International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

# Fragility Fractures in the Elderly: Patterns and Prevalence in a Tertiary Medical Center in 2017-2021

**Gibby R. Urbano, MD [1], Dr. Lucille Detoyato, MD[2], Dr. Karla Araneta, MD[3]**

[1]M.D., Principal Investigator

[2]MD

[3]MD, Adviser

**Abstract:** ***This study investigates the prevalence and patterns of fragility fractures among elderly patients aged 65 and above at a tertiary medical center in Western Visayas, Philippines, from 2017 to 2021. Employing a cross-sectional analytical design, the research analyzes 363 cases to determine fracture distribution by age, sex, and level of activity. Findings reveal a declining trend in fracture incidence, with proximal femur fractures being the most common across all age groups. Females showed higher susceptibility, and community ambulators were more frequently affected. The study highlights the need for early screening and preventive strategies targeting osteopenia and osteoporosis to mitigate future fracture risks in aging populations.***

**Keywords:** Fragility fractures, elderly, osteoporosis, prevalence, risk factors

## 1. Introduction

### Background of the Study

In the developed and developing countries the incidence of osteoporosis is increasing at a rate faster than would be predicted simply by increasing longevity of the population putting more patients at risk for fractures. According to N. Li et al Osteoporotic fractures are associated with increased subsequent fracture risk, morbidity, and excess mortality, placing a large medical and economic burden on healthcare systems.

Furthermore, Fracture Liason Services and multidisciplinary care is evolving globally because of increasing incidence of fractures. According to Patricia Meja Osuna et al a well recognized gap exist between evidence-based recommendations for post fracture care and actual clinical practice, demonstrated by the high percentage of fragility fracture patients who are neither diagnosed nor treated for osteoporosis. Efforts have been made to review FLS models and evaluate national and international experiences in secondary fracture prevention.

However, locally we still lack the data to establish systematic management of prevention of fragility fractures. This scarcity of data may lead us to inadequate clinical management and may be attributed to represent missed opportunities to actively manage and prevent fragility fractures.

### Significance of the Study

The studies regarding fractures in the elderly were done mostly in developed countries. To further our knowledge in management of these cases in our country, learning the factors contributing in geriatric fractures by determining variables and risk factors involved in these cases. It is important to collect these data to better our understanding and improve our care of elderly patients. The knowledge on fracture incidence related to age, sex, gender and socioeconomic structure are explored in the study. This study is a rare epidemiologic study in incidence of geriatric fractures from 2017-2021 in Western Visayas Medical Center Iloilo. This study fills a regional data gap by offering localized epidemiological insights into fragility fractures among the elderly, informing better preventive and clinical interventions.

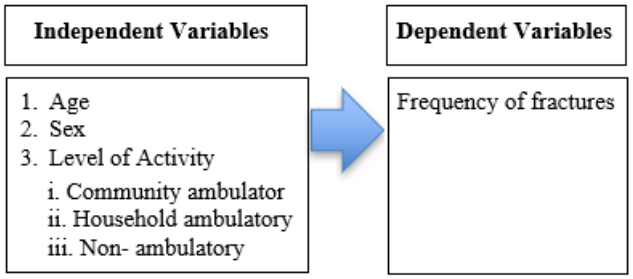
### General Objective

To determine demographic profile and prevalence of fractures in the elderly in Western Visayas Medical Center Iloilo (WVMC Iloilo) from 2017-2021

Specific Objectives

1) Demographic Profile
   a) Age
   b) Sex
   c) Level of activity
      - Community Ambulator
      - Household Ambulator
      - Nonambulator
2) To determine the prevalence of fractures in the elderly- this is a main objective but throughout your paper you did not state prevalence of fractures in the elderly. Remember prevalence is an equation
3) Determine between variables- state specifically what variables are you associating together. You should be correlating fracture frequency with age, sex, level of activity. However, you do not have the tables to show this in your results. You only looked at age and fracture frequency. Your results are not aligning with your 3rd objective.

