

# Evidence-Based Medicine and Quality Assurance Workshops for Screening of Osteoporosis as a Teaching Strategy in the Residency Training Program in Family and Community Medicine at the UP-Philippine General Hospital

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## ABSTRACT

**Objective.** This study aims to determine the effectiveness of Evidence-Based Medicine (EBM) and Quality Assurance (QA) lectures and workshops on osteoporosis screening as a teaching strategy in improving the current level of knowledge and appropriate care given by resident physicians of UP-PGH Department of Family and Community Medicine (DFCM) for adults at risk for osteoporosis.

**Method.** A before-and-after educational intervention study was conducted within the residency training program of the UP-PGH DFCM.

**Results.** A total of 28 resident physicians and 300 medical records of adult patients aged >50 years who were considered at risk for osteoporosis were included in the study. There was an overall significant increase in mean knowledge scores of resident physicians on osteoporosis after the four sessions. None of the medical records reviewed documented evaluation and screening for osteoporosis. Hence, the appropriate standard of care was not achieved as a target.

**Conclusion.** Evidence-Based Medicine and Quality assurance workshops conducted for resident physicians of UP-PGH DFCM were effective in improving the current level of knowledge in osteoporosis screening. However, they were not an effective strategy in improving the level of appropriate care provided for adult patients at risk for osteoporosis.

**Key Words:** *quality assurance, osteoporosis, osteoporosis screening, residency training*

## Introduction

Screening for osteoporosis is one of the neglected areas in preventive medicine. The prevalence of low bone mass in Filipino men and women aged 50 years and above are 69% and 65%, respectively. Thus, two out of five Filipino adults are considered at risk for osteoporosis.<sup>1</sup> There is an increase

in Filipinos having bone problems as the population ages and the lifestyle of young adults changes. The incidence of hip fracture was at 93/100,000 per year with 17,875 cases of hip fracture admissions from 2007 to 2012.<sup>1</sup>

Despite the increasing incidence of bone problems, hospitalizations for fractures, and increasing cost of treatment, the number of adult Filipinos who undergo osteoporosis screening remains low. It is a disease that is not often considered until a fracture is diagnosed, leading to morbidity among the elderly population. Because of the increasing burden of disease, diagnosis, and treatment cost, it is reasonable that training for its screening, diagnosis and prevention be integrated into the training of medical health providers as osteoporosis-related fractures are preventable.

Current trends in medical training integrate Evidence-based Medicine (EBM) and Quality Assurance (QA) in the curriculum. The practice of EBM helps physicians develop critical thinking through critical appraisal workshops which have been proven effective in improving patient care compared to traditional methods of learning.<sup>2</sup> Clinical practice guidelines, didactics, clinical mentoring, evidence-based medicine presentations, quality assurance and appraisal workshops are all part of the training of UP-PGH DFCM resident physicians to enhance clinical skills and capacitate them to provide appropriate care for patients.

EBM has been shown to increase knowledge scores among postgraduate students but the effects of such intervention on improving appropriate care provided by physicians for patients is not clear. There was evidence of increased knowledge, skills, attitudes and behavior of physicians after critical appraisal was integrated with clinical practice<sup>3</sup> and physician's confidence in the use of EBM skills has been shown to increase with the combination of seminars and workshops.<sup>4</sup> However, the effectiveness of EBM in improving appropriate screening interventions for patients, given in addition to other teaching modalities in residency training, needs to be assessed.

It is the objective of this study to determine the effectiveness of EBM lectures and QA workshops on osteoporosis screening as a teaching and QA strategy in improving the current level of knowledge and appropriate care given by resident physicians of the UP-PGH DFCM for adults at risk for osteoporosis.

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## Materials and Methods

### Study Design

This is a before-and-after educational intervention study conducted within the residency training program of the UP-PGH DFCM with an Institutional Ethics Review Board approval. All residents under training in year 2014 were included. The medical records of patients seen at the Family Medicine outpatient clinic for a period of 3 months before intervention and 3 months after intervention were reviewed.

### Study Intervention

The educational intervention comprised four sessions with one didactic EBM-based lecture, two EBM workshops and a QA activity on osteoporosis screening. Attendance in the sessions was required for all resident physicians as part of the UP-PGH DFCM QA activities.

The first session was a one-hour lecture incorporating EBM-based didactics on osteoporosis screening, risk factors, diagnosis, laboratory, therapeutic management, the Osteoporosis Self-assessment Tool for Asians (OSTA) and use of the FRAX tool for 10-year risk assessment for fracture. The two EBM workshops were conducted in two consecutive weeks; each included a lecture and critical appraisal of published articles on economic analysis of osteoporosis. The final session was a QA activity consisting of a 30-minute mini-lecture on QA and a 30-minute data abstraction exercise using audit criteria and patients' medical records from the Family Medicine outpatient clinic.

### Data Collection

A 50-item written exam was given to all resident physicians of the DFCM during the pre-intervention and post-intervention phases of the study.

The pre-intervention chart retrieval month was from April to June 2014 while the post-intervention chart review was from October to December 2014. Of the medical records of patients seen during the period covering three months before and after the intervention, those of patients aged 50-years and above were selected.

