
UNIVERSITY OF NORTH TEXAS
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ABSTRACT

The purpose of this study is to assess whether a current physician practice may inadequately diagnose osteoporosis in a high risk population of postmenopausal women who have sustained a hip fracture.

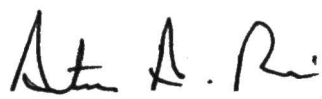
A review of all patients discharged from Texas hospitals during calendar year 1999 was analyzed, using the Public Use Data File provided through the Texas Health Care Information Council. A total of 13,628 women over the age of 55 were admitted to hospital with a fractured hip. Only 2,233, or 16.3%, of women were also coded with the diagnosis of osteoporosis ($P<0.001$). Forty to fifty percent of postmenopausal women have osteoporosis. Therefore, women presenting with a fragility fracture form an even more at-risk subset of the population, such that one would expect a majority of these women to carry a diagnosis of osteoporosis. Percentages of Caucasian, non-Hispanic women in each group were comparable. The age distribution in each group was comparable, implying that the coded diagnosis of osteoporosis was not related to the age of the women when admitted to the hospital.

In conclusion, physicians practicing in Texas during calendar year 1999 inadequately diagnosed osteoporosis in a high risk population of postmenopausal women who were admitted to hospital with fractured hip. Future analysis of subsequent annual databases will be able to identify whether or not continuing medical education efforts will cause physicians to diagnosis osteoporosis in this high risk population more frequently.

AN ANALYSIS OF OSTEOPOROSIS-RELATED HIP FRACTURES, USING HOSPITAL DISCHARGE DATA

Bernard Rubin, D.O.

APPROVED:



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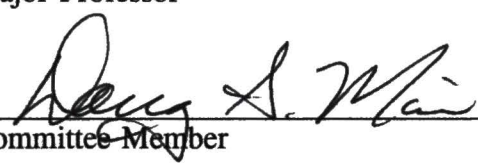

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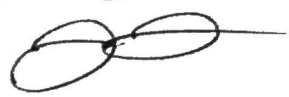

Dean, School of Public Health

An Analysis of Osteoporosis-Related Hip Fractures, Using Hospital Discharge Data.

Bernard Rubin, D.O., School of Public Health, University of North Texas - Health Science Center.

Antonio A. Rene, Ph.D., M.P.H., Douglas Mains, DrPH, MBA, Muriel Marshall, D.O., M.P.H., Dr. PH.

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AN ANALYSIS OF OSTEOPOROSIS-RELATED HIP FRACTURES, USING HOSPITAL DISCHARGE DATA

THESIS

Presented to the School of Public Health

University of North Texas
Health Science Center at Fort Worth

in Partial Fulfillment of the Requirements

for the Degree of

Master of Public Health

By

Bernard Rubin, D.O.

Fort Worth, Texas

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AN ANALYSIS OF OSTEOPOROSIS-RELATED HIP FRACTURES, USING HOSPITAL DISCHARGE DATA

INTRODUCTION

Osteoporosis is defined as a skeletal disorder characterized by diminished bone strength, which predisposes to an increased risk of fracture.[1] Bone strength is comprised of two main features: bone density and bone quality. Bone density in any given individual is determined by peak bone mass and by the amount of bone loss. Bone quality refers to the architecture and mineralization of bone. Fractures occur when a force such as trauma is applied to osteoporotic bone. Osteoporosis has been called the silent epidemic because bone damage occurs over years or decades without symptoms. Eventually, bones become so weak that minor trauma, and even normal movements like bending or turning, can cause bone fractures.[2]

Osteoporosis affects over 28 million people in the United States.[3] Women represent 80% of the affected population and many of these women do not know that they have osteoporosis. The risk for osteoporosis-related morbidity is high. The lifetime risk for hip fracture among white women is 17%, which is an incidence rate higher than a woman's combined risk for breast cancer, endometrial cancer, and ovarian cancer.[2] Osteoporosis risks are highest in white or Asian women, but African-American women and Hispanic-American women are also at risk. There are approximately 300,000 hip fractures per year in the United States. It is believed that 75% of fractures that occur in the elderly are related to osteoporosis.[4] Virtually everyone who fractures their hip requires a hospital stay and surgery. Twenty-five percent of patients die within a year of a hip fracture. A recent U.S. study showed that the total cost of caring for osteoporotic fractures approached 14 billion dollars per year and of this total, hip fractures alone accounted for annual medical costs of

nearly 9 billion dollars.[5] The purpose of this research study is to evaluate the adequacy of diagnosis of osteoporosis in post-menopausal women who presented to Texas hospitals in 1999 with a hip fracture.

