Prevalence of Vertebral Compression Fracture (VCF) in Postmenopausal Women with Back Pain in Villages of Bangladesh

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Background: Back pain is a very common ailment in postmenopausal women.
Objective: To determine prevalence of vertebral compression fracture in postmenopausal women suffering from back pain in the peripheral communities of Bangladesh.
Methods: A cross sectional study was conducted which included all postmenopausal women aged 55 years and above presented with back pain in the Gynae and Orthopedic outpatient departments of Jahurul Islam Medical College Hospital and North Bengal Medical College Hospital. Vertebral fractures were diagnosed by X-Ray scanning of the thoracolumbar spine based on predefined criteria.
Result: Prevalence rate of back pain was found to be 30.6%. It was highest in 70-75 years of age.Maximum patients (48.1%) sustained fracture at only one vertebra.Highest number of fracture (61.1%) was found in the dorsolumbar region.

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Key words: Prevalence, back pain, postmenopausal women

Introduction

Vertebral fractures are common among people with osteoporosis and they are a serious health issue.[1,2] Many publications indicate that vertebral fractures are the most common forms of osteoporotic fractures.[3,4] In the year 2000, there were an estimated 1.4 million osteoporosis related vertebral fractures worldwide.[5] The combination of vertebral fractures and osteoporosis is associated with increased morbidity and mortality.[6]

Prevalence of osteoporotic vertebral fracture is 11.8% in women and the rate increases with age.[7,8] Studies have suggested that having 1 vertibral compression fracture (VCF) increases the risk of future VCFs.[9] Among those with fractures, only one fracture is the commonest type; two and more fractures are present in approximately 30% of the cases. Due to a transitional region, thoracolumbar spine (from 12th thoracic to 2nd lumbar) is most vulnerable to fracture.[7]

The most important risk factor for VCF is osteoporosis, postmenopausal women have the greatest risk because of hormonal changes which disrupts the bone microarchitecture and alters the contents of non-collagenous proteins in the bone matrix.[10]This structural deterioration of the tissue leads to fragile bones which are prone to fractures.[11]

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Fractures occur in these patients during trivial events, such as lifting a light object, a vigorous cough or sneeze, or turning in bed. It has been hypothesized that fractures in vertebral bodies occur because of an increased load on the spine caused by contraction of paraspinal muscles.[12] It has been suggested that approximately 30% of compression fractures in patients with severe osteoporosis occur while the patient is in the bed.[13] Patients with moderate osteoporosis can injure their spine by falling off a chair, tripping, or attempting to lift a heavy object.
VCFs can be classified in three categories: wedge (50%), biconcave (17%), and crush (13%). Complex fractures account for the remaining 20% of VCFs

Osteoporotic vertebral fractures can cause severe physical limitations. Chronic backpain leads to functional limitations and significant disability. Multiple adjacent VCFs can lead to progressive kyphosis of the thoracic spine, resulting in a number of comorbidities, such as decreased appetite resulting in poor nutrition and decreased pulmonary function.[14]

Methods

All postmenopausal women presented with back pain in the outpatient departments were enrolled for the study. Informed consent was taken from the patients and those willing to participate were interviewed using a pretested semi structured interview schedule. It included age, socioeconomic status, obstetric history, past history of fracture, presence of other medical problem. Age ascertainment was done by directly asking age in completed years, correlating with important events like age at marriage, age at first child birth, present age of the child, etc. Age at menarche was recorded as told by the women or/and correlated with personal life event like age at marriage, interval between menarche and marriage and also the period between menarche and first child birth. Age at menopause was recorded as told by the patient and/or correlated with personal life events like birth of youngest child. Mode of menopause was recorded as natural or surgical.

Antero posterior and lateral X-Ray views of the dorsolumbar spinal region were taken to detect fracture.

The question on physical activity had four alternatives which were sedentary, moderate, high and very high. Having few answers both in the “sedentary” and “very high physical activity level” groups, we categorized sedentary and moderate physical activity level as low, and high/very high level as high. Five levels of self-perceived health (very good, good, neither nor, bad, very bad) were categorized into two, good (very good and good) and poor (neither nor, bad, very bad). Educational information was combined from five to three levels: primary school only (i.e. up to grade V level), up to SSC level, and more than SSC level.

Inclusion criteria

1. Postmenopausal women
2. Aged 55 years and above
3. Suffering from back pain

Exclusion criteria

1. Active smokers or with a history of moderate to severe asthma
2. COPD, pulmonary fibrosis, emphysema, or other major lung disease.
3. study participants could not have taken inhaler delivered medications within the past 3 months or have any severe or chronically disabling conditions other than osteoporosis, such as congestive heart failure.

4. Patients were not selected for this study based on their need for an inhaler.

Related definitions

Arm span

Arm span was measured to the nearest centimeter from the tips of the middle fingers of maximally outstretched hands, with the patients tanding facing the wall.