### Medical Chart Audit Criteria

The level of appropriate care provided for patients at risk for osteoporosis was determined using medical chart audit criteria based on clinical practice guideline recommendations for osteoporosis. Criteria included (a) risk assessment, (b) screening using physical examination, (c) probable diagnosis of osteoporosis and (d) request for laboratory tests.<sup>5-10</sup> The risk assessment for osteoporosis was correctly done if five out of the seven risk factors for diagnosis and management were elicited and recorded on patients' medical records. Screening using physical examination was correct if height, weight and body mass index (BMI) were computed and recorded. Probable

diagnosis of osteoporosis was made if a risk assessment was made, a low BMI was documented and the ten-year probability of fracture was indicated. Request for laboratory examination was properly done if a bone mass density using DXA was recorded.

### Data Analysis

Data was extracted from medical records by four independent abstractors and was analyzed using Microsoft Excel for Mac 2011 (Version 14.4.8 Microsoft Corporation, USA) for frequencies and percentages. The data abstractors consisted of two DFCM consultants and two senior resident physicians who worked independently on different data sets. Main outcome measures were knowledge scores and appropriateness of care. Knowledge scores were based on the total raw and percentage scores of written exam results of the resident physicians. Appropriateness of care was based on the percentage of trainees who followed the criteria set. Target standard of care was set at 90%. Pre- and post-intervention levels were compared using paired and independent t-tests.

## Results

### Knowledge of Resident Physicians on Osteoporosis

A total of 28 resident physicians of the DFCM took the pre- and post- test examination for osteoporosis. There was an overall significant increase in mean knowledge scores of residents on osteoporosis after the four sessions. Baseline scores averaged 22.75 (SD± 2.61) points while post-test scores averaged 29.43 (SD± 3.54) points;  $p < 0.000$  (Table 1). The maximum increase in score was 15 points while the lowest increase was only 1 point with a median score increase of 6.5 points. In percentages, the average scores significantly increased from 45.5% (SD± 5.21%) to 58.8% (SD± 7.08%);  $p < 0.000$ .

The mean passing level for the knowledge questions was set at 60%. At baseline, none of the 28 resident physicians passed the pre-test evaluation. After the intervention, 13 residents (46%) passed the examination;  $p < 0.05$  (Table 1).

**Table 1.** Overall Knowledge Scores and Passing Rate Before and After Intervention among UP-PGH Family Medicine Resident Physicians

Parameters	Pre-Test (N=28)	Post-Test (N=28)	p-value
Scores on Knowledge Questions, X (SD)	22.75 (±0 2.60)	29.43 (± 3.54)	0.0000*
Proportion of those who passed the exam, %	0	46	< 0.0001**

\*Computed using paired t-tests, significant at  $p < 0.05$

\*\*Computed using test of two proportions, significant at  $p < 0.05$

*Appropriate Level of Care Based on Medical Records*

A total of 300 medical records of adult patients age  $\geq 50$  years at risk for osteoporosis were included in the study.

1. *Risk Assessment based on Medical History*

The resident physicians were not able to give appropriate care for adult patients at risk for osteoporosis before and after intervention. None of the medical records documented the minimum risk factors required to be able to give appropriate level of care for osteoporosis screening (Table 2).

Smoking history was elicited in 77% of the medical records pre- and post- intervention. History of alcohol use was extracted in only 57% of pre-intervention records but significantly increased to 84% post-intervention;  $p < 0.05$ . Other important risk factors for osteoporosis such as history of fracture, presence of rheumatoid arthritis, steroid use and other secondary causes were elicited in four medical records. There was a significant decrease in resident physician evaluation of other secondary causes of osteoporosis because the risk factors that were only documented in 24% of medical records pre-intervention declined to 12% post-intervention;  $p < 0.05$ .

2. *Appropriate Screening using Physical Examination*

Weight, height and BMI computation were required for appropriate screening for osteoporosis using physical examination. Pre-intervention, 39% of the charts documented height and weight and 32% had BMI computations. Post-intervention, 51% had height and weight recorded and 42% had computations for BMI.

There was a statistically significant change pre- and post- intervention in the percentage of appropriate screening using height and weight. BMI was documented in 32 and 42% pre- and post-intervention, respectively;  $p > 0.05$ .

Despite this documented increase, the target level of appropriate screening for osteoporosis using physical examination was not met.

3. *Appropriate Probable Diagnosis of Osteoporosis and Laboratory Test*

Based on the chart audit criteria, the resident physicians did not assess for risk factors, perform physical examination and screen for osteoporosis. None of the medical charts had a probable diagnosis of osteoporosis and no laboratory exam was requested. Hence, the target for appropriate standard of care was not achieved.

