be associated with low bone mass, rapid bone loss, and high fracture rates.
National nutrition surveys show that many people consume less than half the amount of calcium recommended to build and maintain healthy bones. Food sources of calcium include low-fat dairy products, such as milk, yogurt, cheese, and ice cream; dark green, leafy vegetables, such as broccolli, collard greens, bok choy, and spinach; sardines and salmon with bones; tofu; almonds; and foods fortified with calcium, such as orange juice, cereals, and breads. Depending on how much calcium you get each day from food, you may need to take a calcium supplement.

Calcium needs change during one's lifetime. The body's demand for calcium is greater during childhood and adolescence, when the skeleton is growing rapidly, and during pregnancy and breastfeeding. Postmenopausal women and older men also need to consume more calcium. Also, as you age, your body becomes less efficient at absorbing calcium and other nutrients. Older adults also are more likely to have chronic medical problems and to use medications that may impair calcium absorption.

Recommended Calcium Intakes

<table>
<thead>
<tr>
<th>Life-stage group</th>
<th>mg/day</th>
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<tbody>
<tr>
<td>Infants 0 to 6 months</td>
<td>200</td>
</tr>
<tr>
<td>Infants 6 to 12 months</td>
<td>260</td>
</tr>
<tr>
<td>1 to 3 years old</td>
<td>700</td>
</tr>
<tr>
<td>4 to 8 years old</td>
<td>1,000</td>
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<tr>
<td>9 to 13 years old</td>
<td>1,200</td>
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<tr>
<td>14 to 18 years old</td>
<td>1,300</td>
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<tr>
<td>19 to 30 years old</td>
<td>1,000</td>
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<tr>
<td>31 to 50 years old</td>
<td>1,000</td>
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<tr>
<td>61+ to 70-year-old males</td>
<td>1,000</td>
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<tr>
<td>61+ to 70-year-old females</td>
<td>1,200</td>
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<tr>
<td>&gt;70 years old</td>
<td>1,200</td>
</tr>
<tr>
<td>14+ to 18 years old, pregnant/lactating</td>
<td>1,300</td>
</tr>
<tr>
<td>19+ to 50 years old, pregnant/lactating</td>
<td>1,200</td>
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Source: Food and Nutrition Board, Institute of Medicine, National Academy of Sciences, 2010.

Vitamin D: Vitamin D plays an important role in calcium absorption and bone health. Food sources of vitamin D include egg yolks, saltwater fish, and liver. Many people obtain enough vitamin D naturally; however, studies show that vitamin D production decreases in the elderly, in people who are housebound, and for people in general during the winter. Adults should have vitamin D intakes of 600 IU (International Units) daily up to age 70. Men and women over age 70 should increase their intake to 800 IU daily.

Osteoporosis Overview

Exercise: Like muscle, bone is living tissue that responds to exercise by becoming stronger. Weight-bearing exercise is the best for your bones because it forces you to work against gravity. Examples include walking, hiking, jogging, climbing stairs, weight training; tennis, and dancing.

Smoking: Smoking is bad for your bones as well as your heart and lungs. Women who smoke have lower levels of estrogen compared with nonsmokers, and they often go through menopause earlier. Smokers also may absorb less calcium from their diets.

Alcohol: Regular consumption of 2 to 3 ounces a day of alcohol may be damaging to the skeleton, even in young women and men. Those who drink heavily are more prone to bone loss and fracture, because of both poor nutrition and increased risk of falling.

Medications that cause bone loss: The long-term use of glucocorticoids (medications prescribed for a wide range of diseases including arthritis, asthma, Crohn's disease, lupus, and other diseases of the lungs, kidneys, and liver) can lead to a loss of bone density and fracture. Bone loss also can result from long-term treatment with certain antiseizure drugs, such as phenytoin (Dilantin) and barbiturates; gonadotropin-releasing hormone (GnRH) drugs used to treat endometriosis; excessive use of aluminum-containing antacids; certain cancer treatments; and excessive thyroid hormone. It is important to discuss the use of these drugs with your doctor and not to stop or change your medication dose on your own.

1 Brand names included in this publication are provided as examples only, and their inclusion does not mean that these products are endorsed by the National Institutes of Health or any other government agency. Also, if a particular brand name is not mentioned, this does not mean or imply that the product is unsatisfactory.

Symptoms

Osteoporosis is often called a silent disease because bone loss occurs without symptoms. People may not know that they have osteoporosis until their bones become so weak that a sudden strain, bump, or fall causes a hip fracture or a vertebra to collapse. Collapsed vertebrae may initially be felt or seen in the form of severe back pain, loss of height, or spinal deformities such as kyphosis (severely stooped posture).

Detection

Following a comprehensive medical assessment, your doctor may recommend that you have your bone mass measured. A bone mineral density (BMD) test is the best way to determine your bone health. BMD tests can identify osteoporosis, determine your risk for fractures (broken bones), and measure your response to osteoporosis treatment. The most widely recognized BMD test is a dual-energy x-ray absorptiometry, or DXA test. It is painless—a bit like having an x-ray, but with much less exposure to radiation. It can measure bone density at your hip and spine. BMD tests can:

- Detect low bone density before a fracture occurs.
- Confirm a diagnosis of osteoporosis if you already have one or more fractures.
- Predict your chances of fracturing in the future.
- Determine your rate of bone loss, and monitor the effects of treatment if the test is conducted at intervals of a year or more.

Treatment

A comprehensive osteoporosis treatment program includes a focus on proper nutrition, exercise, and safety issues to prevent falls that may result in fractures. In addition, your doctor may prescribe a medication to slow or stop bone loss, increase bone density, and reduce fracture risk.

Nutrition: The foods we eat contain a variety of vitamins, minerals, and other important nutrients that help keep our bodies healthy. All of these nutrients are needed in balanced proportion. In particular, calcium and vitamin D are needed for strong bones and for your heart, muscles, and nerves to function properly. (See Prevention section for recommended amounts of calcium.)

Exercise: Exercise is an important component of an osteoporosis prevention and treatment program. Exercise not only improves your bone health, but it increases muscle strength, coordination, and balance, and leads to better overall health. Although exercise is good for everyone with osteoporosis, it should not put any sudden or excessive strain on your bones. As extra insurance against fractures, your doctor can recommend specific exercises to strengthen and support your back.

Therapeutic medications:

Several medications are available for the prevention and/or treatment of osteoporosis, including: bisphosphonates; estrogen

Osteoporosis Overview

agonists/antagonists (also called selective estrogen receptor modulators or SERMS); parathyroid hormone; estrogen therapy; hormone therapy; and a recently approved RANK ligand (RANKL) inhibitor.

