Implementation of evidence based osteoporosis protocol to prevent secondary fracture

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IMPLEMENTATION OF EVIDENCE BASED OSTEOPOROSIS PROTOCOL
TO PREVENT SECONDARY FRACTURE

by

BRENDA V. PRUITT

A SCHOLARLY PROJECT

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Nursing Practice
in
The Joint Doctor of Nursing Practice Program
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The University of Alabama in Huntsville
The University of Alabama at Birmingham
The University of Alabama
to
The School of Graduate Studies
of
The University of Alabama in Huntsville

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2011
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SCHOLARLY PROJECT APPROVAL FORM

Submitted by Brenda V. Pruitt in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice and accepted on behalf of the Faculty of the School of Graduate Studies by the scholarly project committee.

We, the undersigned members of the Graduate Faculty of The University of Alabama in Huntsville, certify that we have advised and/or supervised the candidate on the work described in this scholarly project. We further certify that we have reviewed the scholarly project manuscript and approve it in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice.

_________________________________________ Committee Chair
(Date)

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_________________________________________ Program Director

_________________________________________ College Dean

_________________________________________ Graduate Dean

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ABSTRACT
The School of Graduate Studies
The University of Alabama in Huntsville

Degree: Doctor of Nursing Practice College: Nursing

Name of Candidate: Brenda Vest Pruitt

Title: Implementation of Evidence Based Osteoporosis Protocol to Prevent Secondary Fracture

Osteoporosis affects approximately 10 million individuals age 50 years and older in the United States (US) and is the leading cause of fractures in this age group. A scholarly project, grounded in evidence-based research findings and with theoretical underpinning, was implemented to develop a practice protocol recommendation for the screening and treatment of patients over the age of 50 admitted with a low trauma fracture to improve patient outcome and ensure timely treatment. Project success was determined by adherence to the practice protocol as reflected in documentation of inpatient education on osteoporosis, patient referral for bone mineral density (BMD) testing, and providing patients with a list of questions to present to his or her primary care provider (PCP). The ultimate goal of the project protocol was to decrease incidence of secondary fractures for this patient population. Project results indicated a need for adoption of the practice protocol by the site to ensure evidence-based care to promote positive outcomes in this patient population.

Abstract Approval: Committee Chair ____________________________

Program Director ____________________________

Graduate Dean______________________________
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CHAPTER I

IDENTIFICATION OF THE PROBLEM

Osteoporosis affects eight million women and 2 million men in the United States (US), and another 34 million individuals are at risk for osteoporosis due to low bone mass (Gronholz, 2008; NIH, 2010; NOF, 2010). Caucasian and Asian women are at a greater risk for osteoporosis although the disease affects individuals of all ethnic backgrounds. The National Osteoporosis Foundation reports osteoporosis as the leading cause of fractures in individuals over the age of 50 with one in four men and one in two women in this age group suffering a fracture in his or her lifetime. A fracture sustained when falling from a standing height is considered a low trauma fracture. Individuals 50 years of age or older sustaining a low trauma fracture are at a greater risk for a recurrent fracture, which is a major cause of mortality and morbidity in this age group (Feldstein et al., 2007; NOF, 2010).

Osteoporosis, a prevalent and costly problem, poses a major public health threat (Gronholz, 2008; Hansberger, 2008; NIH, 2010; NOF, 2010). Screening and initiating treatment for osteoporosis is warranted at the time of hospitalization; however, the research literature conveys that implementation of screening and treatment by healthcare providers was grossly inadequate (Majumdar, 2008). The lack of current evidence-based
care in managing osteoporotic related fractures establishes a need for this project.
Nationally, the estimated cost of care for fractures related to osteoporosis is greater than $19 billion a year and continues to rise with the estimated cost of $25.3 billion by 2025 (NOF, 2010).

Researchers assert that screening and treatment of osteoporosis for patients admitted with low trauma fractures decreased the incidence of secondary fractures, mortality, morbidity, and increased health related quality of life (Halberg, Bach-Lindstrom, Hammerby, Toss, & Ek, 2009). Appropriate treatment can reduce risk factors 12-65% in patients with osteoporosis depending on the treatment used (Feldstein et al., 2007). Health care organizations and providers need to adopt, implement, and ensure that appropriate guidelines are followed for low trauma fractures in patients over the age of 50.

**Purpose**

The purpose of this scholarly endeavor was to utilize evidence-based research findings to develop, in cooperation with key stakeholders, a protocol recommendation for the screening and treatment of patients over the age of 50 admitted with low trauma fractures. The implementation of such a protocol will likely improve patient outcomes, ensuring timely treatment of patients with osteoporosis and preventing future fractures related to this disease.

**Theoretical Framework**

When considering proposing a healthcare protocol change, a theoretical or conceptual model provides the foundational guide and strengthens the likelihood of success. Wensing’s model for implementing change was utilized to strengthen and
promote change in the current practice of evaluation and treatment of patients admitted with low trauma fractures at the selected site.

Achterberg, Schoonhover, & Grol (2008) provided an overview of Gron & Wensing’s (2005) model for implementing change (Figure 1.1). This model was appropriate for the anticipated change in practice for osteoporosis evaluation and treatment of patients over the age of 50 admitted with low trauma fractures. The model began with identifying appropriate research and guidelines on the subject of interest. If this was not done at the outset, the change may have been unjustified and was likely to be rejected by health care providers and patients.

After the initial step, the process followed with describing the objectives of the change and analysis of current practice, the target population, and location of implementation (van Achterberg et al., 2008). Because there were no current guidelines in place for this particular subject, analysis of current practice was nonexistent, further justifying the need for this protocol. The target group was the key stakeholders that could power the change in practice, which included hospital administration, hospitalist, orthopedic surgeons, primary care physicians, orthopedic nurse practitioner, nurse educator, nurse manager of orthopedics, nurses staffed on the orthopedic unit, and insurance and billing representatives.

Building on these initial steps, the next phase in the model was to develop and select strategies. This step was calculated in choosing strategies that balance impediments and facilitators to prevent choosing inappropriate measures. This balance resulted in a better choice of strategies. The final steps of the model included putting the
plan into action, determining the method of implementation, and completing an evaluation of the process and outcome (van Achterberg et al., 2008).

The Grol and Wensing (2005) model was effective for the implementation of change. The methodical approach allowed the user of the model to make rational, deliberate, and stepwise decisions to accomplish evidence-based practice change that improved patient outcome (van Achterberg et al., 2008).
CHAPTER II
REVIEW OF EVIDENCE

A thorough review of the literature revealed evidenced-based research to determine if healthcare providers were routinely performing osteoporosis screening and treatment in hospital facilities, and to determine the best practice for patients over the age of 50 hospitalized with low trauma fractures. The retrieval process was a Boolean search for peer-reviewed articles published between 2004 and 2010. The databases searched included Cumulative Index to Nursing & Allied Health Literature (CINAHL), Cochrane, PubMed, OVID, and several other peer-reviewed online websites related to osteoporosis. The keywords used were osteoporosis, fractures, secondary fractures, osteoporosis screening, osteoporosis treatment, and osteoporosis guidelines. Although approximately fifty research studies were critiqued, twenty-one were selected that provided the most relevant data to the proposed scholarly project. In addition, five osteoporosis related peer-reviewed websites were utilized. The selected studies provided an in-depth overview of osteoporosis, osteoporotic fractures, secondary fractures, screening and treatment guidelines, and the prevalent lack of appropriate screening, treatment, and follow-up in patients experiencing a low trauma fracture.
The authors of the research studies agreed that improvement in the care of individuals who experience a low trauma fracture is imperative to prevent subsequent fractures, mortality, morbidity, and to improve health related quality of life (HRQOL). Collectively, the evidence supported the need for developing and implementing guidelines or protocols to ensure that this target population receives appropriate and up-to-date care based on the latest research.