## 2. Conceptual Framework




| Age | Sex | Level of Activity |
|---|---|---|
| 65-75<br>76-85<br>86-95<br>96-100 | Male/Female | Community ambulator<br>Household ambulator<br>Nonambulatory |

| Fracture | N | 65-75 | 76-85 | 86-95 | 96->100 |
|---|---|---|---|---|---|
| Spine | | | | | |
| Clavicle | | | | | |
| Scapula | | | | | |
| Proximal Humerus | | | | | |
| Humeral diaphysis | | | | | |
| Distal Humerus | | | | | |
| Proximal Forearm | | | | | |
| Middle forearm | | | | | |
| Distal radius | | | | | |
| Carpus | | | | | |
| Metacarpal | | | | | |
| Hand Phalanx | | | | | |
| Pelvis | | | | | |
| Proximal Femur | | | | | |
| Femoral diaphysis | | | | | |
| Distal Femur | | | | | |
| Patella | | | | | |
| Proximal tibia | | | | | |
| Tibial diaphysis | | | | | |
| Distal Tibia | | | | | |
| Ankle | | | | | |
| Calcaneus | | | | | |
| Midfoot | | | | | |
| Metatarsals | | | | | |
| Toe Phalanx | | | | | |

## 3. Review of Related Literature

According to a study by TJ Robinson Moncatar et al, injury among older adults is a serious health concern, but little information is known about it, particularly in developing countries. Using a pooled data of 21,316 community-dwelling residents aged 60 years or over from three waves of the Philippine National Demographic and Health Survey, multivariate logistic regression analyses were performed to assess the relationship between participants' characteristics and reports of injuries. The total prevalence of self-reported injuries over a 10-year period was at 1.2%. Older adults with either government or private health insurance were more likely to report experiencing injuries (adjusted odds ratio (AOR) 1.55, 95% confidence interval (CI), 1.14–2.11), regardless of socio-demographic and economic status. In contrast, female older adults were found to be associated with a lower likelihood of self-reported injuries, after adjustment for other variables (AOR 0.69, 95% CI 0.53–0.88). Older adults who attained secondary education or higher also showed a lower likelihood of self-reported injuries (AOR 0.53, 95% CI 0.31–0.92)

**Table 1.** Descriptive statistics according to self-reported injury among older adults in the Philippines, 2008–2017.

| Characteristics | Self-Reported Injury [a] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Pooled ($n$ = 21316) | | 2008 ($n$ = 4380) | | 2013 ($n$ = 5567) | | 2017 ($n$ = 11369) | |
| | Yes ($n$) | % | Yes ($n$) | % | Yes ($n$) | % | Yes ($n$) | % |
| **Prevalence** | 266 | 1.2 | 46 | 1.0 | 58 | 1.0 | 162 | 1.4 |
| **Socioeconomic and Demographic Characteristics** | | | | | | | | |
| **Age (yrs)** | | | | | | | | |
| 60–69 | 154 | 1.1 | 27 | 1.0 | 31 | 0.8 | 96 | 1.4 |
| 70–79 | 88 | 1.5 | 13 | 1.0 | 21 | 1.3 | 54 | 1.8 |
| 80+ | 24 | 1.0 | 6 | 1.4 | 6 | 1.2 | 12 | 0.8 |
| $p$ Value | | 0.074 | | 0.614 | | 0.283 | | 0.041 |
| **Gender** | | | | | | | | |
| Male | 142 | 1.5 | 19 | 1.0 | 26 | 0.9 | 97 | 2.0 |
| Female | 124 | 1.0 | 27 | 1.1 | 32 | 1.0 | 65 | 1.0 |
| $p$ Value | | 0.002 | | 0.868 | | 0.720 | | <0.001 |
| **Living Arrangements** | | | | | | | | |
| Living with Others | 246 | 1.2 | 43 | 1.0 | 55 | 1.0 | 148 | 1.4 |
| Living Alone | 20 | 1.2 | 3 | 1.2 | 3 | 1.1 | 14 | 1.3 |
| $p$ Value | | 0.995 | | 0.733 | | 0.844 | | 0.670 |
| **Place of Residence** | | | | | | | | |
| Urban | 80 | 1.0 | 21 | 1.0 | 16 | 0.7 | 43 | 1.1 |
| Rural | 186 | 1.4 | 25 | 1.0 | 42 | 1.2 | 19 | 1.7 |
| $p$ Value | | 0.008 | | 0.944 | | 0.068 | | 0.016 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Island Group of Residence** | | | | | | | | |
| Luzon | 136 | 1.2 | 20 | 0.9 | 28 | 0.8 | 88 | 1.5 |
| Visayas | 71 | 1.5 | 12 | 1.2 | 14 | 1.3 | 45 | 1.7 |
| Mindanao | 59 | 1.1 | 14 | 1.2 | 16 | 1.2 | 29 | 1.0 |
| *p* Value | | 0.228 | | 0.529 | | 0.339 | | 0.164 |
| **Highest Educational Attainment** | | | | | | | | |
| No Education, Preschool | 18 | 1.9 | 6 | 1.5 | 6 | 2.0 | 6 | 2.1 |
| Primary | 146 | 1.3 | 25 | 1.0 | 32 | 1.0 | 89 | 1.6 |
| Secondary or Higher | 102 | 1.0 | 15 | 1.0 | 20 | 0.8 | 67 | 1.2 |
| *p* Value | | 0.038 | | 0.656 | | 0.127 | | 0.091 |
| **Economic Status** | | | | | | | | |
| Poor | 116 | 1.4 | 25 | 1.4 | 26 | 1.2 | 65 | 1.4 |
| Middle | 63 | 1.7 | 9 | 1.1 | 12 | 1.1 | 42 | 2.3 |
| Rich | 87 | 0.9 | 12 | 0.7 | 20 | 0.8 | 55 | 1.1 |
| *p* Value | | <0.001 | | 0.144 | | 0.333 | | <0.001 |
| **Health Characteristics** | | | | | | | | |
| **Presence of Health Insurance** | | | | | | | | |
| No | 61 | 1.0 | 21 | 0.8 | 25 | 1.2 | 15 | 0.8 |
| Yes | 205 | 1.3 | 25 | 1.3 | 33 | 0.9 | 147 | 1.5 |
| *p* Value | | 0.033 | | 0.137 | | 0.273 | | 0.061 |
| **Self-Reported NCDs [b]** | | | | | | | | |
| No | 245 | 1.2 | 46 | 1.1 | 51 | 0.9 | 148 | 1.4 |
| Yes | 21 | 1.2 | 0 | 0.0 | 7 | 1.2 | 14 | 1.5 |
| *p* Value | | 0.831 | | 0.079 | | 0.514 | | 0.909 |