Fall Prevention

Preventing falls is a special concern for men and women with osteoporosis. Falls can increase the likelihood of fracturing a bone in the hip, wrist, spine, or other part of the skeleton. In addition to the environmental factors listed below, falls can also be caused by impaired vision or balance, chronic diseases that affect mental or physical functioning, and certain medications, such as sedatives and antidepressants. It is important that individuals with osteoporosis be aware of any physical changes that affect their balance or gait, and that they discuss these changes with their health care provider. Here are some tips to help eliminate the environmental factors that lead to falls.

Outdoors:

- Use a cane or walker for added stability.
- Wear rubber-soled shoes for traction.
- Walk on grass when sidewalks are slippery.
- In winter, carry salt or kitty litter to sprinkle on slippery sidewalks.
- Be careful on highly polished floors that become slick and dangerous when wet.
- Use plastic or carpet runners when possible.

Indoors:

- Keep rooms free of clutter, especially on floors.
- Keep floor surfaces smooth but not slippery.
- Wear supportive, low-heeled shoes even at home.
- Avoid walking in socks, stockings, or slippers.
- Be sure carpets and area rugs have skid-proof backing or are tacked to the floor.
- Be sure stairwells are well lit and that stairs have handrails on both sides.
- Install grab bars on bathroom walls near tub, shower, and toilet.
- Use a rubber bath mat in shower or tub.
- Keep a flashlight with fresh batteries beside your bed.
- If using a step stool for hard-to-reach areas, use a sturdy one with a handrail and wide steps.
- Add ceiling fixtures to rooms lit by lamps.
- Consider purchasing a cordless phone so that you don’t have to rush to answer the phone when it rings, or so that you can call for help if you do fall.

The National Institutes of Health Osteoporosis and Related Bone Diseases — National Resource Center acknowledges the assistance of the National Osteoporosis Foundation in the preparation of this publication.

For Your Information

This fact sheet contains information about medications used to treat the health condition discussed here. When this fact sheet was printed, we included the most up-to-date (accurate) information available. Occasionally, new information on medication is released.

For updates and for any questions about any medications you are taking, please contact the U.S. Food and Drug Administration at

U.S. Food and Drug Administration
Toll Free: 888–INFO–FDA (888–463–6332)
Website: http://www.fda.gov/

For updates and questions about statistics, please contact


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<th>NIH Osteoporosis and Related Bone Diseases – National Resource Center</th>
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<td>Bethesda, MD 20892-3676</td>
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<td>Phone: 202-223-0344</td>
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<td>Toll Free: 800-624-BONE (2663)</td>
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<tr>
<td>TTY: 202-465-0135</td>
</tr>
<tr>
<td>Fax: 202-293-5258</td>
</tr>
<tr>
<td>Email: <a href="mailto:NIHBoneinfo@mail.nih.gov">NIHBoneinfo@mail.nih.gov</a></td>
</tr>
<tr>
<td>Website: <a href="http://www.bones.nih.gov">http://www.bones.nih.gov</a></td>
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</tbody>
</table>

The NIH Osteoporosis and Related Bone Diseases – National Resource Center provides patients, health professionals, and the public with an important link to resources and information on metabolic bone diseases. The mission of NIH ORBD-NRC is to expand awareness and enhance knowledge and understanding of the prevention, early detection, and treatment of these diseases as well as strategies for coping with them.

The NIH Osteoporosis and Related Bone Diseases – National Resource Center is supported by the National Institute of Arthritis and Musculoskeletal and Skin Diseases with contributions from:

- National Institute on Aging
- Eunice Kennedy Shriver National Institute of Child Health and Human Development
- National Institute of Dental and Craniofacial Research
- National Institute of Diabetes and Digestive and Kidney Diseases
- NIH Office of Research on Women's Health
- DHHS Office on Women's Health

The National Institutes of Health (NIH) is a component of the U.S. Department of Health and Human Services (DHHS).

Most of our bone publications are available online only. Some are available in print. Would you like to order publications on bone disorders to be mailed to you? Visit our online order form.

http://www.niams.nih.gov/Health_Info/Bone/Osteoporosis/overview.asp?print=yes

3/13/2012
RDA – Calcium & Vitamin D
(recommended dietary allowance)
(National Academy of Sciences, Institute of Medicine, Food and Nutrition Board, 2011)

<table>
<thead>
<tr>
<th>Calcium</th>
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</thead>
<tbody>
<tr>
<td>age</td>
<td>male</td>
<td>female</td>
</tr>
<tr>
<td>0–6 months</td>
<td>200 mg</td>
<td>200 mg</td>
</tr>
<tr>
<td>7–12 months</td>
<td>260 mg</td>
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<tr>
<td>1–3 years</td>
<td>700 mg</td>
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</tr>
<tr>
<td>4–8 years</td>
<td>1000 mg</td>
<td>1000 mg</td>
</tr>
<tr>
<td>9–13 years</td>
<td>1300 mg</td>
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</tr>
<tr>
<td>14–18 years</td>
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<td>1300 mg</td>
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<td>19–50 years</td>
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<tr>
<td>51–70 years</td>
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<td>1200 mg</td>
</tr>
<tr>
<td>71+ years</td>
<td>1200 mg</td>
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</table>

<table>
<thead>
<tr>
<th>Vitamin D</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>age</td>
<td>Male</td>
<td>female</td>
</tr>
<tr>
<td>0–12 months</td>
<td>400 IU</td>
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</tr>
<tr>
<td>1–13 years</td>
<td>600 IU</td>
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<td>51–70 years</td>
<td>600 IU</td>
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</tr>
<tr>
<td>71+ years</td>
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Bone Basics © 2010 NOF
National Osteoporosis Foundation
1150 17th Street, NW, Suite 850, Washington, DC 20036-4644
(800) 231-4222 - www.nof.org

EXERCISE FOR YOUR BONE HEALTH

Exercise Regularly. You know that your muscles get bigger and stronger when you use them. Your bones are similar! They get stronger and denser when you make them work. And "work" for bones means handling impact, the weight of your body or more resistance.

Currently, we know the most about two types of exercises that are important for building and maintaining bone density. These exercises are:

1. **Weight-bearing exercises.** These exercises include activities that make you move against gravity while being upright. They include both high-impact and low-impact activities.

   Examples of high-impact weight-bearing activities are running, hiking and playing soccer. See Group 1 in the chart on the right for more examples.