**Osteoporosis**

Osteoporosis is widespread, chronic, and costly. Additionally, it creates a major public health threat to men and women of all ethnic backgrounds (Majumdar, 2008; NOF, 2008). There are 10 million Americans reported to have osteoporosis, 8 million women and 2 million men (Hansberger, 2006; NIH, 2010; NOF, 2010).

Evidence demonstrates the magnitude of the problems resulting from osteoporosis. The burden of osteoporosis includes an increased number of fractures, mortality, morbidity, and marked reduction in HRQOL. Osteoporosis is one of the foremost causes of mortality and morbidity in the elderly (Chami, Jeys, Freudmann, Connor, & Siddiqu, 2006; Feldstein et al., 2007; Halberg et al., 2009; Prasad, Suneramoorthy, Martin, & Murray, 2008). Although osteoporosis is a prevalent and costly problem, it is treatable.

**Osteoporotic Fractures**

Researchers have long established that there is a definite relationship between osteoporosis and hip fractures (Gardner et al., 2005; Majumdar, 2008). Low trauma fractures in patients over 50 years old are related to osteoporosis, and with each osteoporotic fracture, the risk for secondary fractures increases (Chami et al., 2006; NIH,
There is long-term reduction of HRQOL following vertebral fractures, and the risk for nonvertebral fractures increases two-to-threefold following a vertebral fracture (Gronholz, 2008; Halberg et al., 2009; Prasad et al., 2006). Women with hip fractures are four times more likely to have a second hip fracture. The population of women with such fractures will near 15% during the following 4 years (Mujamdar, 2008; NOF, 2010).

In the United States, in 2005, osteoporotic fractures cost $19 billion and researchers estimate that it will increase to $25.3 billion by 2025 (NOF, 2010). This figure is slightly different from the $17 billion reported in 2005 by Gronholz (2008). Secondary fractures are likely, if osteoporosis treatment is not initiated with the initial low trauma fracture (Berry et al., 2008), but can largely be prevented if healthcare professionals initiate screening and treatment immediately following the fracture (Astrand, Thorngren, Tagil, & Akesson, 2008).

**Screening**

With only 5% of patients with an osteoporotic fracture being referred for osteoporosis screening and treatment, many are not given the benefit of secondary fracture prevention (Chami et al., 2006; NIH, 2010; Prasad et al., 2008). Gardner et al. (2005), supports this evidence reporting that screening and treatment following a hip fracture is lacking.

A perioperative, in-patient strategy that involves a brief patient educational session and provision of a list of questions to present to the PCP improves the number of patients with whom osteoporosis is addressed after an initial hip fracture (Gardner et al., 2005). Orthopedic surgeons and PCPs need to be hands-on in identifying and treating at-risk patients (Chami et al., 2006; Prasad et al., 2008). Chami et al. supports the role of an
Osteoporosis Nurse Specialist to improve the exploration of osteoporotic fractures and prevention of secondary fractures.

**Treatment Guidelines**

Under treatment of osteoporosis in patients with symptomatic fractures is well-documented in research evidence. Treatment of osteoporosis reduces the risk of secondary fractures, especially in patients with a recent fracture (Petrella & Jones, 2006). Appropriate treatment can reduce risk factors for secondary fractures in patients with osteoporosis 12-65%, depending on the effectiveness of the treatment used (Feldstein et al., 2007). There is a probable relationship between decreased mortality and the use of calcium plus vitamin D in men and calcium plus vitamin D with anti-osteoporotic drug treatment in females post-fracture (Nurmi-Luthje et al., 2009).

Treatment is essential, but practice audits reveal less than 10-20% of patients received treatment in the 6-12 months following an initial low trauma fracture (Majumdar, 2008). There is little consensus on the appropriate guidelines for evaluation, prevention, and treatment of osteoporosis amid health care providers and organizations. Poor patient and provider compliance is evident in using publications of consensus recommendations and guidelines for treatment (Hansberger, 2006).

Multifaceted interventions are required and need to be implemented as a joint effort that involves the health care system, primary care providers, rehabilitation physicians, and patients (Petrella & Jones, 2006). Research shows that an outreach program to educate about osteoporosis care for primary care physicians and patients improved frequency of treatment after an initial low trauma fracture (Feldstein et al., 2007). Broad recommendations for screening and treatment related to osteoporosis post-
fracture care include bone mineral density (BMD) testing to assess for bone loss, appropriate medications to decrease bone loss and increase BMD, proper diet and smoking cessation to decrease the likelihood of bone loss, fall prevention safety to prevent bone trauma, and exercise to build and strengthen bone (Gronholz, 2008; Hansberger, 2008; NIH, 2010; NOF, 2010).

**Synthesis of Findings**

Osteoporosis is a serious health threat with grave complications, but is under-diagnosed and undertreated even in those with an initial low trauma fracture (Astrand et al., 2008; Feldstein et al., 2005; Metge et al., 2008; Nurmi-Luthje et al., 2009). Many orthopedic surgeons (32%) believe that institution of treatment should be done for patients post-fracture. However, most do not implement treatment, and believe that the PCP should be responsible for the medical care (Skedros, Holyoak, & Pitts, 2006). Additionally, these researchers report that if an orthopedic surgeon does initiate treatment, the treatment is likely inadequate or incomplete.

Health care providers must improve practice patterns in treating osteoporosis to improve patient outcome. Women at high risk of a secondary fracture are rarely screened with BMD testing and are treated with osteoporosis medication just as rarely (Metge et al., 2008). Screening and treatment following a fracture for men is minimal with only 7.1% receiving medication for osteoporosis in the 18 months following a fracture. In nursing home residents that experienced an initial hip fracture, it is found that 6% have a secondary fracture within 6 months, 12% within 12 months, and 21% within 5 years and experienced increased mortality (Berry et al., 2008). Recognition of pre-fracture
characteristics and post-fracture complications is needed so that residents with sufficient life expectancy could benefit from osteoporosis medications (Berry et al.).

In summary, a brief in-hospital patient educational session on osteoporosis and various aspects of available treatment is indicated. Standardized written questions provided during the hospital stay related to osteoporosis could be used as a reminder to the patient to follow-up with the PCP. Ongoing evaluation of patients to ensure compliance with the plan of care is essential. Patients over the age of 50 admitted with a low trauma fracture mandate screening for osteoporosis with treatment initiated in the immediate postoperative period. A multifaceted approach that involved key stakeholders was essential to develop and implement a standardized protocol derived from evidence-based research for optimal care of osteoporotic fractures.