*p* values refer to differences between groups; numbers are unweighted; percentages are weighted; [a] injury includes wounds, burns, or fractures; [b]non-communicable disease (NCDs) includes diabetes mellitus, cancer (all forms), or hypertension.

Another study by Dr. Ai – Min Wu identified bone fractures as a global public issue. Using the framework of the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2019, numbers and age-standardised rates of global incidence, prevalence, and years lived with disability (YLDs) of fractures across the 21 GBD regions and 204 countries and territories, by age, sex, and year, from 1990 to 2019 were compared. Globally, in 2019, there were 178 million (95% UI 162–196) new fractures (an increase of 33·4% [30·1–37·0] since 1990), 455 million (428–484) prevalent cases of acute or long-term symptoms of a fracture (an increase of 70·1% [67·5–72·5] since 1990), and 25·8 million (17·8–35·8) YLDs (an increase of 65·3% [62·4–68·0] since 1990). The age-standardised rates of fractures in 2019 were 2296·2 incident cases (2091·1–2529·5) per 100 000 population (a decrease of 9·6% [8·1–11·1] since 1990), 5614·3 prevalent cases (5286·1–5977·5) per 100000 population (a decrease of 6·7% [5·7–7·6] since 1990), and 319·0 YLDs (220·1–442·5) per 100000 population (a decrease of 8·4% [7·2–9·5] since 1990). Lower leg fractures of the patella, tibia or fibula, or ankle were the most common and burdensome fracture in 2019, with an age-standardised incidence rate of 419·9 cases (345·8–512·0) per 100 000 population and an age-standardised rate of YLDs of 190·4 (125·0–276·9) per 100 000 population. In 2019, age-specific rates of fracture incidence were highest in the oldest age groups, with, for instance, 15381·5 incident cases (11245·3–20651·9) per 100 000 population in those aged 95 years and older. The global age-standardised rates of incidence, prevalence, and YLDs for fractures decreased slightly from 1990 to 2019, but the absolute counts increased substantially. Thus, the study concluded that older people have a particularly high risk of fractures, and more widespread injury-prevention efforts and access to screening and treatment of osteoporosis for older individuals should help to reduce the overall burden.