   If you can't do high-impact weight-bearing activities, try one of the lower-impact ones listed in Group 2. For example, try walking or using an elliptical training machine.

   Biking and swimming are not weight-bearing exercises, so they don't help your bones as much. If you like these activities, try to add other activities to your exercise routine that work your bones.

   If you haven't exercised regularly for a while, check with your healthcare provider before you begin a new program—particularly if you have health problems such as heart disease, diabetes or high blood pressure. Once you have your healthcare provider's approval, start slowly.

2. **Muscle-strengthening exercises.** These exercises include activities where you move your body, a weight or some other resistance against gravity. These exercises are also known as resistance exercises.

   Muscle-strengthening exercises include lifting weights, using elastic exercise bands, using weight machines or lifting your own body weight. Yoga and Pilates are also muscle-strengthening exercises. However, people with osteoporosis and low bone density need to avoid certain positions.

Which Exercise Is Best

The exercises listed in Group 1 are the best for keeping bones strong. If you have osteoporosis, fall easily or are frail, choose safer options from Groups 2 or 3.

<table>
<thead>
<tr>
<th>Group 1: High-Impact Weight-Bearing Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Aerobic Dancing</td>
</tr>
<tr>
<td>• Basketball</td>
</tr>
<tr>
<td>• Dancing</td>
</tr>
<tr>
<td>• Field Hockey</td>
</tr>
<tr>
<td>• Gymnastics</td>
</tr>
<tr>
<td>• Hiking</td>
</tr>
<tr>
<td>• Jogging or Running</td>
</tr>
<tr>
<td>• Jumping Rope</td>
</tr>
<tr>
<td>• Lacrosse</td>
</tr>
<tr>
<td>• Racquet Sports</td>
</tr>
<tr>
<td>• Soccer</td>
</tr>
<tr>
<td>• Stair Climbing</td>
</tr>
<tr>
<td>• Tennis</td>
</tr>
<tr>
<td>• Volleyball</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 2: Low-Impact Weight-Bearing Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cross-Country Ski Machines*</td>
</tr>
<tr>
<td>• Downhill &amp; Cross-Country Skiing*</td>
</tr>
<tr>
<td>• Elliptical Training Machines</td>
</tr>
<tr>
<td>• Low Impact Aerobics</td>
</tr>
<tr>
<td>• Stair-Step Machines</td>
</tr>
<tr>
<td>• Treadmill Walking</td>
</tr>
<tr>
<td>• Walking</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 3: Muscle-Strengthening Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Exercise Bands</td>
</tr>
<tr>
<td>• Pilates**</td>
</tr>
<tr>
<td>• Weight Lifting/Resistance Training**</td>
</tr>
<tr>
<td>• Weight Machines</td>
</tr>
<tr>
<td>• Yoga**</td>
</tr>
</tbody>
</table>

*Avoid if you have balance problems or are at risk of falls.
**Avoid forward-bending exercises.
For example, if you've already had broken bones in the spine due to osteoporosis, be very careful to avoid activities that require reaching far, bending forward, rapid twisting motions, heavy lifting and any movements that increase your chance of a fall.

**How Much Exercise Should I Do?** Weight-bearing, impact exercises should be done for a total of 30 minutes per day, five to seven days per week.

You can do 30 minutes at one time or break it up during the day. For example, 3 sessions of 10 minutes each will provide a similar bone benefit as one 30-minute session. If you can’t fit 10 minutes in, spread your exercise throughout the day by taking the stairs or by parking farther from the store or work.

Muscle-strengthening exercises should be done two to three days a week. You should aim for one exercise for each major muscle group for a total of 8-12 exercises. You should do one or two sets of 8 to 10 repetitions for each exercise. If you lift a weight 10 times in a row and stop, you have completed one set of 10 repetitions.

If you can’t do 8 in a row, the weight is too heavy or resistance is too much. If you can do more than 10 in a row, you should probably increase the weight or resistance. If you have osteoporosis or are frail, it may be better to do 10 to 15 repetitions with a lighter weight.

If you don’t have much time for muscle-strengthening, do small amounts at a time. You can do just one body part each day. For example work arms one day, legs the next and trunk the next. You can also spread these exercises out during your normal day.

As you get started, your muscles may feel sore for a day or two after you exercise. If the soreness lasts longer, you may be working too hard and need to ease up. Exercises should be done in a pain-free range of motion.

**Seeing a Physical Therapist.** If you’ve broken a bone or have osteoporosis, consider working with a physical therapist to choose the best exercises for you and to learn the correct form. Your doctor or healthcare provider should be able to provide you with a referral or prescription to see a physical therapist.

In addition to the exercises listed in the chart on page one, the following exercises are also good for people with low bone density and osteoporosis:

**Balance Exercises.** Exercises that strengthen your legs and challenge your balance, such as Tai Chi, can decrease your risk of falls.

**Posture Exercises.** Exercises that improve your posture and reduce rounded or “sloping” shoulders can help you decrease your chance of breaking bones in the spine.

**Functional Exercises.** Exercises that improve how well you move can help you in everyday activities and decrease your risk of falls and broken bones. For example, if you have trouble getting up from a chair or climbing stairs, you should do functional exercises.

**Where can I learn balance, posture and functional exercises?** A physical therapist can teach you balance, posture and functional exercises.

Another good resource for these exercises is NOF’s handbook *Boning Up on Osteoporosis: A Guide to Prevention and Treatment*. Chapter 6 of this 100-page handbook offers step-by-step instructions for 24 different exercises. You can purchase a copy for $6.50 plus shipping. To learn more, visit www.nofstore.org or call toll free at 1 (877) 868-4520.

**Other Recommendations.** A regular exercise program reduces the chance of falling by improving balance, coordination and muscle strength. Exercise has greater benefits for bone health when it is combined with a healthy diet with enough calcium and vitamin D.

NOF recommends that:
- Adults under age 50 get 1,000 mg of calcium and 400 - 800 IU of vitamin D every day for their bone health.
- Adults age 50 and older need 1,200 mg of calcium and 800 - 1,000 IU of vitamin D every day.

While calcium, vitamin D and exercise are all important for osteoporosis prevention and treatment, some people still may need to take an osteoporosis medicine.
MOVING SAFELY

Keeping Good Posture, Body Mechanics and Alignment

Good posture and proper body mechanics are important throughout your life, especially if you have osteoporosis. "Body mechanics" refers to how you move throughout the day. Knowing how to move, sit and stand properly can help you stay active and prevent broken bones and disability. Keeping good posture can also help to limit the amount of kyphosis, or forward curve of the upper back, that can result from broken bones in the spine.