METHODS

This is a retrospective analysis, utilizing the Public Use Data File (PUDF) from the calendar year 1999. The Texas Health Care Information Council (THCIC) was created by the Seventy-Fourth Texas Legislature in 1995, and operates under the umbrella of the Texas Health and Human Services Commission. THCIC's primary purpose is to provide data that will enable Texas consumers and health plan purchasers to make informed health care decisions. The Council's charge is to collect data and report on the quality performance of health maintenance organizations operating in Texas and hospitals. The goal is to provide information that will enable consumers to have an impact on the cost and quality of health care in Texas. The THCIC gathers data from hospitals using the UB92 Patient Discharge Billing Form. This is an administrative form for submitting patient charges to third-party payers. The data gathered from Texas hospitals ranges from patient diagnoses to charges for various procedures. A Public Use Data File (PUDF) containing patient-level information for inpatient hospital stays is a part of this data. This data can be used to study health care services and to make comparisons of services. The file contains patient-level data on approximately two million discharges quarterly during 1999 that must be read and analyzed using computer software. Individual patient identities are protected in the PUDF, and penalties will be applied to anyone trying to determine an individual's identity.

SELECTION OF STUDY PATIENTS

All patients in the PUDF who had sustained a hip fracture during the study period, the year 1999, were included. The diagnosis was identified by ICD-9-CM code 820--fracture of neck of femur, and eight alternate code descriptions. Only women, fifty-five years of age or older, with these ICD-9-CM codes are included. Women were selected because they are much more likely to have osteoporosis. A minimum age of 55 was selected because the average age of menopause is 50 (range from 45 to 55) with 98.5% of women having experienced menopause by the age of 55.[6] This population is felt to form the highest risk group for having osteoporosis as the etiology of the hip fracture, rather than some other cause.

This population of patients, women over the age 55 who had experienced a hip fracture, was then cross-referenced with the ICD-9-CM codes for osteoporosis (733.00 and four alternate code descriptions).

These outcome variables were chosen to maximize the population of hip fractures. Should a diagnosis of osteoporosis have been made during the hospitalization, this would have been an indication that a diagnosis of metabolic bone disease was an underlying etiology for the hip fracture.

Those patients who had hip fracture plus a diagnosis of osteoporosis would demonstrate a recognition of underlying osteoporosis by the physician, rather than noting the hip fracture simply as an isolated event.

STATISTICAL ANALYSIS

Chi-squares were calculated to determine if there were differences in characteristics between patients who had a hip fracture and osteoporosis on their discharge record and those

who had only hip fracture. Statistical analysis was performed using SPSS 10.0. Additional tables categorize the characteristics of the population who suffered hip fracture, including age, race, and length of hospital stay distributions. The distribution by type of hip fracture, based on ICD-9-CM code, is noted.

RESULTS

Of women over the age of fifty-five, 13,628 had an ICD-9-CM code confirming a hip fracture between January 1st, 1999 and December 31, 1999. (See Tables 1 and 2). The most frequent principal diagnostic codes were 820.21, 820.08, and 820.09. Caucasian non-Hispanic women comprised 8,485 of the 11,395 cases of hip fracture that were not initially coded for osteoporosis. This was 74.4% of that group. Of Caucasian non-Hispanic women, 1,740 were simultaneously coded with fracture and a diagnosis of osteoporosis, which comprised 78% of that group of 2,233. Five hundred African-American women were coded with fracture but not a diagnosis of osteoporosis, which was 4.4% of that population. Sixty-two African-American women were diagnosed with fracture and osteoporosis, comprising 2.7% of that population. One thousand fifty Hispanic women were coded with a hip fracture diagnosis, but not a diagnosis of osteoporosis, which was 9.2% of the 11,395 total in that group. One hundred eighty-four Hispanic women were coded with both the diagnosis of hip fracture and osteoporosis, which comprised 8.3% of that population of 2,233.