The overall strength of the selected research studies is the consistent agreement that osteoporosis care following a low trauma fracture is poor, and that improvement of care is imperative. Most of the researchers point out that a comprehensive approach is required to ensure patients receive optimal care. Limitations include only one randomized control study, small sample size in some studies that limit the ability to generalize, convenience sampling in most studies, and the inability to consider lifestyle, if retrieving data electronically. Despite the limitations, the research studies support the development and implementation of a protocol for patients admitted with a low trauma fracture.
CHAPTER III

DESCRIPTION AND IMPLEMENTATION

Evidence-based interventions are essential to the nursing profession and to the quality and safe care of patients (van Achterberg, Schoonhoven, & Grol, 2008). Implementation of the practice protocol into actual practice required consideration of existing viewpoints of practice, resources, evidence reliability, and key people who could power implementation and outcome of the proposed change in practice (Fineout-Overholt & Johnson, 2006).

Design

To successfully implement a change in health care practice, several strategies were incorporated into the plan. Strengths, weaknesses, opportunities, and threats analysis (SWOT), a timeline of action, and a conceptual model/theory were identified to promote the change. Each of these strategies was evaluated to ensure successful implementation of the practice protocol. The SWOT analysis, an integral part of strategic planning, was conducted at the rural hospital specifically on the orthopedic unit (Table 3.1). An evaluation of the internal and external environments was essential prior to the introduction of any type of change. The factors to consider in the SWOT analysis
were strengths, weaknesses, opportunities, and threats in the proposed environment. Strengths and weaknesses are internal to the facility, and opportunities and threats are external to the facility in which the proposed change would occur (Mind Tools website, n.d.; QuickMBA website, n.d.). Identified strengths included the hospital’s commitment to excellence, key stakeholders with interest to power the change, and access to an interdisciplinary team. The proposed change provided opportunities for improved patient outcomes, as well as patient and staff satisfaction. The primary weakness was lack of a current protocol for evidenced-based care. Threats to the success of the proposed guideline included cost of bone mineral density testing and treatment, possible non-reimbursement for testing, patient noncompliance to the treatment plan, and a chasm between orthopedic surgeons and primary care physicians regarding the person responsible for follow-up care. The hospital’s mission statement reads, “We are dedicated to promoting wellness by providing excellent healthcare services in the most efficient manner and exceeding the expectations of those we serve” (Hospital Website, n.d., p. 1). With this mission statement in mind, the implementation of an evidence-based care guideline for patients in the target group was needed, as there were currently no existing guidelines of care for this population.

The Gantt timeline, or activity chart of the proposed project, outlined the task which was to be accomplished, the time when each task took place, and the timeframe when each task is to be completed (American Society for Quality website, n.d.). A team approach and organizational support was crucial to the success of implementing the proposed change. One of the first steps in the project timeline was to identify the evidenced-based project leader, key stakeholders, team members, and gain support and
approval for the proposed project (Fineout-Overholt & Johnson, 2006). The Gantt timeline was employed to remain on task and complete each task in a timely and cost efficient manner (Table 3.2).

A simple-to-follow algorithm was created to improve adherence to evidence-based practice relating to screening and treating patients admitted with a low trauma fracture and was an integral part of the proposed guideline (Figure 3.1). A PowerPoint and poster presentation was presented on four separate occasions to key stakeholders and orthopedic unit staff with a proposed plan to implement the guideline. A review of current practice, or lack thereof, at the site was addressed. The PowerPoint presentation included an overview of osteoporosis, screening methods with normal and abnormal results, treatment (including medications, nutrition, exercise, and lifestyle changes), complications of untreated osteoporosis, and the need for vigilant follow-up to monitor compliance. A pre- and post-test, using an adapted Facts on Osteoporosis Quiz (FOOQ), was given prior to, and after poster and PowerPoint presentation to determine if increased learning and awareness of this significant problem had occurred (Figure 3.2).

Imperative to the success of the guideline was the consensus between the orthopedic surgeons and the PCPs. Letters describing the purpose of the project along with the osteoporosis algorithm and brochure were mailed to PCPs and orthopedic surgeons having privileges at the proposed site (Appendix A). Two sites agreed to conduct BMD testing on those with insurance or private pay. For those unable to afford the BMD testing, arrangements were made to have BMD testing at the local health department. In addition, osteoporosis medication for those individuals was available at no cost through local private and government agencies.
An in-hospital, patient educational session was conducted by the nurse educator, nurse liaison, or staff nurse. To improve patient understanding of osteoporosis, a brochure was provided in addition to teaching with instructions for the patient to reference past discharge (Astrand et al., 2008). Ideally, a bone mineral density test, Dual Energy X-Ray Absorptiometry (DXA or DEXA), would have been performed as an inpatient procedure. However, the site did not have the technology to provide this procedure; therefore, the patient required a referral for DXA scanning to be done as soon as possible after hospital discharge. If the screening revealed osteoporosis, treatment was to be initiated at that time by the PCP. Prior to hospital discharge, the patient was to be armed with a brief list of questions about osteoporosis management to present to the PCP post-operatively.

Setting

The site for the scholarly project was a 115-bed, rural, non-profit hospital located in central Alabama. According to the 2008 census for this area, the population is 81,324 with 15.6% being age 65 and older and 50.6% being female. This facility did not have a specific policy or guideline for screening, treatment, and follow-up of patients admitted with low trauma fractures.

Sample

For the purposes of this project, a convenience sample initially included all patients 50 years of age and older admitted with a low trauma fracture (n=76) beginning November 1, 2010 and continuing for a period of 12 weeks at the selected site. Following a thorough chart review, eight patients were found to have dementia, one was mentally challenged, and two died in the immediate post-operative period related to other
comorbidities. These patients were excluded from the project, resulting in a final sample of \( n=65 \). The resulting sample was comprised of 53 females and 12 males with ages ranging from 51 to 92 years-old (Table 3.3)

**Protection of human subjects**

The University of Alabama in Huntsville’s Institutional Review Board (IRB) approved the submitted project proposal application (Appendix B). Prior to project implementation, a presentation was conducted at the proposed site with approval received for the project from the Medical Executive Committee and the Quality Management Council. Patient data was linked to a number and names were not published or shared. Aggregate staff data on the FOOQ was done and no names were used.

**Instrumentation**

An adapted Facts on Osteoporosis Quiz (FOOQ), utilized with permission from the original authors (Appendix C), was given pre and post key stakeholders and staff education to determine if learning had occurred and to prepare staff for conducting patient teaching (Figure 3.3a/b). The staff was asked to conduct a brief educational session with the inpatient client utilizing a brochure (Figure 3.4a/b) designed and professionally printed for this purpose, to schedule the patient an appointment for BMD testing when ordered by the orthopedic physician, and to arm the patient with five questions to present to their healthcare provider upon follow-up. The BMD appointment date and the questions were included on the brochure for patient convenience.
Data collection method and analysis

Collection of data was done throughout the implementation of the project. Key stakeholders and orthopedic unit staff that participated in the project poster and PowerPoint presentation were given a pre- and post-test. Each question on the adapted FOOQ was analyzed for improvement in knowledge about osteoporosis. Data collection, pertinent to the implementation of the project, was conducted through a chart review to ascertain if documentation was done reflecting adherence to the project protocol. Documentation was evaluated for inpatient education, for BMD testing referral, and for questions given to patient to follow-up with PCP. Descriptive statistics were employed for the analysis.