One of the most important things about body mechanics and posture is alignment. Proper alignment of the body puts less stress on the spine and helps you have good posture. Alignment refers to how the head, shoulders, spine, hips, knees and ankles relate and line up with each other. To keep proper alignment, avoid the following positions or movements:

- Having a slumped, head-forward posture
- Bending forward from the waist with straight legs
- Twisting or bending the torso (trunk) to an extreme
- Twisting the torso (trunk) and bending forward when doing activities such as coughing, sneezing, vacuuming or lifting
- Anything that requires you to reach far. An example is reaching up for items on high shelves when you could lose your balance and fall
- Strenuous overhead lifts or carrying packages that are too heavy

Some exercises can do more harm than good. If you have osteoporosis or have broken bones in the spine, you should avoid exercises that involve bending over from the waist. Some examples of movements you should NOT do include:

1. Toe-touches
2. Sit-ups
3. Abdominal crunches (also called stomach crunches)

In addition to these movements, many exercises and activities such as yoga, Pilates, tennis and golf may need to be avoided or adjusted because they often involve twisting and bending motions. Bending forward during routine activities also puts stress on the spine and can increase the chance of breaking a bone in the spine. Since bending forward puts strain on the spine, it’s safer if you’re able to keep your back flat. In the following pages we will discuss how you can keep good posture, body mechanics and alignment when you perform your daily activities.
**Sitting**
- When sitting in a chair, try to keep your hips and knees at the same level. Place your feet flat on the floor. Keep a comfortable posture. You should have a natural inward curve to your lower back and a tall, upright upper back.
- When tying your shoes or drying your feet, sit in a chair. Place one foot on a footstool, box or on your other leg. Lean forward at the hips to tie or dry. Do not bend over or slouch through your upper back. Keep the natural inward curve of your lower back and a straight upper back.
- Use a footstool or footrest when seated for long periods of time.
- When sitting in bucket seats or soft couches or chairs, use a rolled up towel or pillow to support your lower back.
- When sitting at a desk, prop up a clipboard so it slants toward you, like a drafting table.
- When reading, do not lean or slump over. Set your reading material on a desk, table or on pillows on your lap.
- When standing up from a chair, move your hips forward to the front of the chair, and use your leg muscles to lift yourself up.
- When driving, use the head rest.

**Standing**
- Keep your head high, chin in, shoulder blades slightly pinched together.
- Maintain the natural inward curve of your lower back as you flatten your abdomen (tummy) by gently pulling it in.
- Point your feet straight ahead with your knees facing forward.
- While standing in one place for more than a few minutes, put one foot up on a stool or in an open cabinet (if in kitchen). Switch to the other foot every so often. You’ll find this much less tiring for your back and legs.

**Walking**
- Keep your head high, chin in, shoulder blades slightly pinched together.
- Keep your feet pointed straight ahead, not to one side (note arrows). Your knees should face forward. Keep your knees slightly bent.
- Avoid letting your knees lock as you bring your weight over your feet.
- Wear rubber or other non-slip soles when walking, and land lightly on your foot.
- Don’t wear loose slip-on shoes or slippers.
Climbing Stairs

- Use the stairs for exercise and to help maintain your bone density, but only if your healthcare provider says it's safe for you. Build up gradually with this exercise.
- Keep your head high, chin in, shoulder blades slightly pinched together and abdomen (tummy) gently pulled in.
- Keep your feet pointed straight ahead, not to one side. Your knees should face forward. Keep your knees slightly bent.
- Instead of putting one foot directly in front of the other, keep your feet a few inches apart, lined up under the hip on the same side.
- For safety, hold the rail while going up and down but try to avoid pulling yourself up by the railing. Be especially cautious going downstairs. A fall down the stairs could cause severe injuries.

Getting Into and Out of Bed

A. Getting Into Bed

- First, sit down on the side of the bed. Lean toward the head of the bed while supporting your body with both hands.
- Then lie down on your side, bringing both feet up onto the bed at the same time.
- Keep your knees bent and arms in front of you. Then roll onto your back in one motion. Pull your abdomen (tummy) in as you roll to support your back and to help prevent twisting.
- Keep nose, knees and toes pointing in the same direction. Do not lift your head and upper back to move in bed. This puts a great deal of strain on your spine and could cause breaks in the spine.

B. Lying Down and Getting Out of Bed

- When lying on your side in bed, use one pillow between your knees and one under your head to keep your spine aligned and increase your comfort.
- When lying on your back in bed, use one or two pillows under your knees and one under your head.
- Try to avoid using extra pillows to prop your head and upper back since this will put you into a rounded upper back position. But, if you have a rounded upper back posture with a forward head, you may need two pillows to support your neck comfortably.
- When getting out of bed, reverse the steps you took to get in bed (above):
  1. Keep both arms in front of you.
  2. Pull your abdomen (tummy) in and breathe as you roll onto your side.
  3. Keep your abdomen (tummy) pulled in and use your hand to raise your upper body as you carefully place your legs over the side of the bed in one motion.
  4. Sit on the edge of the bed for a moment or two before you stand up.
- When on your back, never lift your head and upper back to sit up in bed or get out of bed.
Lifting and Carrying
- Don't lift or carry objects, packages or babies weighing more than 10 pounds. If you're unsure about how much you can lift, check with your healthcare provider, especially a physical therapist.
- If you are picking up a heavy object, never bend over so that your back is parallel to the ground. This places a lot of strain on your back.
- To lift an object off the floor, first kneel on one knee. Place one hand on a table or stable chair for support if you need it.
- Bring the object close to your body at waist level. Gently pull your abdomen (tummy) in to support your back and breathe out when you are lifting an object or straightening up. Do not hold your breath. Stand using your leg and thigh muscles.
- When carrying groceries, request that your bags be packed lightly. Divide heavy items into separate bags. Hold bags close to your body. Balance the load by carrying the same amount in each hand.
- When unpacking, place bags on a chair or table rather than on a high counter or floor. This prevents extra lifting and twisting of the spine.
- Instead of carrying a heavy pocketbook or purse, consider wearing a fanny pack.

Pushing and Pulling
- When you vacuum, rake, sweep or mop, keep your feet apart with one foot in front of the other. Always face your work directly to keep from twisting your back.
- Shift your weight from foot-to-foot in a rocking movement. With knees bent and shoulder blades pinched together, move forward and back, or from side to side rhythmically.
- Do not bend forward from the waist.