The age of patients suffering hip fracture was evaluated in five year segments from 55 until 90+ years. The subset of women age 85 to 89 comprised the largest percent of women suffering hip fracture, in either of the two subgroups. From age 85 to 89 the percent of women who suffered a hip fracture and concomitantly were diagnosed with osteoporosis was greater than the percent of women who suffered a hip fracture and did not have osteoporosis

(26.6% to 24.4%). (See Table 2). This trend continued in the women over the age of 90. Of the women in this age bracket, 20.2% had hip fracture plus a diagnosis of osteoporosis, whereas only 16.6% had a diagnosis of hip fracture alone.

The principal diagnostic code was evaluated for each of the two groups and in both cases ICD-9-CM code 820.21 was the most frequently utilized code in either group, comprising 5,044 of the 11,395 patients who had a hip fracture but not a diagnosis of osteoporosis and 1,109 of the 2,233 patients who had a diagnosis of hip fracture and a concomitant diagnosis of osteoporosis. (See Table 3). Diagnostic code 820.21 is "closed intertrochanteric femoral neck fracture." The next most frequent code is 820.8, which is "closed femoral neck fracture, unspecified." This was utilized in 3,333 of the women diagnosed with hip fracture but no diagnosis of osteoporosis. This was 29.2% of that population of 11,395 women. That same diagnostic code of 820.8 was noted in 551 of the women with hip fracture and a diagnosis of osteoporosis, comprising 24.7% of that population of 2,233 women. The third largest diagnostic code was 820.09, which is "closed transcervical femoral neck fracture, other." This diagnostic code was used in 2,714 of the women who had a diagnosis of fracture, but no diagnosis of osteoporosis, which was 23.8% of that population of 11,395 women. That same diagnostic code of 820.09 was used in 507 women who had a hip fracture and concomitant diagnosis of osteoporosis. This was 22.7% of that population of 2,233 women. (See Table 3).

When looking at the distribution in the two groups by length of stay, it is noted that the majority of women in both groups have a length of stay between one and seven days. This was 7,701 women who were diagnosed with fracture, but no diagnosis of osteoporosis, comprising 67.5% of that group. That same length of stay, between 1 and 7 days, was

seen in 1,596 women who had diagnosis of fracture and in addition were diagnosed with osteoporosis. This comprised 71.4% of that population.

Of the 13,628 total patients, only 2233 (16.3%) also had a diagnosis of osteoporosis. Other studies have shown a significant decreasing rate in the diagnosis of osteoporosis with increasing age.[7] In this analysis, the data indicated a different trend, with a progressively increasing percentage of women with fractured hips additionally being coded with osteoporosis.

DISCUSSION

In the United States alone, 1.5 million fractures, including 300,000 hip fractures, occur each year as a result of osteoporosis.[8] These osteoporotic fractures, particularly the hip fractures, result in substantial morbidity and mortality for post-menopausal women. About 3% of women die during the acute period of treatment of a hip fracture. Within a year, this death rate increases to 20% for women under the age of 80.[9] After the first year, 40% of patients with a prior hip fracture cannot walk independently, two-thirds require assistance with activities of daily living such as dressing, bathing, and cooking. Psychologically, patients become depressed and may fear further fractures.[10,11] Freedman, et al, demonstrated that less than 25% of individuals who have sustained an osteoporotic fragility fracture have already been placed on calcium and vitamin D.[7] Therefore, improved medical management of a patient sustaining a hip fracture should include an increased recognition that the fracture is due to osteoporosis, documentation of the extent of the osteoporosis, and hopefully, initiation of appropriate therapy, not only to include calcium and vitamin D supplementation, but perhaps additional medical therapy, as well.