Implementation

Initially the project was implemented with the education of key stakeholders and the orthopedic unit staff, over a four-day period. An attractive box, labeled as the osteoporosis project, with all materials needed to implement the protocol, was placed at the unit nursing station. The poster was prominently displayed on the unit throughout the project, as well as copies of the brochure and algorithm strategically placed in the nurses’ lounge and the doctors’ dictation area.

Immediately following the staff educational sessions, the project was implemented on the unit by the orthopedic nursing staff and continued throughout a 12-week period. The orthopedic surgeons were asked to write the order for the BMD testing. Upon receiving an order for the BMD testing, the staff nurses were to schedule the BMD testing at a time after the patient was discharged and to write the appointment date and time on the allotted space on the brochure. Utilizing the brochure, the nursing
staff conducted the brief inpatient education, notified the patient of the BMD testing appointment if ordered, and discussed the questions to present to the PCP.
CHAPTER IV

EVALUATION

Analysis of data

Descriptive statistics were employed to analyze the results of the adapted Facts on Osteoporosis Quiz (FOOQ) to assess if increased learning and awareness of this significant problem had occurred among the key stakeholders and orthopedic staff. A chart review of all clients 50 years and older, who were admitted with a low trauma fracture to orthopedic unit was conducted to ascertain if implementation occurred according to the project protocol.

Other important aspects of data evaluated were safety, effectiveness, patient centeredness, efficiency, and equitability. Specifically, the following questions were considered: Did any patient suffer harm from the intervention that was intended to help them? Was the intervention consistent with evidence-based care? Did patients feel that they were able to make decisions dictating their care? Was the intervention efficient in reducing waste and cost? And finally, was the intervention equitable for all groups? Questions were answered in the positive, making the change beneficial and acceptable (Institute of Healthcare Improvement website, n.d.).
Preferably, patients would be followed by the health care provider for at least five years following implementation of the project protocol to determine compliance with treatment and efficacy of the intervention(s). A comparison of patients readmitted for low trauma fractures in the five years prior to the implementation of the protocol can be compared to patients receiving care under the protocol in the next five years to estimate the impact the protocol had in reducing secondary low trauma fractures. An evaluation to determine if readmission was decreased for low trauma fractures by 75% in 12 months is an appropriate outcome measurement. The true measure of successful change will be reduced admissions for secondary low trauma fractures and improved health related quality of life for the patient. Through research and implementation of evidence-based practice, education of key stakeholders, and administrative support, patient outcomes will improve.

For the purpose of this project, success was determined by adherence to the project protocol as reflected in documentation of inpatient education on osteoporosis, patient referral for BMD testing, and providing patients with a list of questions to present to his or her PCP. An acceptable outcome measure was determined to be 50% compliance with the protocol in all three areas. Results were determined by a chart review on patients admitted for the 12 weeks following project protocol implementation.

**Results**

The FOOQ consisted of twenty-nine questions related to the pathophysiology, prevention, clinical manifestations, and treatment of osteoporosis. Ascertaining the staff’s baseline knowledge of osteoporosis, and clarifying any misinformation prior to the staff’s implementation of the educational sessions with patients, was most important.
The pre-test was given immediately prior to the poster and PowerPoint presentation and the post-test was given immediately following the presentation. Twenty-eight staff members consisting of 26 females and 2 males were available to take the pre-test. Twenty-six staff members consisting of 24 females & 2 males were available for the post-test. As was expected, an increase in knowledge did occur in 25 of the 29 questions. One question remained the same, and three questions actually decreased slightly on the post-test (Table 4.1a/b).

Areas where the most improvement was seen included incidence (question1), risk factors (questions 5, 9, 20, & 22), prevention (questions 16 & 19), treatment (questions 12 & 17), and related fracture cost (question 27). Overall, the presentation was a success with the staff verbalizing increased knowledge related to osteoporosis.

The final sample population (n=65) consisted of 82% (n=53) females and 18% (n=12) males, which was similar to the literature findings of the females to males to have osteoporosis (Gronholz, 2008; NIH, 2010; NOF, 2010). The ages ranged from 51 to 92 years with the highest number in the 80 to 89 year age bracket.

Of the 65 patients, 18% (n=12) were previously diagnosed with osteoporosis, 28% (n=18) were on osteoporosis medications on admission, and 35% (n=23) were discharged on the same and/or additional osteoporosis medication. Medications used prior to and after discharge from the hospital included calcium, vitamin D, alendronate (Fosamax), raloxifene (Evista), calcitonin (Miacalcin), and estrogen (Premarin).

Low trauma fractures incurred by the patients included 54% (n=35) hip, 17% (n=11) ankle, 11% (n=7) wrist, 9% (n=6) pelvis, 6% (n=4) spine, 5% (n=3) rib, 5% (n=3) humerus, 3% (n=2) shoulder, <2% each and (n=4) less common sites.
Multiple fractures, two to four, were found in 11% (n=7) of the patients.

The medical record was reviewed to determine if documentation reflected that the patient had received an order for BMD testing, osteoporosis education by the staff, and the five questions to present to the PCP (Table 3.3). A BMD test was planned for 1.5% (n=1) patient. Osteoporosis education was implemented for 15 (23%) of the patients, but only 8 (12%) actually received the project brochure. Patients who were armed with the five questions to present to the PCP totaled 8 (12%). At the outset of the project, 50% compliance in all three areas was considered a successful outcome measure. Compliance at 50% was not seen in any of the three areas.

An incidental finding was that a number of patients experiencing a low trauma fracture had hypothyroidism. Of the 65 patients in the sample, 32% (n=21) had the diagnosis of hypothyroidism listed in the health history and were currently on thyroid hormone replacement.

Upon completion of the chart review and analysis of results, the findings were consistent with protocol compliance rates found in the literature review. Majumdar (2008) found that less than 10-20% of patients admitted for a low trauma fracture received treatment in the following 6-12 months. Few patients are given the benefit of secondary fracture prevention after the initial low trauma fracture (Chami et al., 2006; NIH, 2010; Prasad et al., 2008). The findings reiterate the need for multifaceted interventions implemented as a joint effort involving the health care system, primary care providers, rehabilitation physicians, and patients (Petrella & Jones, 2006).
CHAPTER V

APPLICATION TO PRACTICE

Osteoporosis is a common illness that is linked to a substantial increase in fracture risk, yet treatment that can substantially alter the progression of the disease is accessible (Fraser, 2004). Osteoporosis is often an insidious process until a fracture occurs, and is an under-recognized cause of morbidity and mortality (Newman, 2003). It is important to ascertain that osteoporosis is the underlying cause, so treatment is initiated before subsequent fractures occur (Health Benchmarks, 2006).

The U.S. Census Bureau reported the 2010 population as 309,535,000 and in 2008, 12.6% of the population was greater than 65 years old (US Census Bureau website, 2010). With the baby boomers now age 50 or older, the incidence of osteoporosis and subsequent fractures will only increase, creating a further burden on our health care delivery system.