Coughing and Sneezing
- Support your back with one hand whenever you cough or sneeze.
- Place your hand behind your back or on your thigh. This protects the spine from damage caused by a sudden bend forward.

Bending and Turning
- Keep your feet flat and about shoulder-width apart from one another.
- Let both upper arms touch your ribs on the sides, unless you're using one hand for support.
- As you bend, keep back upright and straight and shoulder blades pinched together.
- Bend only at the knees and hips. Do not bend over at the waist since this will put your upper back into a rounded position which can cause broken bones in the spine.
- Even when standing to brush your teeth or wash dishes, try not to bend over at the waist, but rather bend at the knees and hips while keeping your back straight.
- When changing direction you're facing, move your feet with your body. Do not twist the spine. Pivot on your heels or toes with your knees slightly bent. Keep nose, knees, and toes pointing in the same direction.
DETAILED DESCRIPTION OF THE DVD-BASED
OSTEOPORIS TRAINING WORKSHOP

In terms of the content and order of the DVD-based workshop, the facilitator enthusiastically greeted the participants as they signed in, collected the signed consent forms, distributed and collected the completed demographics forms, and then invited the participants to enter the conference room. Participants were invited to help themselves to healthy snacks that were located on a table along the back wall of the conference room. The snacks provided consisted of the same food items that the enhanced group received. A few of the PowerPoint Slides used for the enhanced workshop were also utilized for the DVD-based training. This included an introductory slide that provided the title of the workshop “Osteoporosis Education Workshop: Promoting Strong Bones for You and for the Individuals with Disabilities that you Support”. Slide number two provided the names of the clinicians who developed the training. Slide number 3 provided a list of the pre-workshop forms and surveys to be completed. After slide number 3 was shown and discussed, manila folders were distributed which contained the pre-workshop OP surveys. Participants were given pens and pencils and asked to complete the surveys. Brief instructions were provided as to how to score the surveys and participant were told to see the facilitator if they had questions or needed assistance. Participants were given approximately 10 minutes to complete the surveys. The facilitator collected the manila folders which were identified by subject number and also identified as being pre-tests. After all surveys were collected, the facilitator showed a few additional Power-Point slides which included slides number 4 and 5 which provided an outline that was revised from the enhanced workshop version, which showed how the workshop would proceed and the basic information to be covered. Next,
slide 6 entitled, “Tell Us about You” was shown. This slide showed questions that were then asked of the participants. They were asked to raise their hand if they could answer “yes” to the specific question. This helped to facilitate learning more about the level of knowledge and experience the participants currently had regarding OP. Slide 7 introduced a contest which was educational but also served as an ice-breaker. The slide asked the question “How many bones are in the adult human body?” Participants were asked to think about this and decide individually on an answer. Then the subjects were called upon to provide their estimate. Slide 8 showed the correct answer of 206 bones in the adult human body. The next slide provided the definition of OP. Then, a slide was shown that asked “Why is it important to learn about Osteoporosis?” The facilitator discussed several reasons why learning about OP is important. The next slide is entitled “Personal Success Story”. The facilitator provided a very brief personal testimony about being diagnosed with bone loss and discussed the steps she took to help maintain or increase her own bone density. The final slide in this section introduced the DVD entitled “Healthy Body Healthy Mind. Treating and Preventing Osteoporosis”. The facilitator distributed the leading question form to each participant and they were told to use this as they watched the DVD, to answer the questions. After the DVD concluded, three final slides were shown which included “Review: Osteoporosis Treatment Options”, “Practical Ways to promote bone health for yourself and the individuals who live here”, and “Wrap Up!” The DVD-based workshop concluded with the completion of post-workshop surveys, door prize drawing, distribution of incentives, and a free, healthy, and calcium rich lunch.
DETAILED DESCRIPTION OF ENHANCED MULTI-METHOD
OSTEOPOROSIS TRAINING WORKSHOP

The enhanced workshop began with the facilitator (co-investigator) and the additional speakers enthusiastically greeting the participants as they arrived and completed their documentation. The facilitator collected the completed consent forms and demographics forms, and then the participants were asked to be seated in the conference room. Participants were invited to help themselves to the healthy snacks on the table in the back of the conference room. The use of these calcium rich snacks also served an educational purpose. Snacks provided to the participants and the calcium content of each snack is provided in table 3.2 below.

Table 3.2: Snacks and Calcium Content

<table>
<thead>
<tr>
<th>Food item</th>
<th>Calcium Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk 1 cup (reduced fat)</td>
<td>295 mg.</td>
</tr>
<tr>
<td>Orange Juice 6 oz. (calcium fortified)</td>
<td>200-260 mg.</td>
</tr>
<tr>
<td>Broccoli 1 cup (raw)</td>
<td>90 mg.</td>
</tr>
<tr>
<td>Yogurt 1 cup (low fat)</td>
<td>415 mg.</td>
</tr>
<tr>
<td>Bread 1 oz. (white)</td>
<td>31 mg.</td>
</tr>
<tr>
<td>Tuna 3 oz. (canned)</td>
<td>10 mg.</td>
</tr>
<tr>
<td>Cheddar Cheese 1 ½ oz. (shredded)</td>
<td>306 mg.</td>
</tr>
</tbody>
</table>

Adapted from NDDIC 2004 and USDA 2002

The tables where participants sat for the workshop were set up in advance in a U shaped design to facilitate interaction between the participants and the presenters. The opening slide of the PowerPoint presentation was already showing on the screen. It provided the title of the presentation, which was “Osteoporosis Workshop: Promoting Strong Bones for You and the Individuals with Disabilities that You Support”. The facilitator again greeted everyone and
thanked them for coming. Then she announced the title of the presentation which was displayed on the screen. The second slide showed the names and credentials of the professional staff who were presenting and the facilitator introduced herself and then the Physical Therapist and the Dietician who were the other two speakers. The next slide provided a list of the forms and surveys to be completed. The facilitator distributed the two pretests to each participant. These were inserted into manila folders prior to the workshop so each participant would receive a manila folder with the survey tools inside. Pens and pencils were distributed and she provided some basic instructions concerning how to complete the surveys. The facilitator told the participants that they had 10 minutes to complete the survey tools. She also told them that if they had any questions or concerns that they should approach her or one of the other speakers in order to get assistance. After the participants had completed their pretests, she collected the manila folders with the pretests inside and placed them in the box reserved for the pretests.