Since fractures are clearly related to a decrease in bone mass, recognition of low bone mass and treatment of it could potentially decrease subsequent fractures. Recommendations of the National Osteoporosis Foundation for the treatment of osteoporosis[5] have been widely published in the medical literature and state:

1. Physicians should perform an evaluation for osteoporosis, using bone-density testing to confirm the diagnosis and to determine the disease severity, for all post-menopausal women who present with a fracture.
2. Physicians should advise all patients to obtain an adequate intake of dietary calcium (at least 1200 mg per day, including supplements if necessary) and vitamin D (400 to 800 International Units per day) for individuals at risk for deficiency.
3. Physicians should initiate therapy to reduce fracture risk in women with bone-mineral-density T-scores of less than -2 in the absence of risk factors and in women with T-scores of less than -1.5, if other risk factors are present (including a history of any adult fracture).
4. Women older than 70 years of age with multiple risk factors (especially those with previous fractures involving neither the hip nor the spine) are at high enough risk of fracture to justify the initiation of treatment without bone-density testing.
5. The Food and Drug Administration-approved pharmacological options for osteoporosis prevention or treatment, or both, are hormone replacement therapy, alendronate, raloxifene, risedronate, and calcitonin.

Age is an independent risk factor for osteoporosis. The older an individual is, the greater the risk for osteoporosis. Only 15% of women between the ages of 50 to 59 have osteoporosis, while up to 70% of those over the age of 80 show some evidence of this

disease.[12] Therefore, one would expect that a diagnosis of osteoporosis should increase as the population ages, particularly a subset of the population who presents with hip fracture, which is a known consequence of long-standing osteoporosis.

While the diagnosis of osteoporosis can be made for patients of virtually any age, there are particular decision points when the risks are higher and a diagnosis of osteoporosis is more likely. Of these, certainly the presence of a fragility fracture would be one of those major decision points. A fragility fracture is felt to be a fracture that occurs with a force of less than that of falling from a standing height. This would, for example, be a fractured rib or perhaps a fractured vertebral body, without major trauma. This is often the first indication that bone mass has dropped to a very low level, which is characteristic of osteoporosis. Fractures are usually identified by x-ray. Current National Osteoporosis Foundation Guidelines would suggest that it is important to respond to the presence of fragility fractures by offering patients preventive and restorative treatment. This is because the evidence for the risk of future fractures is very high in this patient group. For example, it has been shown that women who sustained any fracture prior to menopause (less than 40 years of age) were at 30% increased risk for repeat fracture after menopause (greater than 60 years of age).[13] Another study found that postmenopausal women who had a prior vertebral fracture were at a five-fold increased risk for new vertebral fractures.[14] Therefore, any history of fracture should raise the suspicion of osteoporosis. A hip fracture, being an even more major event, was chosen because the presence of a hip fracture should be even more of a dramatic indicator for concomitant osteoporosis. My analysis indicates that although there is a slight increase in the percentage of cases of women with hip fractures also being diagnosed with osteoporosis, it is always less than 30%, even in the most elderly population.

Bone mass is closely related to fracture risk. One standard deviation of decreased bone mass increases the risk of a spinal fracture by a factor of two fold and a hip fracture by a factor of 2.5, compared with normal peers.[1] Major risk factors that lead to fragility fractures include low body weight, history of a fracture in the individual or within their first degree relatives, family history of osteoporosis, and smoking. These risk factors are independent of bone density.

Since a fracture, in this population, may actually be the presenting event that brings the diagnosis of osteoporosis to the attention of the physician, it is critical that the treating doctor recognizes the possibility of underlying bone fragility, i.e., osteoporosis, in someone who presents with hip fracture. A careful history by the physician should identify those patients who have osteoporosis and then appropriate diagnostic measures and treatment could be started. The medical management of osteoporosis can certainly start at the time of the diagnosis of a fragility fracture. A dual energy x-ray absorptiometry (DEXA) scan is certainly recommended for all individuals with a fragility fracture. All patients should be assessed for their nutritional status and probably placed on treatment with calcium and vitamin D, with doses of vitamin D depending on the age of the patient. Simply adding calcium and vitamin D may decrease the risk of future fracture, even if bone density measurements don't increase.[15] In addition, there are other medications that can now be utilized which can re-establish bone mass and again could potentially decrease the risk of subsequent fracture.[16] Hopefully, with increased physician awareness from continuing medical education courses and workshops, which could emphasize and highlight the correlation between hip fracture and osteoporosis, the percentage of women over the age of 55 who present with hip fracture in Texas who are additionally coded with the diagnosis of

osteoporosis will increase. This is a trend which can be followed in subsequent years as this public use data file is extended over the next several years.