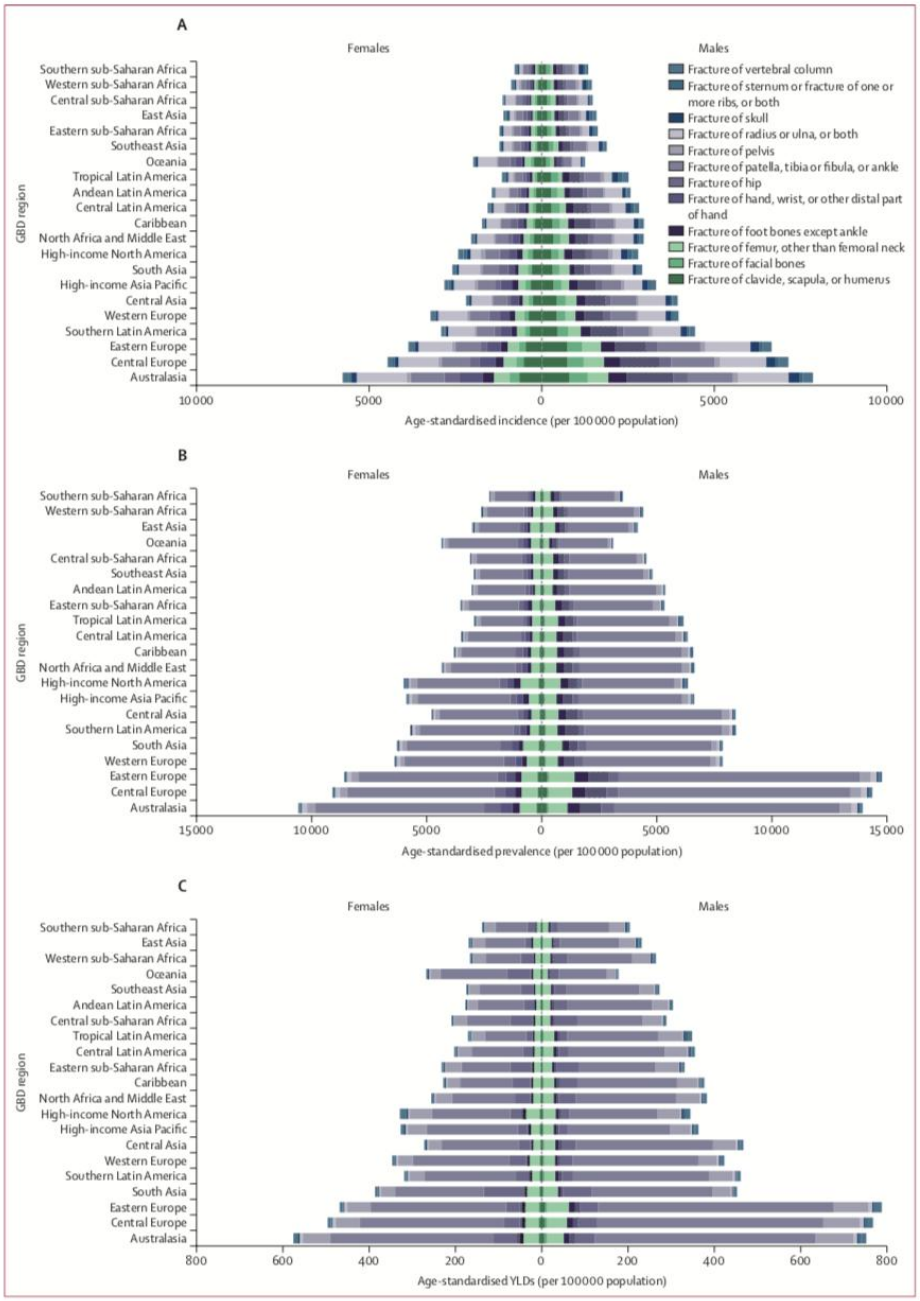



***Figure 2:*** **Age-standardised incidence (A), prevalence (B), and YLDs (C) of fractures for each anatomical site, by GBD region and sex, 2019**
Regions in each panel are listed from lowest (top) to highest (bottom) age-standardised rate for both sexes combined. GBD=Global Burden of Diseases, Injuries, and Risk Factors Study. YLDs=years lived with disability.

