

# Bone care nurses and the evolution of the nurse's educational function: the Guardian Angel® research project

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## Summary

**Osteoporosis mostly affects females over 50 years old, worldwide. The main osteoporosis complication is fragility fractures that reduce quality of life and cause morbidity and mortality. Most patients who have fragility fractures are treated for the fracture. However, patients' adherence to follow-up treatment plans is poor. Therefore, tailored educational interventions are needed to improve medication adherence and healthy lifestyles. In this context, the role of bone care nurses is important, as they can act at different levels of osteoporosis prevention and fracture liaison services, which are secondary fracture prevention programmes implemented by health care systems to treat osteoporotic patients. In Italy, a research project called Guardian Angel® was developed to provide tailored education to osteoporotic women in order to improve their disease management and reduce related complications.**

*KEY WORDS: osteoporosis; bone care nurse; adherence; educational interventions; guardian angel project.*

## Introduction

Aging populations have meant an increase in age-related diseases. Among musculoskeletal diseases, osteoporosis is a critical disease in terms of rates of incidence (1). Worldwide, more than 200 million individuals are estimated to have osteoporosis and, in those over 50 years old, 33% of women and 12.5% of men are affected by osteoporosis (2, 3). In Italy, the disease affects approximately 5 million people, of which 80% are postmenopausal women – 50% of whom are not aware of being sick (4, 5).

Osteoporosis is a skeletal disease characterised by a decrease in bone mass, fracture susceptibility and alterations in bone tissue microarchitecture. The condition is called the 'silent disease' because bone loss often progresses asymptotically. Osteoporosis's most insidious manifestation is fragility fractures, and prior incidences increase the risk of future fractures.

Fragility fractures are due to traumas that would not harm normal bone. These fractures occur mainly in trabecular bones, such as vertebrae, the femoral neck, wrists, ankles and proximal humeri. These fractures are among the major causes of morbidity and mortality worldwide and cause a deterioration in the quality of life (5-7). Complications resulting from fragility fractures are an important cause of disability, with similar dimensions to those of acute myocardial infarctions (8). Health expenditure linked to osteoporosis is growing exponentially every year, and, in Italy alone, costs are estimated to exceed 1.5 billion euros, of which about 1 billion are related to femur fractures. The total cost of a femur fracture is around 13,500 euros (9, 10). In Italy, every year, over 100,000 hospital admissions involve femoral neck fractures, of which 80% are in people over 75 years old (11). The mortality rate after hip fractures is 5% in the period immediately following the event and 20% after one year. Of those treated, 30% will have permanent disabilities (12). The data on other sites of fracture are not entirely reliable because these last do not always require hospitalisation, so their incidence tends to be underestimated (13).

Most patients who have had fractures due to osteoporosis are treated for the fractures, but they do not receive appropriate interventions to improve their bone stock, lifestyle and medication adherence (14). Antiosteoporotic treatments have long-term, anti-fracture efficacy and lead to an increase in bone mineral density.

However, osteoporosis is frequently not treated as a systemic disease (15). Poor lifestyle (16) and medication adherence has been shown in people with osteoporosis (16, 17). Weak adherence causes an increased risk of fractures, major health care costs, more hospitalisations and greater use of resources (15, 18).

To improve osteoporotic individuals' adherence, new care models integrating more health professionals are needed (19). These models can promote adherence with different interventions. For example, educational interventions can

increase osteoporotic individuals' motivation to develop healthy lifestyles and persist with therapy (17, 19).

### **Educational interventions**

Educational interventions are considered crucial to improving adherence in osteoporotic patients (17). These interventions seek to promote proper diet, regular exercise and correct use of drug therapy in postmenopausal, osteoporotic women. In the literature, tailored interventions using counselling sessions or motivational interviewings and educational programmes promoting healthy lifestyles have effectively improved medication adherence and healthy lifestyles. In these interventions, interactions and relationships develop between patients and health professionals such as doctors, nurses and pharmacists (20-22). Other interventions using only educational materials, such as leaflets with information regarding osteoporosis, have not been effective (23, 24). Health professionals need to encourage patients to improve self-care behaviours (25), which are essential to promoting and maintaining healthy lifestyles, such as quitting smoking, exercising, following proper diets, taking medications regularly and spending at least 10-15 minutes outdoors on sunny days.

In this context, bone care nurses (BCNs) are particularly important. In several countries, for example, England and Australia, BCNs follow patients with osteoporosis along specific care pathways, with the main purpose of providing educational interventions at various stages of the disease (26).

### **Bone care nurses**

BCNs have advanced knowledge of metabolic bone diseases and specific clinical skills to plan, manage and evaluate the care of osteoporotic patients. These nurses can act at different levels of prevention and in different care settings.

In primary prevention, preventive measures are applicable for the general population, regardless of specific individual risk. In the case of osteoporosis, these interventions seek to prevent the pathology's onset, acting on lifestyles and, in particular, on nutrition, exercise, exposure to sunlight and reduction or elimination of smoking.

In secondary prevention, the focus is on early disease detection, identifying and controlling individual risk factors to prevent fragility fractures. Fall reduction programmes to avoid trauma and fractures are of particular importance. In this phase, drug therapies are effective if the prescribed treatment is adhered to over time. An estimated 50% of patients stop taking their medication within the first year of prescription, making their therapeutic plans ineffective and wasting economic resources (26). Therefore, this phenomenon needs to be dealt with through information and education that BCNs can offer, to improve long-term adherence to therapeutic prescriptions significantly.