LIMITATIONS OF THE STUDY

There are several potential limitations of this study. There is the possibility that the physician inappropriately recorded the wrong diagnosis in the medical record. This would, of course, then translate into an inappropriate ICD-9-CM code for diagnosis. Additionally, the correct diagnosis could be written in the medical record, but medical records personnel could either miss the diagnosis or misinterpret the diagnosis, and therefore code incorrectly. This would apply not only to the type of hip fracture that the patient experienced, but also would apply to the possible diagnosis of osteoporosis, as well.

Another potential source of bias could occur if patients were not covered by insurance. The need for ICD-9-CM coding might be moot in that instance. One could understand that the correct surgical procedure might be coded, but there would be perhaps little impetus to code for osteoporosis if there were no reason to think that the patient was going to be followed long-term, either by the admitting physician or by other physicians on the medical staff, because of a lack of insurance coverage. Additionally, if patients had no health care insurance, then they would not be covered for bone density testing and therefore no additional testing would be done on patients while they are hospitalized to detect osteoporosis. The likelihood of these patients being followed up as an outpatient to secure a diagnosis of osteoporosis would also be minimal.

In conclusion, certainly a key to the prevention of osteoporosis is recognition of its existence. There is a substantial in-hospital mortality in patients with hip fracture, ranging up to 11½%. Many people with hip fracture are discharged to nursing homes rather than

back to their own home. They may suffer subsequent fractures, as well. Given this high degree of mortality and morbidity, it is shocking that such a small number of individuals hospitalized in Texas in 1999 with a hip fracture had a concomitant diagnosis of osteoporosis. This would seem to indicate a lack of awareness of the underlying metabolic bone disease and hip fracture. Implications of this are that if no diagnosis of osteoporosis is included in the discharge summary, then patients are not being placed on medications to prevent further fractures. Subsequent fractures would not be prevented, nor would subsequent surgeries due to osteoporotic fractures.

Since osteoporosis is a disease of fracture risk, which can be assessed by measurement of bone density, failure to diagnose metabolic bone disease in someone who presents with fracture, particularly hip fracture, indicates a lack of physician awareness to known risk factors of the disease. Subsequent modification of lifestyle, diet, and pharmaceutical intervention is therefore minimized because of a seeming lack of awareness of the problem. Hopefully, with increased physician awareness, CME lectures, and workshops, the percentage of women over age 55 presenting with hip fracture in Texas also being coded with osteoporosis will increase.

APPENDIX A

TABLES

Table 1. Distribution of Race/Ethnic Characteristics

Group	Race/Ethnicity								Total
	Caucasian, Non-Hispanic		African American		Hispanic		Other		
	N	Percentage	N	Percentage	N	Percentage	N	Percentage	
Fracture Non-Osteoporosis	8485	74.4	500	4.4	1050	9.2	1360	12	11395
Fracture Osteoporosis	1740	78	62	2.7	184	8.3	247	11	2233
Total	10225		562		1234		1607		13628

Table 2. Distribution of Patients by Age in Each Group

Group		Age of Patient								Total
		55-59	60-64	65-69	70-74	75-79	80-84	85-89	90+	
Fracture Non-Osteoporosis	Count	188	303	619	1047	1979	2586	2784	1889	11395
	% within group	1.6%	2.7%	5.4%	9.2%	17.4%	22.7%	24.4%	16.6%	100.0%
Fracture Osteoporosis	Count	25	40	92	174	348	508	595	451	2233
	% within group	1.1%	1.8%	4.1%	7.8%	15.6%	22.7%	26.6%	20.2%	100.0%
Total	Count	213	343	711	1221	2327	3094	3379	2340	13628
	% within group	1.6%	2.5%	5.2%	9.0%	17.1%	22.7%	24.8%	17.2%	100.0%

