The 30th Anniversary of the Korean Society for Bone and Mineral Research

OSTEOPOROSIS AND OSTEOPOROTIC FRACTURE FACT SHEET 2019

Korean Society for Bone and Mineral Research
National Health Insurance Service joint research
Since 2017, the Korean Society for Bone and Mineral Research (KSBMR) has published fact sheets on osteoporosis and osteoporotic fractures in Korea, working in close cooperation with the Korea Centers for Disease Control and Prevention (KCDC) and the National Health Insurance Service (NHIS). Commemorating the 30th anniversary of its founding this year, our society compiled the two fact sheets that we have published so far, and summarized the data on osteoporosis and osteoporotic fractures and the status of management. The status of prescriptions for medicine for osteoporosis was also surveyed and added to the fact sheet. In addition, there are plans to analyze the characteristics of the recurrence of fractures and risk factors in detail.

The prevalence of osteoporosis in the population age 50 and over in South Korea is 22.4%. Here, there are significant differences between males and females, as the rate of osteoporosis in females is 37.3%, five times higher than that in males. Since 2013 the incidence of osteoporotic fractures has no longer been increasing, but the number of patients has continued to grow due to the aging of the population. Fractures cause pain and motor disorder for the patients, and reduce the quality of life, placing a huge burden on society and the economy. Of the fracture types, wrist fractures are most commonly observed in people in their 50s, and the incidence of spinal and hip fractures significantly increases with age. The overall incidence of osteoporotic fractures in females is over three times higher than that in males, but the death rate in males is higher than that in females. In addition, once fractures occur, the risk of relapse increases.

Osteoporotic fractures are one of the most commonly diagnosed geriatric diseases, and accurate epidemiologic data in the fact sheets has contributed to improving public awareness of the disease and increasing public interest in the importance of prevention. In addition, such data can be utilized by the government as important base data in establishing policies on the management of geriatric diseases.

Lastly, I would like to once again express my gratitude to the Korea Centers for Disease Control and Prevention (KCDC) and the National Health Insurance Service (NHIS) for providing valuable data for our society, and Epidemiology Director Kim, Ha-young, the committee members and the head office for sparing no effort in supporting the publication of this fact sheet.

Byung Koo Yoon, M.D., Ph.D.  
President  
Korean Society for Bone and Mineral Research

Ho-Yeon Chung, M.D., Ph.D.  
Chairman, Board of Directors  
Korean Society for Bone and Mineral Research
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Source of data and definition of osteoporosis and osteoporotic fracture
Summary
1

Status of osteoporosis and osteoporotic fracture

Prevalence of osteoporosis and osteopenia
Prevalence of osteoporosis and osteopenia by age
Number of osteoporotic fracture
Incidence of osteoporotic fracture
Incidence of hip fracture by sex and age
Incidence of vertebral fracture by sex and age
Incidence of wrist fracture by sex and age
Incidence of humerus fracture by sex and age
Patterns of major osteoporotic fracture by site
Post-fracture mortality in the first 12 months
Patterns of secondary fracture
Prevalence of osteoporosis and osteopenia (≥50 years old)

- The prevalence of osteoporosis and osteopenia among adults 50 years or older were 22.4% and 47.9%, respectively; therefore, nearly 1 of 5 and 1 of 2 Korean adults had osteoporosis and osteopenia, respectively.

- The prevalence of osteoporosis in men was one fifth that in women, but the prevalence of osteopenia was similar between men and women.

Data were derived from the KNHANES 2008–2011 pooled-sample data.
From osteoporosis or low bone mass in adults 50 years and older in the Republic of Korea, 2008–2011, KCDC
Prevalence of osteoporosis and osteopenia by age

- The prevalence of osteoporosis was increasing with age, and 68.5% of women aged 70 years or older had osteoporosis.
- In women, the prevalence of osteoporosis doubled as age increased by 10 years.

Data were derived from KNHANES 2008–2011 pooled-sample data.
From osteoporosis or low bone mass in adults 50 years and older in the Republic of Korea, 2008–2011, KCDC
Number of osteoporotic fracture (≥50 years old)

- The number of osteoporotic fracture has gradually increased since 2008.

(Unit: 1,000 cases)

Data were derived from the NHIS data set: 2008–2016.
Incidence of osteoporotic fracture (≥50 years old)

- The incidence of osteoporotic fracture gradually increased from 2008 but was stationary after 2013.