There continues to be a gap between the knowledge about osteoporosis diagnosis and treatment and the organized delivery of the best possible bone health care. This gap results when osteoporosis is not viewed as a disease that commands urgent management. Incorporating current evidence into the care of patients who have osteoporosis to develop
a protocol encouraging the participation of HCPs, patients, and insurers will result in reduction of low trauma fractures (Newman, 2003).

The lack of patient knowledge about the causal relationship between osteoporosis and fractures contributes to the incidence of low treatment rates (Gardner et al., 2005). In a study by Gardner et al., 40% of the patients asked to participate in the study declined because they felt that the fracture was not a result of osteoporosis, underscoring the critical need for patient education in an osteoporosis intervention program. Patients need to drive personal care by becoming knowledgeable about osteoporosis and assertively addressing the issue with health care providers.

The utilization of guidelines to improve osteoporosis treatment is beneficial in ensuring provider and patient compliance to the management of osteoporosis following hospital admission due to a low trauma fracture. Patients who have BMD testing are more likely to receive treatment than those who do not (Gronholz, 2008; Hansberger, 2006; NIH, 2010; NOF, 2010). It is imperative to increase knowledge and awareness about osteoporosis, to ensure implementation of guidelines, and to improve quality of care for these patients (Gunter et al., 2003).

Nurses and other health care providers must incorporate information about osteoporosis into patient teaching plans and empower patients to initiate discussions of treatments and management strategies for osteoporosis (Curry, Hogstel, & Davis, 2003). Dynamic relationships with associates in the health care system will boost incentive and knowledge to adequately manage patients at highest risk (Astrand et al., 2008). Stakeholders who provide health care need to be cognizant of the immense data regarding
osteoporosis. The data not only exists on management of osteoporosis, but on the epidemiological, social, and medical impact of the disease. The existing and proposed increase of the health care burden and available treatments necessitates osteoporosis disease management (Fraser, 2004).

Evidence-based research can assist in closing the gap in the diagnosis and treatment of fractures, prevention of secondary fractures, and reduction of the fracture-related morbidity and mortality. This change will reduce fracture related cost to the health care system, and increase health-related quality of life for patients with osteoporosis (Lentle et al., 2007). The literature has supported screening and initiating treatment for patients at the time of hospital admission with a low trauma fracture; however, this is not a standard practice for many hospitals. Development and successful implementation of an appropriate protocol will improve patient outcomes and influence the adoption of the project protocol as policy at the site for the project.

**Barriers**

Osteoporotic fractures are not seen as life threatening by health care providers as evidenced by lack of staff involvement in the implementation of the protocol. The first barrier encountered to successful implementation of the project protocol was that the orthopedic surgeons did not order the BMD testing. Recent literature supports immediate treatment for osteoporosis following a low trauma fracture, for patients 50 years and older, as the low trauma fracture is almost always related to osteoporosis (Hamby et al., 2010). To encourage the physicians to prescribe BMD testing for patients admitted with low trauma fractures, the charge nurse agreed to place a project brochure in the medical records as a reminder.
The second barrier encountered was lack of participation from the staff nurses on the orthopedic unit, osteoporosis teaching did not occur, nor was the patient given the printed pamphlet with the teaching and the questions to present to the PCP. Reasons given by those nurses who did not implement the protocol were lack of time, forgetfulness, or lacking the necessary knowledge to implement the protocol due to inability to attend one of the four poster and PowerPoint presentations. Frequent visits to the unit were made to encourage staff participation. Discussions with the unit manager and charge nurses were undertaken to promote implementation of the project.

The final barrier encountered was a change in record keeping, by the facility to electronic records. Reviewing the charts was time consuming because it required looking at both the paper chart and the computer chart. However, this barrier was largely overcome by the medical records staff pulling the charts so that both paper and computer charts could be reviewed simultaneously.

**Future expansion**

The foundation for the osteoporosis protocol to prevent secondary fractures has been established. Sustainability of the project will be ensued by the orthopedic nurse liaison who has expressed an interest in project oversight. The role of an Osteoporosis Nurse Specialist to improve the exploration of osteoporotic fractures and prevention of secondary fractures was supported by Chami et al. (2006).

The project could be continued by the facility with a comparative study of the impact the protocol had on decreasing secondary fractures comparing the five years prior to and following implementation. This project protocol, without the BMD testing order or a similar protocol is imperative to continue to ensure the improvement of the health of
patients and quality healthcare. The protocol will need to be mandated to maintain implementation compliance.

**Summary**

Results of this protocol implementation were consistent with the findings in the literature in that osteoporosis management following a low trauma fracture is inadequate. Although the results of the project implementation were less than proposed in the project design, steps were taken to bring the disease of osteoporosis and subsequent complications to light. Both staff and patients received a benefit from this project.

Several of the orthopedic unit staff members personally implemented osteoporosis prevention strategies such as calcium and vitamin D supplements, diet, and exercise. Physicians ordered laboratory testing for patients that confirmed osteoporosis risk, ordered additional osteoporosis medications such as high dose vitamin D and calcium, ordered hip precautions upon discharge from hospital, and diagnosed patients with osteoporosis, after considering the low trauma fracture and other signs and symptoms.

The ultimate goal of the project protocol was to decrease secondary fractures, decrease morbidity and mortality, and increase health related quality of life. Health care organizations and providers need to adopt, implement, and ensure that appropriate guidelines for low trauma fractures in patients age 50 years and greater are followed. There is a large discrepancy in time between available research, and implementation of research into practice. Health care providers, and particularly those providers with clinical doctorates, need to lead the way for infusing research evidence into practice (Fineout-Overholt & Johnson, 2006).
- Research findings/guidelines
- Matching problems identified or best practices
- Describing specific change targets
- Analysis of target group, current practice, & context
- Development & execution of implementation plan
- Continuous evaluation & adapting plan