Pearson's Chi Square 40.584 (7, n=13628), p = 0.0001

Table 3. Distribution by Type of Principal Diagnostic Code

Group		Principal Diagnostic Code						Total
		820.09	820.20	820.21	820.31	820.8	820.9	
Fracture Non-Osteoporosis	Count	2714	277	5044	5	3333	22	11395
	% within group	23.8%	2.4%	44.3%	.0%	29.2%	.2%	100.0%
Fracture Osteoporosis	Count	507	62	1109	1	551	3	2233
	% within group	22.7%	2.8%	49.7%	.0%	24.7%	.1%	100.0%
Total	Count	3221	339	6153	6	3884	25	13628
	% within group	23.6%	2.5%	45.1%	.0%	28.5%	.2%	100.0%

Pearson's Chi Square 27.989 (5, n=13628), p = 0.0001

Table 4. Distribution by Length of Stay

Group	Length of Stay, days (percent)			
	1-7	8-14	15-21	22+
Fracture Non-Osteoporosis	7701 (67.5)	2294 (20.1)	702 (6.2)	697 (6.2)
Fracture Osteoporosis	1596 (71.4)	390 (17.4)	116 (5.2)	131 (6)
Total	9297 (68.2)	2684 (19.7)	818 (6)	828 (6.1)

APPENDIX B
JAOA INFORMATION FOR CONTRIBUTORS

Journal of the American Osteopathic Association
Information for contributors

The Journal of the American Osteopathic Association (JAOA) is the scholarly publication of the osteopathic medical profession. It provides a forum for communicating and disseminating philosophical concepts, clinical practice observations, and scientific information, and for defining the current status of the profession. It is directed toward the osteopathic primary care physician with a broad range of interests and provides a clinical and scientific update for the osteopathic specialist.

JAOA is the official scientific publication of the American Osteopathic Association. Articles are accepted with the understanding that they have not been published elsewhere and that they are not simultaneously under consideration by any other publication. Priority in publication is given to original work. Where appropriate, an osteopathic medical slant is expected.

JAOA publishes original investigations, current reviews with an expert critical viewpoint, and didactic discourses in a wide variety of clinical fields.

JAOA welcomes submission of papers in the following categories:

Original Contribution
Documentation of original clinical or applied research. Basic science research will be accepted only in abstract form unless the work is specifically related to clinical application. Length of the paper is optional, but references are limited to 30.

Brief Reports
Substantive, but brief, documentation of clinical information, pilot investigation, theoretical concepts, clinical "pearls" et cetera. Length limited to 750 words, a maximum of 10 references, and one or two figures.

Case Reports
Unusual clinical presentations with newly recognized or rarely reported features. Length is limited to 1500 words, 4 illustrations, and 10 references.

Clinical Practice
Articles that practical application for both general practitioners and specialists and present an expert critical viewpoint. Length is limited to 1500 words, 2 illustrations, and 10 references.

Medical Education
Articles on undergraduate and graduate osteopathic medical education. Length is optional. Illustrative tables and graphs are welcomed.

Special Communications
Informed commentary and hypotheses on medical scientific topics, including controversial issues: Text length, 1500 to 2000 words. Appropriate illustrations will be considered.

Review articles
Detailed, critical surveys and meta-analyses of published research relevant to clinical problems. Text length, optional.

Letters to the Editor
Comment on articles published in the JAOA or new information on clinical topics. Length is limited to 500 words with a maximum of 5 references and 2 illustrations.

Contributions are accepted from osteopathic physicians, faculty members in osteopathic medical

colleges, guest lecturers at osteopathic medical meetings, and others when consistent with the mission of the JAOA.

In all but rare instances, trainee papers must include the trainer as an author. The coauthorship implies review and additional material from the experience of the senior physician. Letters to the editor may be E-mailed to letters@aoa-net.org.

Submission

Submit all papers to Gilbert E. D'Alonzo, DO, Editor in Chief, JAOA, American Osteopathic Association, 142 E. Ontario St., Chicago, IL 60611.

All manuscripts must be accompanied by Manuscript Checklist as noted in the "Departments" section on the last page of the Table of Contents of the print edition.

Editorial Review

All papers received for JAOA consideration are submitted to referees in the field(s) of interest represented by the paper. Notification of acceptance or rejection usually is given within 3 months after acknowledgment of the paper; publication follows as soon as possible thereafter, depending on the current backlog of papers.

Because of the large number of manuscripts considered by JAOA, some are necessarily rejected through no fault in the paper, but because of duplication of subject matter, a preference for original material over some forms of review, or the necessity to establish priorities on the use of limited space.