Tertiary prevention is focused on patients who have suffered fragility fractures, to avoid the risk of refractures (27). Even in these situations, the BCNs' function is to educate people about healthy lifestyles, paying attention to food, smoking habits, alcohol intake and mobilisation, as well as seeking to improve adherence to drug treatment and additional supplements, such as calcium and vitamin D (28).

BCNs practice in the area of prevention, primary care and rehabilitation, both in hospital and community care. Their role

is integrated with multidisciplinary teams planning and managing care pathways designed to monitor patients at risk for osteoporosis and fragility fractures (26). During discharge after fragility fractures, hospitalisation educational interventions are particularly important. Patients' residual capacities are measured, healthy lifestyles are promoted and risk factors are reduced, for example, reducing the risk of falls (26). These advanced nursing skills are integrated into structured care pathways through organisational models that promote multi-professional coordination and continuity of care.

### **Fracture liaison services**

Units that manage continuity of care and multi-professional care pathways are called fracture units or fracture liaison services (FLSs). FLSs can evaluate patients for bone fractures during hospitalisation or after hospital discharge. FLSs' purpose is tertiary prevention of refractures and treatment of osteoporosis as a systemic disease. Organisational models of managing care for patients who have suffered fragility fractures have been used in several countries (29). In these models, experienced nurses are often the link between patients, families, orthopaedic surgeons, primary care physicians and other health professionals. Experienced nurses reduce costs, maintain care networks and educate patients and families. This coordination role's importance has been confirmed by a systematic review (30) in which 66% of these organisational models were found to be managed by orthopaedic staff and physicians who create links between patients and health care systems. This model is effective (31) in reducing secondary fracture incidence because it promptly identifies patients after fragility fractures in order to provide assessments and appropriate treatments – following up-to-date guidelines and reducing the risk of refractures and poor patient outcomes. Patients who have suffered fragility fractures are at high risk of new fractures if they are not adequately treated. The organisational models described above are essential to treating these patients and reducing health and social costs (32-37).

The International Osteoporosis Foundation (IOF) has launched the Capture the Fracture® campaign to encourage the implementation of coordinated multidisciplinary models for secondary prevention of fragility fractures. IOF believes that this is important to improving patient care and reducing worldwide healthcare costs related to bone fractures. Studies of these structured care pathways have showed that FLSs can increase by up to 135% the number of patients treated for osteoporosis and that 95% of patients with osteoporosis are diagnosed and treated within the care pathways (38).

### **Guardian Angel® research project**

In view of these important dynamics, the Guardian Angel® research project was developed in Italy. This project was divided into two parts: (1) 1.0 Severe Osteoporosis Patient in Orthopaedic Surgeon Departments and (2) 2.0 Severe Osteoporosis Patient Management.

The two projects' objectives were to improve patients' quality of life and self-care disease management and to prevent the risk of refractures by providing tailored education through nurses. Another goal was to develop nurses' advanced skills. In these projects, nurses planned, performed, managed and evaluated tailored educational interventions, to promote

patients' healthy lifestyles and medication adherence.

The 1.0 Severe Osteoporosis Patient in Orthopaedic Surgeon Departments project involved 50 nurses in orthopaedic and traumatology departments in several healthcare settings (i.e. general hospitals, university hospitals, ambulatory centres and nursing homes), in the north, centre and south of Italy. The reference population consisted of women in surgical or spontaneous post-menopause who reported at least one fragility fracture and were hospitalised in orthopaedic and traumatology departments. To conduct this study, a multi-centre, quasi-experimental and interventional design was used. The study was longitudinal; therefore, the variables were investigated at different times, from the time of admission until up to 180 days after discharge. Several variables were investigated, such as patients' self-care maintenance, quality of life, adherence to guidelines, sociodemographic characteristics and risk factors related to osteoporosis. The study was conducted from May 2013 to April 2014, with 316 patients enrolled.

The 2.0 Severe Osteoporosis Patient Management project involved nurses or nurse leaders who actively participated in the 1.0 project. Overall, this project included 200 nurses working in outpatient services in different Italian regions. The reference population consisted of women in surgical or spontaneous post-menopause who are affected by osteoporosis or at risk for osteoporosis in ambulatory settings. The same study design as in the first project was used with the same variables. The study was conducted from February to November 2014, with 643 patients enrolled.

The overall research project was approved by the Independent Ethics Committee at the Policlinico Tor Vergata of Rome and was supported by the University of Rome Tor Vergata's Department of Biomedicine and Prevention, the Italian Centre of Excellence for Nursing Scholarship and the Italian Orthopaedic Group for the Study of Severe Osteoporosis.

## Conclusions

Aging populations and the increase of chronic diseases such as osteoporosis requires health systems to review pathways of care, treatment and prevention, paying particular attention to therapeutic education programmes that can promote adequate lifestyles and greater adherence to treatment. The Italian programmes and projects presented in this paper have raised awareness of the need for a systematic approach to osteoporosis, contributing to the successful treatment of fractures and care pathways dedicated to prevention and education.

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