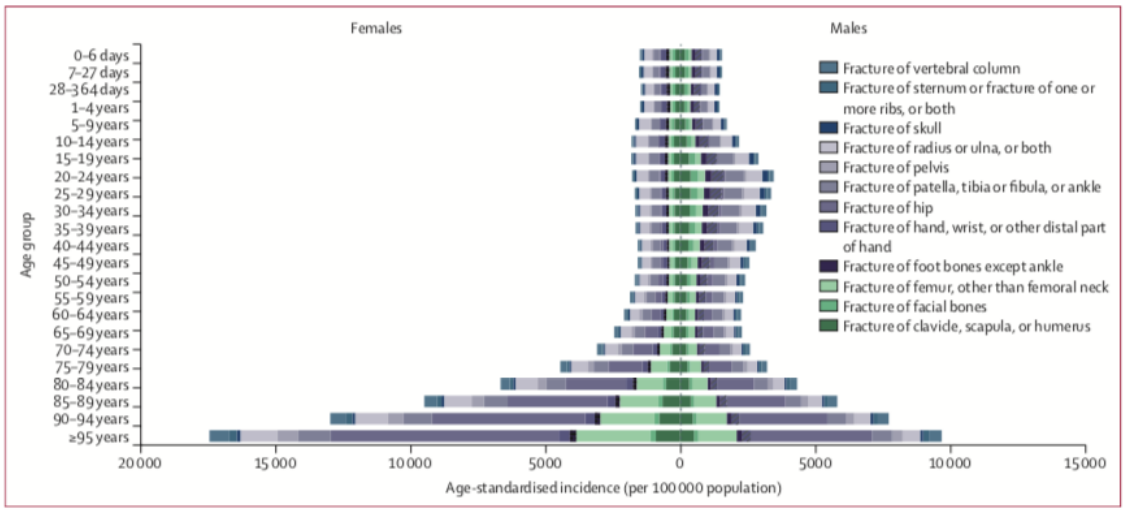



*Figure 3*: Age-specific incidence rate of fractures for each anatomical site globally, by age group and sex, 2019

**Fractures relating to Age**

A study by Lauren T. Southerland, MD et al stated that older adults 65 years and older have both increased rate of trauma and increased predisposition to injury from minimal force. Older adults are high-risk population for traumatic fracture from high – or low-impact mechanisms. Low impact fractures have higher mortality rate than high impact fractures in older adults. Older patients with injuries from fall from standing height have five times the mortality that their same age colleagues have in injuries from Motor vehicle collisions (MVCs). The most common fractures in older adults are vertebral fracture from compression trauma, followed by hip and distal radius fractures.

**Table 2:** Incidence of Fractures in Older Adult Men and Women30,53,54,70,73,83,99-101

| Fracture | Incidence (per 10,000 patient years) | |
|---|---|---|
| | Women | Men |
| Lower vertebral- clinical and incidental‡ | 680 | 700 |
| Hip‡ | 50-76 | 33-36 |
| C-spine** | 18-85 | 18-85 |
| Non hip, non vertebral, low trauma‡ | 154 | 78 |
| Distal Radius† | 75 | 19 |
| Ankle* | 58 | 24 |
| Proximal Humerus†† | 42 | 15 |
| Rib | 40© | 35* |
| Overall | 2 million /year | |

‡ Incidence in ages ≥ 60, low energy trauma fractures only
** Incidence from Norway increases from 18/10,000 in 60-75 year olds up

**Fractures relating to gender**

In December 2020, a study published by Camila Bergh et al from The Swedish Fracture Register where they collected data prospectively on fractures at the time of care seeking. Age, gender and fracture locations (according to AO/OTA classification) were used for the analyses and presentation of fracture incidences. They concluded that at older ages 60-70 years of age the fracture incidence pattern is similar for men and women, but the slope of the curve increases occurs earlier in women. This means that women have a higher incidence than men at older ages. They noted that Proximal femoral fractures ranks highest in incidence in men and women at 92% at age >65 and 77.2% at age >75. For gender specific incidence rate in males, proximal femoral fractures occurs 87.1% at age >65 and 67.9% at age >75. In females, proximal femoral fractures occurs 95% at age >65 and 82% at age>75.