(Unit: per 10,000 persons)

Data were derived from the NHIS data set: 2008–2016.
Data are presented by age and sex standardization using the 2016 census Korean population.
Incidence of hip fracture by sex and age

(Unit: per 10,000 persons)


Men: 10 10 11 12 12 11 11 11 10
Women: 18 18 20 20 21 20 20 19 17
Total: 22 22 25 25 26 25 26 26 23

(Unit: per 10,000 persons)


50–59 yrs: 151 160 175 192 199 192 187 196 187
60–69 yrs: 151 151 151 151 151 151 151 151 151
70–79 yrs: 36 35 38 39 40 37 36 35 30
80–89 yrs: 9 8 9 9 8 8 7 6 2
90–99 yrs: 2 2 3 3 3 2 2 2

Data were derived from the NHIS data set: 2008–2016.
Incidence of vertebral fracture by sex and age

(Unit: per 10,000 persons)

Men  Women  Total

2008: 117  83  37
2009: 120  85  38
2010: 130  92  42
2011: 139  99  46
2012: 131  93  43
2013: 132  93  44
2014: 129  90  43
2015: 128  90  44
2016: 128  88  44

(Year)

50–59 yrs  60–69 yrs  70–79 yrs  80–89 yrs  90–99 yrs

2008: 288  188  240  253  194
2009: 309  206  302  253  206
2010: 339  224  336  224  206
2011: 366  210  318  210  206
2012: 354  208  347  208  199
2013: 363  199  337  199  196
2014: 365  364  354  364  192
2015: 365  365  354  365  192
2016: 365  365  354  365  192

(Year)

Data were derived from the NHIS data set: 2008–2016.
Incidence of wrist fracture by sex and age

(Unit: per 10,000 persons)

Data were derived from the NHIS data set: 2008–2016.
Incidence of humerus fracture by sex and age

(Unit: per 10,000 persons)

- **Men**: 4, 4, 4, 4, 5, 4, 4, 4, 4
- **Women**: 7, 7, 7, 7, 7, 7, 7, 10, 10
- **Total**: 7, 7, 7, 7, 7, 7, 7, 7, 7

(Year)

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(Unit: per 10,000 persons)

- **50–59 yrs**: 25, 25, 29, 29, 26, 25, 26, 28, 26
- **60–69 yrs**: 20, 20, 22, 22, 20, 20, 20, 19
- **70–79 yrs**: 12, 12, 14, 13, 11, 12, 12, 12
- **80–89 yrs**: 6, 6, 6, 6, 6, 6, 6, 6
- **90–99 yrs**: 3, 3, 4, 4, 4, 4, 4, 4

(Year)

Data were derived from the NHIS data set: 2008–2016.
Patterns of major osteoporotic fracture by sites

- Wrist fracture mainly occurs in the 50s, and the incidences of hip and vertebral fracture increase with age.

Data were derived from the NHIS data set: 2016.
Post-fracture mortality in the first 12 months

- The mortality rates after hip and vertebral fractures in the first 12 months were 1.5 and 2.2 times higher in men than in women.

**Hip fracture**
- Men
- Women

(Unit: %)

<table>
<thead>
<tr>
<th></th>
<th>3 months</th>
<th>6 months</th>
<th>1 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>9.1</td>
<td>14.1</td>
<td>20.8</td>
</tr>
<tr>
<td>Women</td>
<td>5.6</td>
<td>6.6</td>
<td>13.6</td>
</tr>
<tr>
<td>Women</td>
<td>9.0</td>
<td>10.0</td>
<td>15.6</td>
</tr>
</tbody>
</table>

**Vertebral fracture**
- Men
- Women

(Unit: %)

<table>
<thead>
<tr>
<th></th>
<th>3 months</th>
<th>6 months</th>
<th>1 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>3.0</td>
<td>5.5</td>
<td>9.2</td>
</tr>
<tr>
<td>Women</td>
<td>1.2</td>
<td>1.6</td>
<td>2.3</td>
</tr>
<tr>
<td>Women</td>
<td>3.0</td>
<td>4.2</td>
<td>5.4</td>
</tr>
</tbody>
</table>

Data were derived from the NHIS data set: 2013–2015.
Patterns of secondary fracture (≥50 years old)

- The annual incidence rate of secondary fracture after an osteoporotic fracture was similar during the 4-year follow-up.
- Secondary fracture occurred most frequently in the spine.

