evaluated this association, they have performed mostly in a general population with limitation of between-study heterogeneity. Statin may not be equally effective for bone metabolism to every patient, but it can give some benefits for some patients especially with metabolic syndrome (MetS). However, no recent study assessing this relationship, to best our knowledge, has evaluated specifically on patients with MetS. It is also unclear whether the association between statin and osteoporotic fracture differ by statin intensity, dose (cumulative defined daily dose), and duration. This study aimed to investigate the association of statin use with the risk of major osteoporotic fracture in MetS patients from a population-based cohort (NHIS-HEALS, 2002–2015). A nested case-control study was performed in patients with MetS (≥50 years) who had no history of previous osteoporotic fracture. This study included 17,041 cases diagnosed as new-onset osteoporotic fractures and controls matched in a 1:1 ratio by age, sex, body mass index, cohort entry date, and follow-up duration. Conditional logistic regression analysis was used to evaluate covariate-adjusted odds ratio (OR) and 95% confidence interval (CI). During the 4-year follow up period, statin users had a significantly lower risk of major osteoporotic fractures by 9% (OR, 0.91; 95% CI, 0.85 to 0.97) compared with non-users. Among subtypes of major osteoporotic fracture, a risk reduction of vertebral fracture was significant (OR, 0.86; 95% CI, 0.79 to 0.94), but not non-vertebral fracture (OR, 0.97; 95% CI, 0.88 to 1.06) with statin use. Longer duration (OR, 0.97 per 1 year) and cumulative dose (OR, 0.97 per 365 defined daily dose) of statin was negatively associated with the risk of major osteoporotic fracture. There was no difference in risk of major osteoporotic fractures among groups according to statin intensity. In conclusion, this study supports the hypothesis that statin treatment has a beneficial effect on major osteoporotic fracture, especially for vertebral fracture, in patients with MetS with a possibly dose-effect relationship.

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FRACTURE PREVENTION AND TREATMENT

Ethnicity, Ethnic Language, and Fracture Risk Conditions in Women Initiating Osteoporosis Therapy

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Introduction: The ethnic diversity of women with osteoporosis has increased, but data on acculturation and health remain limited. Having a primary language (PL) other than English may reflect acculturation level and/or immigration as an adult. We used electronic health record (EHR) data from a large US health plan to examine the association of baseline clinical risk conditions and PL among US Chinese and US Hispanic women who initiated osteoporosis therapy. **Methods:** We identified women age 65-74y who initiated osteoporosis therapy in 2002–2014, excluding those with skeletal disorders, advanced kidney disease and metastatic cancer. PL was ascertained from the EHR. The study included 1676 Chinese women with English-PL (50%) vs Chinese-PL (50%); 3453 Hispanic women with English-PL (72%) vs Spanish-PL (28%); and 20,289 non-Hispanic White (White) women with English-PL. Clinical conditions assessed included: current smoking; BMI <19 kg/m2; Charlson-Deyo Comorbidity Index (CCI); diabetes (DM) based on diagnosis with treatment; rheumatoid arthritis (RA) based on 2 diagnoses; and fracture diagnosis in the prior 5 years. Language subgroups (* denotes significant difference by PL, p<.05) and ethnic groups (all ethnic differences cited are significant at p<.05) were compared using chi-square tests. **Results:** Mean age was (69±3y) for Chinese, Hispanics, Whites, and PL subgroups. Prior fracture was lower in Chinese (12.8%) and Hispanics (25.6%) vs Whites (29.7%), with Chinese lower than Hispanics. Smoking was lower in Chinese (1.6%) and Hispanics (6.7%) vs Whites (11.3%). CCI score ≥3 was lower in Chinese (5.2%) and higher in Hispanics (13.0%) vs Whites (10.4%). RA was low overall and lowest in Chinese, especially Chinese-PL. More Chinese (4.2%) and fewer Hispanics (0.8%) had a BMI <19 vs Whites (2.2%). DM was higher in Hispanics (14.8%) and Chinese (8.2%) compared to Whites (5.7%). Significant and non-significant differences by PL were observed for current smoking (0.8%* vs 2.4% for Chinese-PL vs English-PL; 4.0% vs 7.8% for Spanish-PL vs English-PL), prior fracture (11.4%* vs 14.2% for Chinese-PL vs English-PL; 24.3% vs 26.1% for Spanish-PL vs English-PL) and DM (10.5%* vs 5.8% for Chinese-PL vs English-PL; 24.3% vs 26.1% for Spanish-PL vs English-PL) in Chinese and Hispanic women. **Conclusion:** Among older women initiating osteoporosis therapy, US Chinese women have lower comorbidity but a higher DM prevalence compared to white women, especially those with Chinese-PL. Hispanic women have higher comorbidity and higher DM prevalence than White women, with no differences by PL. Variation in prior fracture, low BMI, RA, and smoking were also seen. These findings highlight ethnic differences in women receiving osteoporosis care, including differences by primary language in Chinese women. Future studies should examine fracture risk factors and outcomes in US immigrant populations, especially Asians.