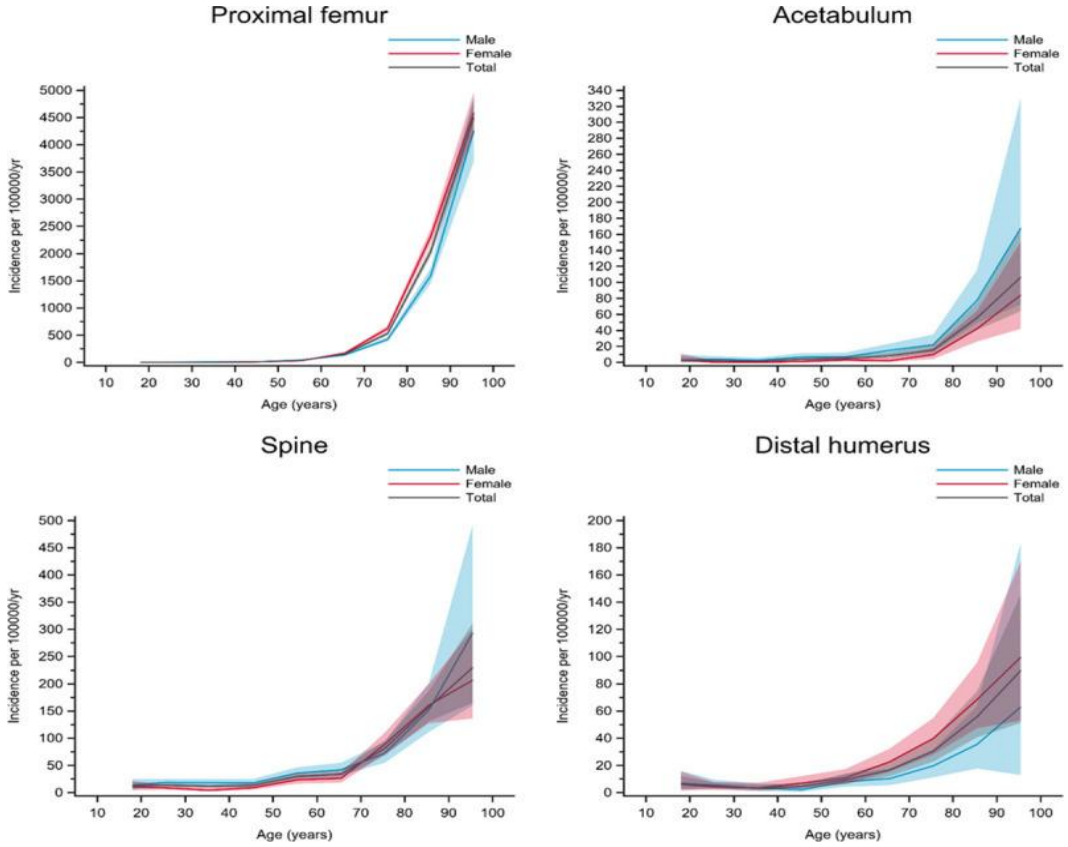



**Figure 2**

**Fractures in Group A**

Age- and gender-specific incidence with 95% confidence interval. Black line represents the total population; red line represents females and blue line represents males.

## 4. Methodology

**Study Design**
An analytical cross-sectional study was utilized.

**Study Setting**
The study was conducted at Western Visayas Medical Center Iloilo a tertiary level training general hospital with a capacity of 750 beds.

**Study Period**
This study is conducted from January 2017 to December 2021.

**Study Population**
All elderly patients admitted January 2017 to December 2021 with Fractures

Inclusion criteria: Elderly patient >65 years old male or female with fragility fractures

Exclusion criteria:
1) Patients <65 years old
2) All cases with pathologic fractures of the spine or extremities
3) High energy trauma patients

**Technical Definition of Terms**
- Elderly patient – any patient >65 years old male or female
- Fragility fractures – fractures that result from low energy/low level trauma
- Community ambulator – walking speed ≥0.80 m/s, independent in all home and moderate community activities; can accept uneven terrain and can negotiate a crowder area with superfision only
- Household ambulator – walking speed <0.40 m/s, ranges from requiring wheelchair for bathoroom and bedroom mobility to being able to use walking for all household activities but encounters difficulty with stairs and uneven terrain, needs supervision for both entering/exiting the house and managing curbs
- Nonambulatory – patients not able to walk about
- Low energy fractures – occurs from falls from standing height or of lesser mechanisms
- High energy fractures – occurs from falls from height, motor vehicle collisions and sporting injuries

**Data Collection**
Permission from the records section of the institution will be secured and once approved by Medical Center Chief and Head of records data collection will commence. The data will include the demographic profile specifically age, sex, and level of activity.