(Unit: per 10,000 fracture patients)

Data were derived from the NHIS data set: 2012–2016.
Secondary fracture was followed up for 4 years after the osteoporotic fracture was first reported in 2012.
Status in the treatment of osteoporosis and osteoporotic fracture

Health service utilization rate in Korean patients with osteoporosis

Treatment rate in Korean patients with osteoporosis

Treatment rate after osteoporotic fracture

Treatment rate after osteoporotic fracture by sex and age
Health service utilization rate in Korean patients with osteoporosis

- 4 of 10 patients with osteoporosis did not access medical services for osteoporosis.

Health service utilization rate = (the number of patients with osteoporosis who accessed medical services/total number of patients with osteoporosis) x 100 (%)  
Total number of patients with osteoporosis = [prevalence of osteoporosis by bone mineral density (KNHANES 2008–2010)] x the census Korean population (n)  
Data were derived from the NHIS data set: 2008–2012.
Treatment rate in Korean patients with osteoporosis

- 7 of 10 female patients and 8 of 10 male patients with osteoporosis did not take anti-osteoporosis medication.

Data were derived from the NHIS data set: 2010.
Medication rate = (patients who received bisphosphonate, SERM, or calcitonin/total osteoporosis patients) x 100 (%)
Treatment rate after osteoporotic fracture

- Only 42% of patients with osteoporotic fracture took anti-osteoporosis medication in the first 12 months.
- The treatment rate was highest (53%) in the patients with vertebral fractures.

Data were derived from the NHIS data set: 2015.
Treatment rate after osteoporotic fracture by sex and age

- The treatment rate after osteoporotic fracture in the first 12 months was 2.3 times higher in women than in men.
- The treatment rate after osteoporotic fracture in the first 12 months increased with age until 80 years and then decreased.

Treatment rate within a year by sex

- Men: 21.0%
- Women: 48.2%
- Total: 41.9%

Treatment rate within a year by age

(Unit: %)

50-54: Men 4.8, Women 7.4
55-59: Men 13.1, Women 24.3
60-64: Men 19.6, Women 37.7
65-69: Men 27.5, Women 50.8
70-74: Men 30.2, Women 57.0
75-79: Men 33.0, Women 58.8
80-84: Men 30.9, Women 56.1
85-89: Men 26.9, Women 48.2
90-94: Men 22.4, Women 39.4
95-99: (Yrs)

Data were derived from the NHIS data set: 2015.
3

Status in the prescription of osteoporosis treatment

- Prescription analysis of osteoporosis treatment
- Prescription analysis of osteoporosis treatment by sex and age
- Prescription analysis of osteoporosis treatment by administration methods
- Adherence to treatment
Prescription analysis of osteoporosis treatment

- The prescription of anti-osteoporosis medications steadily increased by 6% every year until 2016.
Prescription analysis of osteoporosis treatment by sex and age

- The prescription of anti-osteoporosis medications increased in women but was unchanged in men.
- The prescription of anti-osteoporosis medications was highest in both men and women in their 70s, followed by those in their 60s and 80s.

Data were derived from the NHIS data set: 2011–2016.
Prescription analysis of osteoporosis treatment by administration methods

- The prescription rate of intravenous medications increased up to 42% in 2016.

Administration route

<table>
<thead>
<tr>
<th>Year</th>
<th>Oral (case)</th>
<th>Intravenous (case)</th>
</tr>
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<tbody>
<tr>
<td>2011</td>
<td>84,782</td>
<td>1,077,016</td>
</tr>
<tr>
<td>2012</td>
<td>117,513</td>
<td>1,187,555</td>
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<tr>
<td>2013</td>
<td>162,153</td>
<td>1,212,310</td>
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<tr>
<td>2014</td>
<td>235,578</td>
<td>1,206,894</td>
</tr>
<tr>
<td>2015</td>
<td>320,118</td>
<td>1,127,406</td>
</tr>
<tr>
<td>2016</td>
<td>395,697</td>
<td>1,093,921</td>
</tr>
</tbody>
</table>

(Unit: case)

Data were derived from the NHIS data set: 2011–2016.
Prescription analysis of osteoporosis treatment by administration methods

- The prescription of weekly medications gradually decreased, but that of quarterly or daily medications increased.

Data were derived from the NHIS data set: 2011–2016.
Adherence to treatment

- The persistence with anti-osteoporosis medications was only 45.4% at 6 months, 33.2% at 1 year, and 21.5% at 2 years after initiation of therapy.

Data were derived from the NHIS data set: 2012–2014.
Medication possession ratio (MPR): (Total Rx days supplied during a specified period/total number of days during a specified period) x 100 (%)
Persistent group: Those who received anti-osteoporosis medications during the specified period accounted for 80% or more of the total study population.
Source of data

- Information from the National Health Information Database from January 2008 to December 2016 made by the National Health Insurance Service (NHIS) was used to analyze the incidence of osteoporotic fracture.