Height

Height was measured using a Harpenden stadiometer. According to a standardized protocol, patients were measured in bare feet, with their back against the wallmounted stadiometer, heels together, and head positioned in the Frankfort horizontal plane. The patient was asked to breathe in, and height was noted and recorded at peak inspiration.[15]

Arm span and height measurements were taken one time.

Type of fracture

Vertebral morphometric was used to define vertebral fractures based on the measurement of vertebral heights. Three types of fractures were identified: wedge, biconcave, and crush. The wedge fractures were characterized by deformed structure of the anterior part of the vertebrae, the biconcave of the middle part, and crush fractures caused by compression of the total vertebrae.[16]

Severity of fracture

Using lateral radiographs of the thoracic and lumbar spines, each vertebra was scored quantitatively as 0, 1, 2, or 3. Grade 0 indicated an unfractured vertebra, grade 1 is mild compression (approximately 20%-25%), grade 2 is moderate compression (approximately 25%-40%), and grade 3 is severe compression (>40%).[17]

Result

Total study population was 1000 among which 306 patients suffered from vertebral fractures yielding the prevalence rate 30.6%.

Table I: Patient characteristics

Factor		No fracture (Mean±SD)	Fracture (Mean±SD)
Age		61±8.2	59±7.5
Height		150±6	154±7.1
Weight		45±6.3	47±7.1
BMI		21.2±2.1	22.1±2.5
Education	1 (Primary)	231	117
	2 (Upto HSC)	320	134
	3 (More than HSC)	143	55
Physical activity	Highly active	407	229
	Low active	189	175
Health status	Good	247	197
	Poor	325	231
Number of pregnancy		3±1	3±1.1
Age at menarche		12±1.5	12±2.7
Age at menopause		49±4	46±4.7
Reproductive years		44±5	43±4.7

Almost all the subjects were of same parameters with little variation but a few more subjects were in the highly active, poor nutritional status, undergraduate group.

Table II: Prevalence of vertebral fracture according to age

Age group (Years)	Women With fracture		Without fracture		Total	
	No.	%	No.	%	No.	%
55-59	56	5.6	301	30.1	357	35.7
60-69	148	14.8	95	9.5	243	24.3
70-74	176	17.6	37	3.7	213	21.3
≥75	165	16.5	22	2.2	187	18.7

Most of the patients belonged to 55-59 years group but the rate was highest in 70-75 years of age group showing an upward inclination toward increased age.

Table III: Distribution of number of deformities

Number of deformities	Women (N)	%
At least 1 deformity	147	48.1
2 deformities	94	30.7
3 or more deformities	65	21.2
Total	306 patients (1-4 deformities)	

Maximum patients (48.1%) suffered from 1 vertebra fracture.

Table IV: Distribution of deformities in different regions of the spine

Spinal region	Number	%
Dorsal	64	20.9
Dorsolumbar	187	61.1
lumbar	37	12.1
Skipped regions (i.e. Upper Dorsal+Lumbar)	18	5.9

Highest number of fracture (61.1%) was found in the dorsolumbar region. 5.9% fractures were found in a skipped manner. A history of trauma was in the past was found in most of the cases.

Discussion

Difference in fracture mechanisms may possibly explain the discrepancy in prevalence, as non-vertebral fractures are connected to falls, whereas vertebral fractures are not.[18,19]It has been reported that a large amount of vertebral fractures are asymptomatic.[20]Some studies report that only one in three vertebral fractures are diagnosed and as such argued that vertebral fractures are largely under diagnosed.[20-23]

Age of the patient was a significant predictor of vertebral deformities in women with a prevalence increasing from approximately 5.6% in the age group below 60 years to approximately 34.1% in the age group 70+ in women. Same finding was observed by others.[7]However the prevalence rate may be an under estimate because we could not validate actual age of the patients in every case due to lacking of certifications.

For women, it can even be regarded as rather low compared to other studies reported from

Vietnam to be from 17.1% in the age group 50-59 to 39.2% in the age group 70+ (overall prevalence 23%) and in Spain from 7.2% in the age group 55-59 and 46.3% in the age group 75+ (overall 21.4%).[7,24,25]

Women with vertebral fractures were older, shorter, weighted less, had lower educational level, and lower self-reported health compared to those without fractures. Prevalence of vertebral fracture showed an increasing trend with increasing age. This is because an accelerated bone loss which occurs after menopause makes the bone fragile.[7]

As reported by others, we also found the prevalence of vertebral deformities to be highest in the mid thoracic region (5th-9th thoracic) and thoracolumbar transition.[26]

Conclusion

Osteoporotic fracture is a public health problem in our country as well as in the developed countries. As life expectancy is on the rise, policy makers should deploy necessary planning to reduce the load of fragility of fractures and thereby improving quality of life of the elderly aged people.

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