**Table 2.** Proportion of Risk Factors for Osteoporosis Elicited in Out-Patient Charts Before and After Intervention among UP-PGH Family Resident Physicians

Criteria	Pre-Test N=150, (%)	Post-Test N=150, (%)	p-value*
Smoking	116 (77)	115 (76)	0.84
Alcohol Consumption	86 (57)	126 (84)	<0.00
History of Fractures	2 (1)	4 (2.6)	0.41
Medical History of Rheumatoid Arthritis	1 (0.67)	1 (0.67)	-
History of Glucocorticoid Use	1 (0.67)	1 (0.67)	-
Family History of Hip Fracture	0	0	-
Medical History of Secondary Causes of Osteoporosis	36 (24)	18 (12)	0.01

\*computed using test of two proportions, significant at  $p < 0.05$

**Discussion**

Evidence based medicine workshops conducted concomitantly with quality assurance activities within the residency training program of the Department of Family and Community Medicine was effective only in increasing the current level of knowledge of resident physicians in osteoporosis screening. It was not useful strategy in translating the knowledge base into actual practice of screening for osteoporosis based on the review of medical records of patients with age greater than 50 years old.

Training programs for Family and Community Medicine aim to produce Family Physicians who can provide holistic health care in their clinical practice. Lectures and multifaceted strategies in teaching have been used in helping students and residents in training programs gain sufficient knowledge required in their field. This was exemplified in the study by the increase in the knowledge scores of residents after the intervention. However, this outcome on knowledge measured the mean scores of the residents who participated in the intervention and did not set individual knowledge base targets.

The EBM and QA sessions as interventions were conducted by the primary investigator and the consultants of the DFCM research committee within the regular scheduled teaching-learning sessions of the residency program. Teaching strategies included two didactic lectures on osteoporosis screening and evidence based medicine and was followed up with two workshops on critical appraisal and Quality assurance activities. The training sessions were multifaceted and interactive in its approach with residents actively participating in the workshop activities with specific emphasis on quality assurance criteria on osteoporosis screening and data abstractions of medical records. The instructional design was formulated based on effective teaching strategies for physicians which are generally cited successful in the literature for behavior change. Interactive educational meetings with physicians, participation in workshops, discussions or practice and multifaceted interventions of a combination of two or more audit feedbacks, reminders, local consensus processes or marketing have been proven to be effective in changing

behavior among health professionals.<sup>11</sup> However, these findings were not evident in the outcome of appropriate care on osteoporosis screening among the resident trainees after the intervention.

Various limitations imposed by the setting where the study was done were unavoidable and could have inadvertently affected the learning experience of resident physicians. These factors include the huge number of patients to attend to, the limited time period to see patients during consultations and the curative approach in a hospital setting. Resident physicians were expected to see each patient for an average of ten to fifteen minutes to ensure that they will be able to finish the daily quota of patients. Because of the need to see more patients, documentation of certain medical findings was also affected. The study involved chart review and was therefore directly tied to how well a resident physician can document everything that was done during consultation. Lack of documentation is a difficult scenario that may lead to medical negligence if problems arise in the clinical setting. Proper documentation of patient's clinic encounter together with the medical treatment provided are part of good clinical practice every trainee should be able to develop and apply in the practice of medicine. Physician and patient mindsets during consultation were also noted to be based on medical complaints at the time of clinic visit. Preventive care which included screening was not prioritized in the face of an acute medical problem. Given these factors, there is a need for more focused skills-based educational sessions where residents can practice what they are taught in didactic lectures. As screening for preventable diseases is an important component of Family Medicine practice, it should be given emphasis in residency training programs.

QA activities are employed by the residency training program to assess the status of how resident physicians are providing medical care to patients. Several QA activities have been undertaken within the training program of UP-PGH Family and Community Medicine but the results of previous activities have been varied and their effectiveness as a tool in physician training has not been assessed. It was the aim of the study to address the gap in the evaluation of the EBM-QA activities as the tasks has been proposed as a fixed requirement for graduation in residency programs of Family and Community Medicine nationwide.

The study results also have implications in the way the residency training program in Family and Community Medicine is being implemented. Time constraints during consultation could be resolved if a sufficient number of resident physicians rotate in the clinic or if patient quotas will be set based on the capacities of resident physicians. Strict implementation of rules on absences and tardiness of resident physicians, proper documentation or charting, and monitoring of resident physicians may also help address issues arising from the process.

Different venues to translate knowledge into practice should be provided to resident physicians. Therefore, the training designs of the different sessions for resident physicians have to be re-evaluated in terms of their effectiveness in helping trainees put into actual practice what knowledge they had acquired in training.

The study also has some limitations with regards the EBM and QA sessions as an educational intervention. First, it did not assess the quality and the number of sessions that needed in order for the intervention to be successful in improving level of appropriate care. Second, the study did not include residents feedback on the way the training sessions were conducted.

In conclusion, evidence-based medicine workshops and quality assurance activities within the residency training program of the DFCM were effective in increasing the knowledge base of resident physicians about osteoporosis screening. But the interventions were not successful in translating the knowledge into actual practice of screening for osteoporosis.

An in depth evaluation of EBM and QA sessions in residency training programs is therefore recommended and should be done together with the long term assessments of teaching strategies utilized in training. Residency training programs should be focused not only on knowledge acquisition during didactics but on interventions that can help translate learning into actual clinical practice.

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