- Data from the Korean National Health and Nutrition Examination Survey (KN-HANES) 2008–2011 from the Korea Centers for Disease Control and Prevention (KCDC) were used to analyze the prevalence of osteoporosis.

- Data are presented by sex and age standardization using the 2016 census Korean population.

Definition of osteoporosis and osteoporotic fracture

- Osteoporosis and osteopenia were defined in accordance with the definitions of the World Health Organization, such as a vertebral or hip bone mineral density (BMD) of 2.5 standard deviations or more below the mean for healthy young adults (T-score of -2.5 or below) measured using dual-energy X-ray absorptiometry as osteoporosis and a vertebral or hip BMD between 1 and 2.5 standard deviations below the mean as osteopenia.

- Osteoporotic fracture was defined in accordance with the ICD-10 codes and physician’s claim for site-specific fracture.

ICD-10 code

- Hip (S72.0 and S72.1)
- Spine (S22.0, S22.1, S32.0, M48.4, and M48.5)
- Distal radius (S52.5 and S52.6)
- Humerus (S42.2 and S42.3)
Summary

- The prevalence of osteoporosis and osteopenia among adults 50 years or older were 22.4% and 47.9%, respectively.
- In women, the prevalence rate of osteoporosis doubled as age increased by 10 years, and 68.5% of women aged 70 years or older have osteoporosis.
- The incidence of osteoporotic fracture has gradually increased since 2008, but the incidence rate of osteoporotic fracture was stationary after 2013, with the rapid increase in the elderly population.
- The incidence of osteoporotic fracture was 2.3 to 3.7 times higher in women than in men at all sites, with a decreasing trend in the 70s age group and a steadily increasing trend in the 80s age group.
- Wrist fracture mainly occurred in the 50s age group, and the incidence rates of hip and vertebral fractures increased with age.
- The mortality rates after hip and vertebral fractures in the first 12 months were 1.5 and 2.2 times higher in men than in women.
- The incidence rate of secondary fracture after an osteoporotic fracture was similar annually during 4 years’ follow-up, with most cases occurring in the spine.
- The health service utilization rate in the patients with osteoporosis was approximately 60%, which rapidly decreased in women at ages 70 years and older but steadily increased with age in men.
- The treatment rate for osteoporosis was only 34%. Only 41.9% of the patients with osteoporotic fracture took anti-osteoporosis medications in the first 12 months, and the treatment rate was highest in the patients with vertebral fracture.
- The treatment rate after osteoporotic fracture in the first 12 months was 2.3 times higher in women than in men and decreased after age 80 years in both men and women.
- The prescription of anti-osteoporosis medications steadily increased by 6% every year until 2016, but men showed similar numbers.
- Anti-osteoporosis medications were most frequently prescribed to both men and women in their 70s, followed by those in their 60s and 80s, and the prescription rate of intravenous medications increased.
- The persistence rate with anti-osteoporosis medications was only 45% at 6 months, 33% at 1 year, and 22% at 2 years after initiation of therapy.
## FACT SHEET TASK FORCE TEAM

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Affiliation</th>
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</thead>
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<tr>
<td>Director</td>
<td>Ha Young Kim</td>
<td>Wonkwang University</td>
</tr>
<tr>
<td></td>
<td>Young-Kyun Lee</td>
<td>Seoul National University</td>
</tr>
<tr>
<td>Secretary</td>
<td>Sang-Min Park</td>
<td>Seoul National University</td>
</tr>
<tr>
<td></td>
<td>Seong Hee Ahn</td>
<td>Inha University</td>
</tr>
<tr>
<td>Member</td>
<td>Se Hwa Kim</td>
<td>Catholic Kwandong University</td>
</tr>
<tr>
<td></td>
<td>Tae-Young Kim</td>
<td>Konkuk University</td>
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<td>Jae-Hwi Nho</td>
<td>Soonchunhyang University</td>
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<tr>
<td></td>
<td>So Young Park</td>
<td>Kyung Hee University</td>
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<tr>
<td></td>
<td>Jun-II Yoo</td>
<td>Gyeongsang National University</td>
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<td>Sunmee Jang</td>
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<td>Hyung Suk Jung</td>
<td>Chung-Ang University</td>
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<td></td>
<td>Yong-Chan Ha</td>
<td>Chung-Ang University</td>
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National Health Insurance Service joint research