*Figure 1.1* Grol & Wensing Model for Implementing Change

**Table 3.1. SWOT Analysis**

<table>
<thead>
<tr>
<th><strong>Strengths:</strong></th>
<th><strong>Weaknesses:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>What is done well?</td>
<td>What could be improved?</td>
</tr>
<tr>
<td>What unique resources can be drawn on?</td>
<td>Where does the organization have fewer resources than others?</td>
</tr>
<tr>
<td>What do others see as strengths?</td>
<td>What are others likely to see as weaknesses?</td>
</tr>
<tr>
<td>• Mission statement</td>
<td>• No existing policy, guideline or protocol for osteoporosis evaluation and treatment of patients 50 years or older admitted with low impact fracture</td>
</tr>
<tr>
<td>• Hospital commitment to excellence</td>
<td>• No evidence-based follow-up (EBP) post-fracture care for these patients by orthopedic surgeons or PCPs</td>
</tr>
<tr>
<td>• Key people with interest to promote change</td>
<td>• Patients not given opportunity for secondary prevention of fractures</td>
</tr>
<tr>
<td>• Access to needed resources (outpatient BMD Testing)</td>
<td>• Nurse overload</td>
</tr>
<tr>
<td>• Nurse educator, Nurse Liaison, and Manager on the unit</td>
<td></td>
</tr>
<tr>
<td>• Adequate nursing staff to implement brief patient education</td>
<td></td>
</tr>
<tr>
<td>• Excellent pool of orthopedic surgeons and PCPs</td>
<td></td>
</tr>
<tr>
<td>• Orthopedic Nurse Practitioner (DNP)</td>
<td></td>
</tr>
<tr>
<td><strong>Opportunities:</strong></td>
<td><strong>Threats:</strong></td>
</tr>
<tr>
<td>What good opportunities are open?</td>
<td>What trends could harm the organization?</td>
</tr>
<tr>
<td>What trends can be taken advantage of?</td>
<td>What is the competition doing?</td>
</tr>
<tr>
<td>How can strengths be turned into opportunities?</td>
<td>What threats do the weaknesses expose the organization to?</td>
</tr>
<tr>
<td>• Improvement of patient outcomes</td>
<td>• Chasm between orthopedic surgeons and PCPs on who is responsible for patient follow-up care</td>
</tr>
<tr>
<td>• Implementation of EBP</td>
<td>• Cost of BMD testing</td>
</tr>
<tr>
<td>• Increase HRQOL for patients</td>
<td>• Reluctance of third party payers to reimburse</td>
</tr>
<tr>
<td>• Education of patients and healthcare providers</td>
<td>• Patient noncompliance</td>
</tr>
<tr>
<td>• Close gap in care</td>
<td></td>
</tr>
<tr>
<td>• Meet consumer need &amp; demand for quality care</td>
<td></td>
</tr>
<tr>
<td>• Utilization of technology (DXA Scan)</td>
<td></td>
</tr>
</tbody>
</table>

Mind Tools website, n.d.
**Table 3.2. Gantt Timeline**

**Project Chair & Contact INFO,** Dr Haley Hoy, Faculty, UAHuntsville  
**Project Leader & Contact INFO,** Brenda Pruitt, CRNP, DNP Student UAHuntsville

<table>
<thead>
<tr>
<th>Task</th>
<th>Start /Date</th>
<th># Days Required</th>
<th>Percent Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select EBP topic</td>
<td>1/1/10</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>Develop PICO question</td>
<td>1/15/10</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>Submit PICO question to EBP mentor for approval</td>
<td>1/20/10</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>Review of literature</td>
<td>1/25/10</td>
<td>14</td>
<td>100</td>
</tr>
<tr>
<td>Submit Review of literature to EBP mentor for approval</td>
<td>2/24/10</td>
<td>24</td>
<td>100</td>
</tr>
<tr>
<td>Synthesis of literature</td>
<td>2/15/10</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>Submit synthesis of literature to EBP mentor for approval</td>
<td>2/28/10</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Initial protocol development</td>
<td>3/1/10</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>Submit initial protocol to EBP mentor for approval</td>
<td>3/7/10</td>
<td>14</td>
<td>100</td>
</tr>
<tr>
<td>Overview with key people at organization</td>
<td>5/20/10</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Develop plan for implementation, evaluation, and implications for practice of EBP protocol</td>
<td>6/25/10</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td>Submit scholarly project proposal to project chair for input/approval</td>
<td>6/25/10</td>
<td>6</td>
<td>100</td>
</tr>
<tr>
<td>Revision of scholarly project proposal considering project chair input</td>
<td>7/2/10</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>Submit revised scholarly project proposal to project chair for input/approval</td>
<td>7/5/10</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>Project proposal to committee members for input per project chair</td>
<td>7/7/10</td>
<td>4-7</td>
<td>100</td>
</tr>
<tr>
<td>Revision of scholarly project proposal considering project committee input</td>
<td>7/14/10</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>Develop final protocol including PowerPoint &amp; patient brochure for presentation &amp; dissemination of project</td>
<td>7/16/10</td>
<td>33</td>
<td>100</td>
</tr>
<tr>
<td>Submit revised scholarly project proposal past input from committee members to project chair for input/approval</td>
<td>8/1/10</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>Final protocol approved by project chair</td>
<td>8/1/10</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Prepare PowerPoint presentation for first defense</td>
<td>8/5/10</td>
<td>13</td>
<td>100</td>
</tr>
<tr>
<td>Present first project defense</td>
<td>8/18/10</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Apply for IRB approval</td>
<td>8/27/10</td>
<td>14</td>
<td>100</td>
</tr>
<tr>
<td>Form team and obtain appropriate approval</td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Poster and PowerPoint presentations to team &amp; unit nurses</td>
<td>11/01/10</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>Review with key stakeholders &amp; project chair</td>
<td>11/01/10</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>Implement protocol on entire orthopedic unit/organization</td>
<td>11/01/10</td>
<td>84</td>
<td>100</td>
</tr>
</tbody>
</table>

American Society for Quality website, n.d.
Figure 3.1 Osteoporosis Algorithm

Hospitalization with a Low Trauma Fracture

50 Years Old or Greater

No

Differential Diagnoses with follow-up as directed

Yes

Provide patient a list of questions to ask PCP (Patient Empowerment)

Referral for BMD Testing

Normal

Abnormal

Differential diagnoses with follow-up as directed

Follow-up with PCP

Regularly scheduled follow-up for compliance to prevent risk of secondary fractures

1. What were the results of my BMD test?
2. If I have osteoporosis, what medications will you prescribe?
3. Do I need to take calcium and vitamin?
4. What else can I do to improve my bone health?
5. Will I have another BMD in the future?
Please answer each of the following questions with True, False or Don’t Know

1. One in four women over the age of 60 will develop osteoporosis
   □ True □ False □ Don’t know

2. Inactivity increases the risk of osteoporosis
   □ True □ False □ Don’t know

3. Heredity does not play a role in osteoporosis
   □ True □ False □ Don’t know

4. Early menopause, such as hysterectomy, is not a risk factor for osteoporosis
   □ True □ False □ Don’t know

5. High caffeine intake (more than 2 cups per day) increases the risk of osteoporosis
   □ True □ False □ Don’t know

6. A lifetime of low intake of calcium will increase the risk of osteoporosis
   □ True □ False □ Don’t know

7. Osteoporosis is low bone mass, thin, or weakened bones
   □ True □ False □ Don’t know

8. Smoking is not a risk factor for osteoporosis
   □ True □ False □ Don’t know

9. Thin women are more often affected by osteoporosis than heavy ones
   □ True □ False □ Don’t know

10. Weight-bearing exercise such as walking can help prevent osteoporosis
    □ True □ False □ Don’t know

11. After age 40, it is too late for people to increase their calcium intake to prevent osteoporosis
    □ True □ False □ Don’t know

12. There is no treatment for osteoporosis once you develop it
    □ True □ False □ Don’t know

13. After menopause, osteoporosis may be slowed down by taking estrogen
    □ True □ False □ Don’t know

14. All individuals lose bone mass after 40 years of age
    □ True □ False □ Don’t know

15. Normally, bone loss slows down after menopause
    □ True □ False □ Don’t know

*Figure 3.2a Facts on Osteoporosis Quiz (FOOQ) (Pre- & Post-test)*
16. A diet high in calcium throughout life can help prevent osteoporosis
   □ True □ False □ Don’t know