The data will be gathered and treated with strict confidentiality. To preserve the anonymity of the patients, the names will not be included in the data collection and a control number will be assigned for each record. The electronic copy of the data will be disposed two weeks after the research

defense. Furthermore, an exclusive room will be used by the researcher to ensure privacy.

**Data Processing and Analysis**

Descriptive analysis will be used to demonstrate the demographic profile of the fractures in the elderly in WVMC Iloilo. Frequency count and percentage will be utilized for all categorical variables. The researcher will compute for Pearson's Chi-square to determine what fractures is significantly associated with the elderly. The prevalence of fragility fractures of the elderly admitted in WVMC Iloilo was calculated by taking the number of cases per year of the study over the number of total cases admitted.

**Ethical Considerations**

The researcher will secure permission and approval from the institutional ethical review board at WVMC Iloilo. Data privacy will be strictly observed throughout the conduct of the study and accessed only by the researcher and adviser. The results of the study may be published or presented in appropriate educational fora but utmost confidentiality of patients' data will be ensured at all times such that no patient will be identified or singled out.

## 5. Results

Initially 387 patients were logged for fractures occurring in elderly patients. However, 24 patients were with injuries due to high energy trauma and were excluded. This left us with 363 patients for analysis in the study.

Shannon Diversity Index was used to provide important information about rarity and commonness of fracture in each age category in elderly in Western Visayas Medical Center Iloilo in 2017-2021 (*see Table 1)*. Chi square was used to test the prevalence of fracture types across different age categories *(see Table 2)*.

The diversity (2.467834) and evenness (0.903341) in 65-75 years old patients were much higher than other age groups *(see Table 1)*. Hence, most of the fracture types were present in 65-75 years old patients. However, two (2) out of five (5) patients in 65-75 years old group had *Proximal Femur (61, 37.9%).* In addition, *Proximal Femur* was the most common in all age categories. Furthermore, more than half of elderly had *Proximal Femur (206, 56.7%).* While, the proportion of the rest of the fracture types had only at most 5.2% (19), each, of the total fracture incidence. In 76-85 years old elderly, there were only 21 fewer number of fractures but eight (8) less fracture types compared to 65-75 years old. Lastly, there were no records of *Scapula, Calcaneus* and *Midfoot* fractures in all age categories. *See Table 2*

The test of proportion of *Fracture Types* across *Age Categories* was significant (*p=0.000).* There was a significant difference in the proportion of fracture types across age categories. Proportion of 86-95 years old patients with *Proximal Femur (41, 87.2%)* was significantly higher compared to other age groups. The age group with lowest proportion of *Proximal Femur* was 65-75 years old *(61, 37.9%). See Table 2*

The total number of fracture incidence was decreasing from year 2017 to 2021 (*see Fig.1).* Also, the total number of fracture incidence was decreasing from 65-75 years old age group to 96-100 years old age group (*see Fig.2).*

**Table 1:** Shannon Diversity Index

| Age | n (%) | H | E (H) |
|---|---|---|---|
| 65-75 yo | 161(44.4) | 2.467834 | 0.903341 |
| 76-85 yo | 145(39.9) | 1.520449 | 0.419005 |
| 86-95 yo | 47(12.9) | 1.387734 | 0.327672 |
| 96-100 yo | 10(2.8) | 1.37973 | 0.321888 |