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Factors Associated With Inadequate Response to Bisphosphonate Therapy in Patients With Osteoporosis in Real-Life Clinical Practice: a Single-Center Retrospective Analysis of 300 Patients

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Introduction: Bone mineral density (BMD) measurement by dual X-ray absorptiometry (DXA) is a useful tool to monitor response to osteoporosis treatment in clinical practice. Despite bisphosphonates therapy, some patients

may exhibit bone loss during treatment for different reasons. These patients may have greater fracture risk than responders and may have unrecognized secondary causes that require further attention and treatment. **Objectives:** To identify factors associated with inadequate response (IR) to bisphosphonates therapy in patients with osteoporosis in real-life clinical practice. **Methods:** This is a single-center case-control study of patients with osteoporosis treated with bisphosphonates as recommended. Baseline and follow-up (12–24 months/apart) DXA scans were performed on same device (GE-Lunar Prodigy). IR was defined as loss of BMD greater than the least significant change (LSC) on the follow-up DXA. Clinical, biochemical and densitometric parameters of patients with IR were compared to responders using t-test or Mann-Whitney test (continuous), or chi-square test (categorical variables), as appropriated. We used logistic regression to assess the association magnitude between exposures and IR. **Results:** From 300 patients included from 2014 to 2018 (13% males, mean age 68 ±10 years), 198(66%) were treated with oral bisphosphonates and 102(34%) with zoledronic acid (ZA). IR was observed in 44(15%) patients. All parameters were similar at baseline, except for greater prevalence of oral bisphosphonates (82% *vs* 63%, p=0.016) and anticonvulsants use (18% *vs* 7%, p=0.015) in patients with IR compared to responders. Additionally, patients with IR exhibited a lower % change in CTX following therapy in comparison to responders (median -37% [IQR -68; -16%] *vs* -57% [-74; -32], p=0.029, respectively), and higher serum CTX levels after treatment (median 236pg/mL [IQR 162; 344] *vs* 165pg/mL [119; 254], p=0.004). The likelihood of IR was greater with oral bisphosphonates then with ZA (OR 2.61, IC95% 1.16–5.81, p=0.002), and with anticonvulsants use (OR 2.94. IC95% 1.19–7.25, p=0.019). The association with IR persisted for both variables (p≤0.01), when accounted simultaneously in the same model, along with age and gender. **Conclusion:** Inadequate bisphosphonate response was present in 15% of individuals, which was independently associated with anticonvulsant use and particularly among those on oral bisphosphonate therapy rather than ZA. This knowledge may help to clinically identify potential modifiable factors related to unresponsiveness and to optimize treatment accordingly.

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Fall Patterns Are Independent Risk Factors for Mortality After Hip Fracture in Older Adults

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Hip fracture is becoming a major health problem with high mortality and morbidity in older adults. However, whether specific fall patterns could act as independent risk factors for predicting mortality after hip fracture remains unknown. We aimed to investigate whether fall patterns can serve as an independent risk factor for mortality after hip fracture. Electronic medical records (EMR) of individuals who visited emergency room or admitted to the Severance hospital, Seoul, Korea, between January 2005 to December 2019 were reviewed to categorize fall patterns. Fall patterns were categorized upon review of explanatory description in EMR, using modified classification based on motion analysis of video-captured falls in a prior study. Among 1,991 study subjects (mean age 77 years, 71% women), 211 patients died (10.6%; median survival 296 days). Fall location was divided into home (67.4%) and outdoor (32.6%) with mortality rate of 11.9% and 8.0% (p=0.009), respectively. Fall patterns were specified by "cause of fall" (6 categories; slip [29.6%], trip or stumble [17.5%], etc.) and by "activity at time of fall" (6 categories; walking [54.8%], getting up or rising [14.1%], etc). Among the combinations of both causes and activities, individuals who sustained hip fracture during "incorrect weight shift while sitting down or lowering"(hazard ratio [HR] 3.35, p=0.003), "collapsed during unclassified activity"(HR 2.37, p=0.006), "incorrect weight shift while getting up or rising"(HR 2.13, p=0.003), and "slipped while walking"(HR 1.83, p=0.004) had increased mortality after hip fracture compared to those with outdoor falls, after adjustment for age, sex, and Charlson comorbidity index. Specific fall patterns in individuals who sustained hip fracture predicted excess mortality in older adults, independent of age, sex, and comorbidities. Acknowledgement: We thank Doori Cho of the the SENTINEL (Severance ENdocrinology daTa scIeNcE pLatform) team (4-2018-1215) for the data acquisition process. Conflict of Interest: SB, NH, and YR have nothing to declare.

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Fracture Rates in Men With Non-Metastatic Prostate Cancer on Androgen Deprivation Therapy With or Without Anti-Osteoporosis Treatment

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Introduction: Androgen deprivation therapy (ADT) decreases bone mineral density and increases osteoporotic fracture (OsteoFx) risk. **Hypothesis:** To assess OsteoFx incidence most predictive of future OsteoFx among men with prostate cancer on ADT. **Methods:** 4370 electronic medical records were reviewed of adult men with prostate cancer on cancer therapy +/- anti-osteoporotic therapy (Anti-OsteoRx) from 2011–2019. Cancer therapy included ADT (anti-androgens, GnRH agonists & antagonists, orchiectomy) and supplemental cancer therapy (SupplRx) (prostatectomy, brachytherapy, radiation, immunotherapy, and chemotherapy). Anti-OsteoRx included bisphosphonates, denosumab, and parathyroid hormone analogs. Patients with other cancers within 5 years of initial visit, metastasis or traumatic fractures were excluded. Retrospective analysis was done to determine baseline characteristics, type and duration of ADT, Anti-OsteoRx, SupplRx, and OsteoFx incidence. **Results:** Fracture rate subgroups: • ADT only - Anti-OsteoRx 37/ 374 fractured (9.89%) • ADT only + Anti-OsteoRx 10/52 fractured (19.23%) • ADT + SupplRx +