17. Women over 40 need about 1500mg of calcium
   □ True □ False □ Don’t know

18. There is no way to prevent osteoporosis
   □ True □ False □ Don’t know

19. Dairy products are a major source of calcium
   □ True □ False □ Don’t know

20. It is normal for bone loss to continue throughout life
   □ True □ False □ Don’t know

21. Active women are at higher risk for osteoporosis than inactive women
   □ True □ False □ Don’t know

22. Alcohol abuse is not linked to the incidence of osteoporosis
   □ True □ False □ Don’t know

23. A risk factor for osteoporosis is having a mother with it
   □ True □ False □ Don’t know

24. A test to measure bone thickness is useful in diagnosing osteoporosis
   □ True □ False □ Don’t know

25. Osteoporotic fractures account for approximately $19 billion in healthcare expenditures
   □ True □ False □ Don’t know

26. Men do not get osteoporosis
   □ True □ False □ Don’t know

27. A woman’s risk of hip fracture is greater than the combined risk of breast, uterine, and ovarian cancer
   □ True □ False □ Don’t know

28. Medications can be used to treat osteoporosis
   □ True □ False □ Don’t know

29. Guidelines for screening and treatment of osteoporosis can reduce the incidence of fractures
   □ True □ False □ Don’t know

*Figure 3.2b Facts on Osteoporosis Quiz (FOOQ) (Pre- & Post-test) continued

Adapted and used with permission from Ailinger, Lasus, & Braun (1998) Facts on Osteoporosis Quiz (FOOQ)
Table 3.3 Project Sample Population

<table>
<thead>
<tr>
<th>Ages</th>
<th>Females</th>
<th>Males</th>
<th># w/Prior Osteoporosis Diagnosis</th>
<th># Admitted on Osteoporosis Medications</th>
<th># Discharged on Osteoporosis Medications</th>
<th># of BMDs Ordered</th>
<th># Receiving Osteoporosis Education</th>
<th># Armed with Questions to Present to PCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-59</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>60-69</td>
<td>11</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>70-79</td>
<td>14</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>7</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>80-89</td>
<td>20</td>
<td>5</td>
<td>9</td>
<td>9</td>
<td>11</td>
<td>0 (1 prior)</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>&gt;90</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>82% (n=53)</td>
<td>18% (n=12)</td>
<td>18% (n=12)</td>
<td>28% (n=18)</td>
<td>35% (n=23)</td>
<td>2% (n=1)</td>
<td>23% (n=15)</td>
<td>12% (n=8)</td>
</tr>
</tbody>
</table>
Bone Mineral Density Test (BMD) Appointment

Date: ______________________
Time: ______________________
Location & Phone #: ______________________

Questions to discuss with your healthcare provider after your test:

1. What were the results of my bone mineral density test?
2. If I have osteoporosis what medications will you prescribe?
3. Do I need to take calcium and vitamin D?
4. What else can I do to improve my bone health?
5. Will I have another bone mineral density test in the future?

Figure 3.4a Project Brochure Exterior

To Prevent Future Fractures
Osteoporosis Facts

Osteoporosis is thin or weakened bones that break easily.

If you break a bone when you fall from a standing position that is called a low trauma fracture.

Most low trauma fractures are caused by osteoporosis.

If you have experienced a low trauma fracture, you are likely to have another fracture unless you take preventative action.

There are treatments available for osteoporosis even if you have already broken a bone.

What can be done?

1. Have a bone mineral density test; it helps determine the health of your bones.

2. Treatment Plan may include:

   - Mediations that keep your bones from breaking down or medications that build up bone.
   - Diet high in calcium and vitamin D. Calcium builds up bone and vitamin D helps you absorb calcium. Dairy products and dark greens are good sources of calcium.
   - Calcium and vitamin D supplements.
   - Weight bearing exercise such as walking and strengthening exercises such as light weights. Exercise builds strong bones and slows bone loss.
   - Avoid smoking and drinking excessive amounts of alcohol and caffeine. Smoking decreases absorption of calcium. Caffeine and alcohol in excess can cause the body to lose calcium.
   - Fall prevention measures such as handrails, well-lit rooms, clutter free walkways, and no loose rugs.

Figure 3.4b Project Brochure Interior
Table 4.1a FOOQ Pre- and Post-test Results

<table>
<thead>
<tr>
<th>Correct Response</th>
<th>n=28</th>
<th>n=26</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOOQ (adapted) Percentage of orthopedic unit staff answering correctly</td>
<td>T/F</td>
<td>Pretest</td>
</tr>
<tr>
<td>1</td>
<td>One in four women over the age of 60 will develop osteoporosis</td>
<td>F</td>
</tr>
<tr>
<td>2</td>
<td>Inactivity increases the risk of osteoporosis</td>
<td>T</td>
</tr>
<tr>
<td>3</td>
<td>Heredity does not play a role in osteoporosis</td>
<td>F</td>
</tr>
<tr>
<td>4</td>
<td>Early menopause, such as hysterectomy, is not a risk factor for osteoporosis</td>
<td>F</td>
</tr>
<tr>
<td>5</td>
<td>High caffeine intake (more than 2 cups per day) increases the risk of osteoporosis</td>
<td>T</td>
</tr>
<tr>
<td>6</td>
<td>A lifetime of low intake of calcium will increase the risk of osteoporosis</td>
<td>T</td>
</tr>
<tr>
<td>7</td>
<td>Osteoporosis is low bone mass, thin, or weakened bones</td>
<td>T</td>
</tr>
<tr>
<td>8</td>
<td>Smoking is not a risk factor for osteoporosis</td>
<td>F</td>
</tr>
<tr>
<td>9</td>
<td>Thin women are more often affected by osteoporosis than heavy ones</td>
<td>T</td>
</tr>
<tr>
<td>10</td>
<td>Weight-bearing exercise such as walking can help prevent osteoporosis</td>
<td>T</td>
</tr>
<tr>
<td>11</td>
<td>After age 40, it is too late for people to increase their calcium intake to prevent osteoporosis</td>
<td>F</td>
</tr>
<tr>
<td>12</td>
<td>There is no treatment for osteoporosis once you develop it</td>
<td>F</td>
</tr>
<tr>
<td>13</td>
<td>After menopause, osteoporosis may be slowed down by taking estrogen</td>
<td>T</td>
</tr>
<tr>
<td>14</td>
<td>All individuals lose bone mass after 40 years of age</td>
<td>T</td>
</tr>
</tbody>
</table>
Table 4.1b FOOQ Pre- and Post-test Results continued