After completion of the pretests the speakers distributed an outline with leading questions having a place to “fill in the blank”, which the participants were encouraged to complete as they participated in the workshop. The speakers told them that it was not going to be collected but was for their use during the workshop. The speakers then proceeded with the instructional content of the OP workshop. They proceeded to the next slide entitled “Osteoporosis Workshop Outline” which listed the topics to be covered during the workshop and their order and this slide lead into a continuation slide of the outline. The next slide entitled “Tell us about you” provided us an opportunity to learn more about each participant’s knowledge and experience with OP. The goal of this slide and exercise was to get feedback from the participants as to the amount of knowledge and experience they already had regarding OP. Questions were asked of the participants and they were asked to raise their hand to indicate that the question was true of them.
A few examples of the questions asked are “How many of you have heard of OP?”, and “how many of you have attended training about osteoporosis?” Several other questions were asked as well. The set of questions and interactions served as ice-breaking and also allowed us to tailor the presentation based on what the participants knew and what they still needed to learn. The next slide introduced a contest which also served as an ice-breaker. Participants were asked to guess how many bones are in the adult human body. Each participant was asked to think about and choose their answer. Then the facilitator started at one end of the table and asked the participant in the first seat to share their answer. We asked each participant to share their answer one at a time. Then the next slide was shown which provided the answer to the question. The participant who guessed a number closest to the actual number of bones in the human body (206) was cheered for and invited to choose a prize (a container of chocolate calcium chews or Ovaltine chocolate drink powder). A basic definition of OP was provided in the following slide. After that, a slide asked “Why is it important to learn about osteoporosis?” Next was a slide entitled “Personal Success Story”. At this time, the facilitator provided a brief personal testimony sharing how she had been diagnosed as having bone loss but then provided a success story in regard to the actions she took to maintain or improve her bone health. After the facilitator, who is a Certified Therapeutic Recreation Specialist, finished the above section of the training, the Physical Therapist began her presentation.

The Physical Therapist provided two slides entitled “Osteoporosis Basics”. She talked about the factors that impact bone health and she discussed bone formation and bone breakdown. She introduced a visual teaching aid to help the participants conceptualize the difference between a healthy human bone and an osteoporotic bone. A bone model of normal vertebrae and then a bone model of vertebrae with OP were shown and passed around among the participants. A
continuation slide called “More Osteoporosis Basics” was shown next. After this the Physical Therapist showed a slide that provided demographics information regarding people with OP. Next she showed a slide called “How our Spine Changes with Age”. It showed the aging process of the spine with OP which pictured a female at three different ages and the curvature of her spine at each of these ages. Two slides were provided next that showed enlarged photos of osteoporotic vertebrae and normal vertebrae and bone architecture. The physical therapist then discussed the risk factors for osteoporosis and first highlighted the factors that were uncontrollable and then she reviewed the controllable factors. The training provided by the Physical Therapist concluded with slides pertaining to exercise as being a key to osteoporosis prevention. She emphasized the importance of weight-bearing and resistance training exercises and also discussed the importance of exercises to help reduce the risk of falls, such as balance and functional exercises. Then she touched on the importance of good posture. The next slide pertain to exercise frequency and duration. Her last slide called LIVE provided a reminder of the importance of load, intensity, variety, and enjoyment in the exercise program. She then demonstrated recommended exercises to prevent OP, to maintain current bone density or to enhance bone density. This was an interactive component during which the Physical Therapist brought out portable exercise supplies such as elastic bands, etc. She demonstrated several exercises that were recommended to promote bone health. She demonstrated how to use the exercise supplies. Participants were invited to stand in a circle and practice the exercises themselves, but it was stressed that their participation was totally voluntary. The Physical Therapist did emphasize that any participant who had a health condition, for which exercise is contraindicated, should not participate without their doctor’s authorization. All subjects
attempted the exercises and were monitored by the Physical Therapist to ensure they were performing the exercises safely and appropriately.

The next section of the enhanced training was provided by the Dietician. She began by discussing the importance of nutrition in maintain healthy bones. She shared a slide which showed the recommended dietary allowance of calcium and vitamin D, by age and gender. She then showed a diagram that showed the degree to which bone loss increases as humans age. The next slide was a graphic entitled “Lifespan Bone Loss” which showed how women lose bone mass faster after menopause. She next shared a slide with a photo of foods that are rich in calcium and then a slide that emphasized dairy products as being a very good source of calcium.

The next slide introduced an illustration that she provided for the participants, called “How much calcium is in the body?” This exercise involved showing various sizes of sealed clear plastic bags with a specific amount of flour inside of each bag. These bags of flour represented the volume of calcium content of an average person at various ages and the demonstration concluded with showing the flour illustration of the volume of calcium in the bones of someone with osteoporosis. Next the Dietician showed a slide of sources of Vitamin D, which showed a photograph of foods high in Vitamin D and a photo of the sun. Next, the Dietician discussed Vitamin D metabolism, while showing a corresponding slide, and discussed how exposure to natural sunlight is an effective way for the body to absorb Vitamin D. The next slide entitled “How to read a food label” was explained in detail. The importance of knowing the recommended amount of calcium for your age and gender was emphasized, because these recommendations vary. It was also noted that it is important to research each year for any changes that may have been made by professional dietary associations regarding recommended daily allowances of calcium and vitamin D. Changes are made after new research results have
been published that indicate the changes in recommendations that should be made. The Dietician allowed time for participants to ask questions and for her to thoroughly address the questions asked. The last part of her presentation was an interactive segment pertaining to determining which recipes had the highest calcium content. Participants worked in small teams to review three different recipes, discuss them among themselves, and then choose the recipe they thought had the highest calcium content. Each group shared their choice of recipes and the Dietician provided feedback.

The instructional parts of the enhanced workshop ended with two slides which included: “Review: Osteoporosis Treatment Options”, and “Practical ways to promote bone health for yourself and the individuals who live here”, during which participants shared their ideas and group interaction was encouraged. Finally, the “Wrap Up!” was conducted when participants completed and submitted their post-workshop surveys, a door prize drawing was held, calcium supplements were distributed, and participants were invited to take hand outs and to enjoy the free calcium rich lunch, which was immediately provided in the conference room.

The post workshop surveys were distributed in the same way as the pre-tests. Post-workshop surveys included the OKT, the OHBS, and the OSES. They were placed in manila folders prior to the workshop and were distributed to the participants, in the manila folders, at the conclusion of the training. Participants were given approximately 10 minutes to complete the surveys. Just as with the pre-tests, the participants were told to write their subject number on each of their surveys. Again, the participants were provided with brief instructions, pencils and pens, and were told that if they had any questions or concerns to approach the facilitator or one of the other speakers for assistance. After the post-workshop surveys were completed, the facilitator
collected all the manila folders with the surveys enclosed. They were placed in a box designated for the post-workshop surveys.