JAOA Submission requirements

* *Manuscript*

1. Type/wordprocess all text, references, and tabular material caps and lower case, double-spaced with 1-inch margins all around. (No script or italic typeface. Do not use daisy wheel typewriter or printer.) Number all pages consecutively.
2. Submit original plus 4 photocopies. Be sure to retain one copy for your files.
3. Check that all references, tables, and figures are cited in the text and in numerical order.
4. For human or animal experimental investigations, state that project was approved by an appropriate institutional review board, or when no formal ethics review process is in place, state the manner in which informed consent was obtained from human subjects.
5. Describe basic study design; define all statistical methods used; and list measurement instruments, methods, and tools used for independent and dependent variables.
6. In the "Materials and Methods" section, identify all interventions that are used in a manner that does not comply with approved or standard usage.
7. Include a cover letter that gives the author's full name and address, telephone, FAX number, and E-mail address, institution from which work initiated, and academic title or position.

* *Illustrations*

1. Submit 4 sets of illustrations with a self-adhesive label affixed to the back of each, indicating the first author's name, the figure number, and the top of the figure. (Retain one set for your files.)
2. Photos should be submitted as 5 X 7-inch glossy black-and-white prints with high contrast. Use a photocopy to indicate the placement of arrows and other markers on the photos. JAOA requires that authors convert all 35-mm slides to glossy black-and-white prints and submit 4 sets of such prints along with the original set of 35-mm slides clearly labeled, with the tops marked on the frames.
3. Include a caption for each figure. For photomicrographs, indicate the original magnification and staining methods used.

4. Drawings and charts should be professionally drawn with India ink on poster board or heavy white paper, or prepared using a computer and a high-resolution printer. You may submit good quality glossy photos of art rather than the originals.

* *Permissions*

Obtain written permission from the publisher and author to use previously published illustrations/tables, and submit these letters with the manuscript. You also must obtain written permission from patients to use their photos if there is a possibility that they might be identified. In the case of children, permission must be obtained from a parent or guardian.

* *Abstract*

Provide a 150-word abstract that summarizes the main points of the paper and its conclusions.

* *References*

1. Be discriminating in the type and number of references selected. Too many references may indicate lack of critical thinking, whereas too few may suggest the possibility of unwarranted speculation.
2. References are required for all material derived from the work of others. Cite all references in numerical order in the text. If there are references used as general source material, but from which no specific information was taken, list them in alphabetical order following the numbered references.
3. For journals, include the names of all authors, complete title of the article, name of the journal, volume number, date, and inclusive page numbers. For books, include the name(s) of the editor(s), name and location of publisher, and year of publication. Give page numbers for exact quotations.

* *Editorial processing and reprints*

All accepted articles are subject to copy editing. On acceptance of Original Contributions and Brief Reports, authors must provide photocopies of all references so that statements cited in the text may be verified. If available, authors should submit an IBM-compatible disc containing the electronic version of the paper with label identifying document name and program used. (Be sure to retain back-up disc). Authors receive gallery proofs for approval before publication. Authors are responsible for all statements, including changes made by the manuscript editor.

Information for ordering reprints is supplied on request. Three copies of the JAOA containing the author's article will be sent on request.

Papers will be entered automatically for CME credit where appropriate.

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APPENDIX C

JOURNAL COVER LETTER

November 30, 2001

Gilbert E. D'Alonzo, DO
Editor in Chief, JAOA
American Osteopathic Association
142 E. Ontario St.
Chicago, IL 60611

Dear Sir:

Enclosed please find one original and four photocopies of a manuscript entitled "An Analysis of Osteoporosis-Related Hip Fractures, Using Hospital Discharge Data" for consideration of publication only in the JAOA. This manuscript has not been previously published in whole or in part.

I can be contacted at:

Bernard Rubin, D.O.
University of North Texas Health Science Center, Fort Worth
Dept. of Medicine--Fourth Floor
855 Montgomery
Ft. Worth, Texas 76107

(817) 735-5181
brubin@hsc.unt.edu

If you have any questions or comments about this manuscript, please feel free to contact me.

Sincerely,

Bernard Rubin, D.O.

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