<table>
<thead>
<tr>
<th></th>
<th>FOOQ (adapted) Percentage of orthopedic unit staff answering correctly</th>
<th>Correct Response</th>
<th>n=28</th>
<th>n=26</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Normally, bone loss slows down after menopause</td>
<td>F</td>
<td>89%</td>
<td>92%</td>
</tr>
<tr>
<td>16</td>
<td>A diet high in calcium throughout life can help prevent osteoporosis</td>
<td>T</td>
<td>71%</td>
<td>100%</td>
</tr>
<tr>
<td>17</td>
<td>Women over 40 need about 1500mg of calcium</td>
<td>T</td>
<td>71%</td>
<td>92%</td>
</tr>
<tr>
<td>18</td>
<td>There is no way to prevent osteoporosis</td>
<td>F</td>
<td>82%</td>
<td>96%</td>
</tr>
<tr>
<td>19</td>
<td>Dairy products are a major source of calcium</td>
<td>T</td>
<td>93%</td>
<td>100%</td>
</tr>
<tr>
<td>20</td>
<td>It is normal for bone loss to continue throughout life</td>
<td>T</td>
<td>68%</td>
<td>85%</td>
</tr>
<tr>
<td>21</td>
<td>Active women are at higher risk for osteoporosis than inactive women</td>
<td>F</td>
<td>96%</td>
<td>100%</td>
</tr>
<tr>
<td>22</td>
<td>Alcohol abuse is not linked to the incidence of osteoporosis</td>
<td>F</td>
<td>64%</td>
<td>96%</td>
</tr>
<tr>
<td>23</td>
<td>A risk factor for osteoporosis is having a mother with it</td>
<td>T</td>
<td>82%</td>
<td>96%</td>
</tr>
<tr>
<td>24</td>
<td>A test to measure bone thickness is useful in diagnosing osteoporosis</td>
<td>T</td>
<td>93%</td>
<td>100%</td>
</tr>
<tr>
<td>25</td>
<td>Osteoporotic fractures account for approximately $19 billion in healthcare expenditures</td>
<td>T</td>
<td>78.5%</td>
<td>96%</td>
</tr>
<tr>
<td>26</td>
<td>Men do not get osteoporosis</td>
<td>F</td>
<td>93%</td>
<td>96%</td>
</tr>
<tr>
<td>27</td>
<td>A woman’s risk of hip fracture is greater than the combined risk of breast, uterine, and ovarian cancer</td>
<td>T</td>
<td>68%</td>
<td>100%</td>
</tr>
<tr>
<td>28</td>
<td>Medications can be used to treat osteoporosis</td>
<td>T</td>
<td>96%</td>
<td>100%</td>
</tr>
<tr>
<td>29</td>
<td>Guidelines for screening and treatment of osteoporosis can reduce the incidence of fractures</td>
<td>T</td>
<td>96%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table 4.2a Project Results

<table>
<thead>
<tr>
<th></th>
<th>AGE</th>
<th>GENDER</th>
<th>SITE OF FRACTURE</th>
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APPENDIX A

LETTER TO HEALTHCARE PROVIDERS

J.J. Kullman, M.D.
1900 Alabama Highway 157
POB I, Suite 000
Cullman, AL 35058

Dear Dr. Kullman:

I am currently enrolled in the Doctorate of Nursing Practice (DNP) program at The University of Alabama in Huntsville (UAH). I am a life time resident of Cullman and a Cullman Regional Medical Center Hospital (CRMC) consumer and advocate. As part of the curriculum requirement, I must complete a scholarly project. I chose to implement a pilot project protocol entitled, Osteoporosis: An Evidence-Based Project Protocol to Prevent Secondary Fractures.

As you are well aware, osteoporosis is prevalent, costly, and the major cause of secondary fractures in individuals age 50 years and older. My project entails: 1. a brief in-patient educational session conducted by the staff nurses on 3 East; 2. scheduling a bone mineral density (BMD) test to be done after discharge; and, 3. Five questions to be given to the patient to present to their primary healthcare provider at follow-up for this age group admitted with a low trauma fracture. Please see enclosed brochure that will be given to the patient that contains all the above items.

The length of the project will be twelve weeks beginning the first week of November, 2010. I will complete a chart review to ascertain if the three elements were completed prior to patient discharge. Patient names will not be used and confidentiality will be maintained. I have obtained IRB approval from UAH and approval by CRMC QMC and MEC committees to implement the project. An easy to follow algorithm that I developed for the project is enclosed.

BMD testing is offered by Cullman Internal Medicine, Cullman Family Practice, and Cullman OB/GYN. If the patient does not have insurance, I have arranged for simple osteoporosis screening (heel test) through the health department. In addition, for patients that meet the qualifications, Evista is available through the Commission on Aging, and Actonel through the Good Samaritan Clinic. Use of the most cost-effective medications will enhance patient compliance with treatment regime.

I am requesting that the orthopedic surgeons order the BMD to be done at the patients preferred site and for the patient to sign a release for results to be sent to their healthcare provider at the time of the BMD test. I would appreciate your support in implementing this project. If you have any questions, suggestions, or need further information, feel free to contact me.

Sincerely,

Brenda Pruitt

Brenda Pruitt
Enclosures (2)
APPENDIX B

IRB APPROVAL

Nicholas Jones
332B Morton Hall
Phone: 256.824.2338
Fax: 256.824.2387
Email: irb@uah.edu

Brenda Pruitt
c/o Haley Hoy, Ph.D., ACNP
NB 317
College of Nursing
UAHuntsville
Huntsville, AL 35899

September 14, 2010

Dear Ms. Pruitt,

As chair of the IRB Human Subjects Committee, I have reviewed your proposal, Osteoporosis: Evidence Based Practice Protocol to Prevent Secondary Fractures, and have found it meets the necessary criteria for expedited review according to 45 CFR 46. I have approved this proposal, and you may commence your research. Please note that this approval is good for one year from the date on this letter. If data collection continues past this period, a renewal application must be filed with the IRB.

Please contact me if you have any questions.

Sincerely,

[Signature]

Dr. Nicholas Jones
Chair, UHSC

OFFICE OF THE VICE PRESIDENT FOR RESEARCH
Von Braun Research Hall M-17
Huntsville, AL 35899
T 256.824.6100  F 256.824.6783
APPENDIX C

PERMISSION FOR FOOQ

Re: FOOQ

Sunday, July 25, 2010 11:03 AM

From: "Rita L. Ailinger" <rla22@georgetown.edu>

To: "Brenda Pruitt" <pruittbg@yahoo.com>

The revisions look good. You have permission to use the tool. Please send me an abstract of your findings.
Good luck with your research.

Rita L. Ailinger, PhD, RN

"None of us can do everything, but all of us can do something." Oscar Romero

FOOQ

Friday, July 23, 2010 8:44 AM

From: "Rita L. Ailinger" <rla22@georgetown.edu>

To: "Brenda Pruitt" <pruittbg@yahoo.com>

I have reviewed your adapted version of the FOOQ. Most of it is fine. However, I think you need to do a reading level on in (Word>Tools) because some of the vocabulary does not fit with the 8th grade reading level of the original tool.

For example, #7 uses the term "microarchitectural deterioration"; #25 talks about T and Z scores; #29 uses term "antiresorptive". These are all highly technical terms that most people wouldn't know. I'd suggest that you delete those items or use comprehensible terms.

I'd be happy to review a revised version.
Rita L. Ailinger

"None of us can do everything, but all of us can do something." Oscar Romero
REFERENCES

Academic Center for Evidence-Based Practice website. (n.d.).
http:www.acestar/uthscsa.edu/Learn_Model.htm


Cullman Regional Medical Center (CRMC) Website. (n.d.).