After all surveys had been collected, a name was drawn for the door prize. The door prize of a decorated basket of healthy foods and snacks was provided to the winner. Then each participant who had completed the workshop and the surveys was provided a calcium rich lunch of healthy foods and a bottle of calcium supplements, which served as incentives for the workshop.

The enhanced live workshop lasted approximately one and one half hours. Participants were dismissed to return to their group home if they were working pm shift or to go home if they had already worked the am shift.
Fact Sheet: Osteoporosis

- Osteoporosis affects 44 million Americans (California's population is around 34 million) at a cost of $17 billion dollars annually.
- One out of two women and one out of eight men will be affected by osteoporosis in their lifetime.
- Having osteoporosis puts people at higher risk for fractures that are painful, can be disfiguring, and reduce their ability to lead active lives.
- In a recent study, one half of all women over 50 years old had osteoporosis or low bone mass and did not know it.
- Only 35% of American adults consume the recommended daily allowance of calcium.
- An estimated 14 million men in the United States currently have low bone mass or osteoporosis.
- Osteoporosis is treatable and may be preventable.
- People need to know their risk for osteoporosis and talk to their doctors about diagnosis, prevention, and treatment strategies.

Contact
Foundation for Osteoporosis Research and Education
for information on how to keep your bones healthy throughout your lifetime.
(510) 832-2663 or www.fore.org
How to read a food label

[Image of a nutrition facts label]

In reading food labels, the Nutrition Facts Panel Figure 7-1. How to Use the

**Calcium**
- In food labels, look for **Calcium** in the Nutrition Facts Panel.
Three-Cheese Spinach Frittata

Yields: 1 serving  
Prep time: 4 minutes  
Cook time: 8 minutes  
Total time: 12 minutes

Ingredients:
For the frittata:

• 1 cup baby spinach leaves  
• Olive-oil-flavored cooking spray  
• 1 egg  
• 4 egg whites or 1/2 cup egg substitute  
• 2 teaspoons fresh minced basil leaves  
• 3 tablespoons fat-free milk  
• 1/2 ounce provolone cheese  
• 2 tablespoons feta cheese  
• 1/2 ounce shredded mozzarella cheese

Serve with:
• One 6-ounce container plain fat-free Greek yogurt  
• 1/2 cup fresh or frozen, unsweetened raspberries

Directions:
1. Tear the stems from the spinach leaves and tear the leaves into small pieces. Set aside.
2. Spray a skillet with the cooking spray. Whisk together the egg, egg whites, basil, and milk. Pour the eggs into the skillet and heat over low to medium heat.
3. Sprinkle the spinach over the eggs.
4. Tear the provolone cheese into tiny pieces and sprinkle over the eggs. Add the feta and mozzarella cheese over the eggs.
5. Continue to heat the frittata for 6 to 7 minutes or until eggs are puffed, browned and set.
6. Serve with the yogurt topped with raspberries.
Macaroni Tuna Casserole

Prep Time: 10 Minutes
Cook Time: 20 Minutes
Ready In: 30 Minutes
Servings: 4

Ingredients:
- 1 (7.25 oz) package macaroni and cheese
- 1 (6 oz) can tuna, drained and flaked
- 1/2 cup milk
- 1 cup shredded Cheddar cheese
- Minced fresh parsley

Directions:
1. Prepare macaroni and cheese according to package directions. Stir in soup, tuna and milk. Pour into a greased 2-qt baking dish. Sprinkle with cheese and parsley if desired. Bake, uncovered, at 350 degrees F for 20 minutes or until cheese is melted.

Nutrition Information

Servings Per Recipe: 4
Calories: N/A

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Tuna Noodle Supreme

Prep Time: 15 Minutes
Cook Time: 40 Minutes
Ready In: 55 Minutes
Servings: 4

Ingredients:
- 1 1/2 cups sour cream
- 1/2 cup mayonnaise
- 1/2 cup milk
- 1/4 cup grated Parmesan cheese
- 1 teaspoon Dijon mustard
- 1/4 teaspoon salt
- 1/4 teaspoon pepper
- 4 cups cooked small pasta shells
- 2 cups fresh broccoli florets
- 1 (12 oz) can tuna, drained and flaked
- 1/2 cup chopped sweet red pepper
- 1/2 cup sliced green onions

Directions:
1. In a large bowl, combine the first seven ingredients; stir until smooth. Stir in the pasta, broccoli, tuna, red pepper and onions. Transfer to a greased 2-qt baking dish. Cover and bake at 350 degrees F for 40-45 minutes or until hot and bubbly.

Nutrition Information

Servings Per Recipe: 4
Calories: N/A

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Fig and Granola Bowl

Yields: 1 serving  
Prep time: 2 minutes  
Cook time: 5 to 6 minutes  
Total time: 7 to 8 minutes

Ingredients:
- 2 tablespoons slivered almonds  
- 8 ounces low-fat plain yogurt  
- 1/4 cup low-fat granola without raisins  
- 2 dried figs, chopped into small pieces

Directions:
1. Preheat the oven to 250 degrees. Spread the almonds on a cookie sheet and bake for 5 to 6 minutes. Watch the nuts carefully so they don’t burn.
2. Fill a bowl with yogurt, then top with granola, figs and toasted almonds.

Gobble Up Granola Snacks

Servings: 18

INGREDIENTS:
- 2 1/2 cups crispy rice cereal  
- 2 cups quick-cooking oats  
- 1/2 cup raisins  
- 1/2 cup packed brown sugar  
- 1/2 cup light corn syrup  
- 1 cup crunchy peanut butter  
- 1 teaspoon vanilla extract

DIRECTIONS:
1. In a large bowl, stir together the rice cereal, oats, and raisins. Set aside. Grease a 9x13 inch baking dish with cooking spray.
2. Combine the brown sugar and corn syrup in a small saucepan over medium heat. Heat just until boiling, then remove from heat and stir in peanut butter and vanilla until smooth. Pour over the cereal and oat mixture, and mix well.
3. Press into the prepared pan using the back of a large spoon. Allow to cool, then cut into squares.

Chewy Chocolate Chip Granola Bars

INGREDIENTS:
- 1/2 cup packed brown sugar  
- 2 1/3 cup peanut butter  
- 5 tablespoons corn syrup  
- 1/2 cup applesauce  
- 2 teaspoons vanilla extract  
- 3 cups rolled oats  
- 1 cup chocolate chips  
- 1/2 cup miniature marshmallows  
- 1/2 cup toasted oat cereal rings  
- 2/3 cup wheat germ

DIRECTIONS:
1. Preheat the oven to 350 degrees F (175 degrees C). Grease a 9x13 inch baking pan.
2. In a large bowl, stir together the brown sugar, peanut butter, corn syrup, applesauce, and vanilla. In a separate bowl, stir together the oats, chocolate chips, mini marshmallows, cereal rings, and wheat germ. Stir the dry ingredients into the peanut butter mixture until evenly coated. Press lightly into the prepared pan.
3. Bake 25 to 30 minutes in the preheated oven, or until slightly golden. Cool in the pan on a wire rack. Cut into bars.
Tuna Noodle Casserole from Scratch

INGREDIENTS:
1/2 cup butter, divided
2 cups milk
1 (8 ounce) package uncooked medium egg noodles
1/2 medium onion, finely chopped
1 stalk celery, finely chopped
1 clove garlic, minced
6 ounces button mushrooms, sliced
1/4 cup all-purpose flour
2 tablespoons butter, melted
1 cup shredded Cheddar cheese
2 (8 ounce) cans tuna, drained and flaked
1 cup frozen peas, thawed
Salt and pepper to taste

DIRECTIONS:
1. Preheat oven to 375 degrees F (190 degrees C). Butter a medium baking dish with 1 tablespoon butter.
2. Bring a large pot of lightly salted water to a boil. Add egg noodles, cook for 8 to 10 minutes, until al dente, and drain.
3. Melt 1 tablespoon butter in a skillet over medium-low heat. Stir in the onion, celery, and garlic, and cook 5 minutes, until tender. Increase heat to medium-high, and mix in mushrooms. Continue to cook and stir 5 minutes, or until most of the liquid has evaporated.
4. Melt 4 tablespoons butter in a medium saucepan, and whisk in flour until smooth. Gradually whisk in milk, and continue cooking 5 minutes, until sauce is smooth and slightly thickened. Season with salt and pepper. Stir in tuna, peas, mushroom mixture, and cooked noodles. Transfer to the baking dish. Melt remaining 2 tablespoons butter in a small bowl, mix with bread crumbs, and sprinkle over the casserole. Top with cheese.
5. Bake 25 minutes in the preheated oven, or until bubbly and lightly browned.

Nutrition Information

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Printed from Allrecipes.com 7/23/2012

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Charles Town, WV 25414  Berryville, VA 22611
Phone: 571-214-6813  e-mail: joy.felegie@gmail.com

Summary
25 years experience in field of intellectual and developmental disabilities, serving in a variety of leadership roles. Conceptualized and developed clinical initiatives. Researched and acquired funding for programs. Developed and implemented training presentations, events, and recreation therapy interventions. Management and quality assurance experience. Detail oriented collaborator.

EDUCATION

Indiana University, Bloomington, Indiana  Master of Science
Recreation Therapy  School of Public Health
Expected summer 2014

Shenandoah University, Winchester, Virginia  Bachelor of Science
Therapeutic Recreation

PROFESSIONAL EXPERIENCE

2014  Felegie Consulting & Support
Private practice providing consulting and support to organizations and families who support/serve people with intellectual and/or developmental disabilities (ID/DD). Provide consultation for grant prospect research, grant writing, and program development. Provide chart review assistance and recreation therapy.

2004-Present  Grants & Special Projects Coordinator
Northern Virginia Training Center
Grant prospect research, grant writing, grants management, planning of health education initiatives, coordination and implementation of large volunteer projects, volunteer supervision, team collaboration, and fund-raising. Develop and track outcomes. Assist program compliance department with chart reviews.
1987-2004 Director Therapeutic Recreation  
Northern Virginia Training Center  

Develop and implement comprehensive therapeutic recreation program for over 200 individuals with ID/DD. Supervise department of eight recreation therapists. Develop initiatives and evidenced-based programs. Initiate position upgrades to transform department to a more clinically based service. Private foundation grants for recreation facility acquisition and program implementation. Establish internship program.

1984-1987 Assistant Director of Therapeutic Recreation  
Northern Virginia Training Center  

Assist Director of Therapeutic Recreation with planning and implementation of comprehensive therapeutic recreation program. Plan and implement special events. Provide recreation therapy services for caseload of 30 adults with ID/DD. Provide facility and pool management, as well as lifeguarding and swim instruction.

PROFESSIONAL DEVELOPMENT AND COMMUNITY ACTIVITIES

2007-Present Chairman, David H. Lawson Foundation  

Lead non-profit foundation with mission to promote access to health and habilitation services for people with ID/DD. Administration and coordination, serve as Treasurer, facilitate board meetings, communicate with donors, and write grants and raise funds.

1981-Present Nationally Certified Therapeutic Recreation Specialist  

2007-2010 Taskforce Member “Health Promotion for People with Disabilities”  

2006-2009 Founder, David H. Lawson Foundation  

2006-2007 Adaptive Aquatics Instructor-Fairfax County Park Authority  

2005 Leadership ATRA  

2005 Grant Writing Course-Zockland & Associates  

PRESENTATIONS

2012 “Promoting Strong Bones for You and the Individuals with Disabilities you Support”-Osteoporosis Education Workshops, co-presenter  
Northern Virginia Training Center  

2005 “Redefining Success”- Adaptive Aquatics Workshop, co-presenter  
Northern Virginia Park Authority
1999  “Designing and Utilizing Enriched Environments to Enhance Well-Being”  
28th Annual National Conference  
The Association of Public Developmental Disabilities Administrators

1998  “Multisensory Environments”, co-presenter  
Southeastern Therapeutic Recreation Symposium

1998  “Designing and Utilizing Enriched Sensory Environments to Enhance Well-Being”, co-presenter  
Midwest Symposium on Therapeutic Recreation

**GRANTS**

- **2012**  Amerigroup Foundation  Dental Workshop  Awarded: $3,000
- **2009**  VBPD  Integrated Dental Initiative  Awarded: $64,000
- **2007**  May & Stanley Smith Trust  Therapeutic Riding Program  Awarded: $5,130
- **2006**  Phillip Graham Fund  Accessible Nature Trail  Awarded: $10,000
- **2005**  Clark-Winchcole Foundation  Accessible Trail Ramp  Awarded: $10,000
- **2004**  KOVAR  Accessible Nature Trail  Awarded: $25,000

References available upon request