**Table 2:** Proportion of Fracture Age Categories, *n (%)*

| Fracture | Age Category | | | | Total | Sig. |
|---|---|---|---|---|---|---|
| | 65-75 | 76-85 | 86-95 | 96->100 | | |
| Proximal Femur | 61(37.9) | 97(66.9) | 41(87.2) | 7(70) | **206(56.7)** | |
| Distal Femur | 11(6.8) | 6(4.1) | 1(2.1) | 1(10) | **19(5.2)** | |
| Femoral diaphysis | 11(6.8) | 5(3.4) | 1(2.1) | - | **17(4.7)** | |
| Distal Tibia | 14(8.7) | 3(2.1) | - | - | **17(4.7)** | |
| Tibial diaphysis | 5(3.1) | 7(4.8) | - | - | **12(3.3)** | |
| Spine | 3(1.9) | 7(4.8) | 1(2.1) | - | **11(3.0)** | |
| Distal radius | 4(2.5) | 3(2.1) | 1(2.1) | 2(20) | **10(2.8)** | |
| Hand Phalanx | 10(6.2) | - | - | - | **10(2.8)** | |
| Proximal tibia | 6(3.7) | 3(2.1) | - | - | **9(2.5)** | |
| Middle forearm | 7(4.3) | - | - | - | **7(1.9)** | |
| Metacarpal | 3(1.9) | 4(2.8) | - | - | **7(1.9)** | |
| Metatarsals | 4(2.5) | 2(1.4) | - | - | **6(1.7)** | **0.000** |
| Pelvis | 5(3.1) | - | - | - | **5(1.4)** | |
| Patella | 5(3.1) | - | - | - | **5(1.4)** | |
| Ankle | 1(0.6) | 4(2.8) | - | - | **5(1.4)** | |
| Humeral diaphysis | 2(1.2) | 1(0.7) | 1(2.1) | - | **4(1.1)** | |
| Proximal Humerus | 1(0.6) | 2(1.4) | - | - | **3(0.8)** | |
| Proximal Forearm | 3(1.9) | - | - | - | **3(0.8)** | |
| Toe Phalanx | 2(1.2) | 1(0.7) | - | - | **3(0.8)** | |
| Distal Humerus | 2(1.2) | - | - | - | **2(0.6)** | |
| Clavicle | 1(0.6) | - | - | - | **1(0.3)** | |
| Carpus | - | - | 1(2.1) | - | **1(0.3)** | |
| Scapula | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Calcaneus | | | | | | |
| Midfoot | | | | | | |
| **Total** | **161(44.4)** | **145(39.9)** | **47(12.9)** | **10(2.8)** | **363(100)** | |

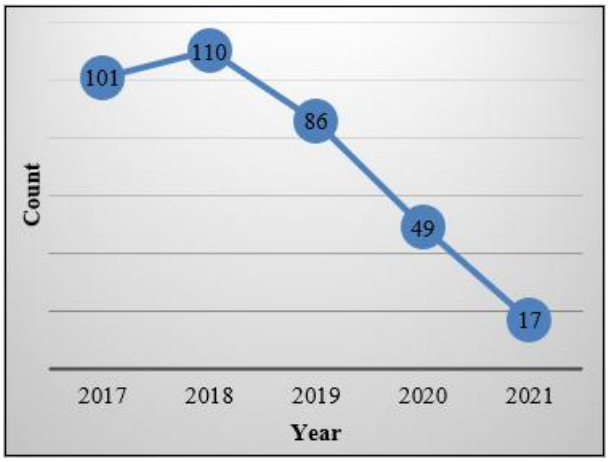



**Figure 1:** Frequency of Fractures by Year

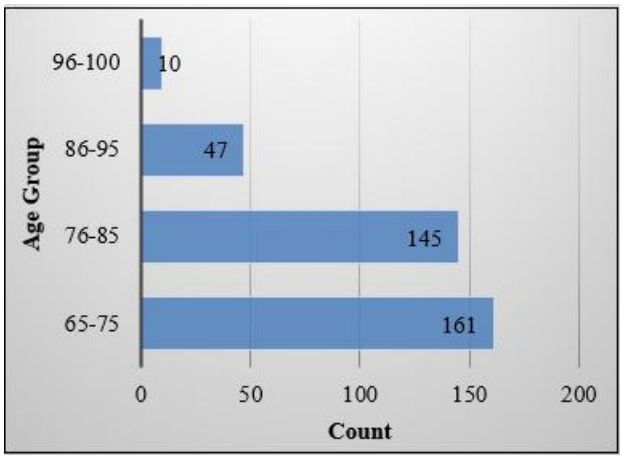



**Figure 2:** Frequency of Fractures by Age Group

The test of proportion of *Level of Activity* across *Age Categories* was significant (*p=0.000)*. There was a significant difference in the proportion of *Level of Activity* across age categories. The proportion of 65-75 years old patients with *Community Ambulator (123, 65%)* was significantly higher compared to other age groups. Hence, *Community Ambulator* was prevalent to 65-75 years old patients. Also, the proportion of 76-85 years old patients with *Household Ambulator (79, 46%)* was significantly higher compared to other age groups. Hence, *Household Ambulator* was prevalent to 76-85 years old patients. The difference in total proportion of patients with *Community Ambulator (191, 52.6%)* from total proportion of patients with *Household Ambulator (171, 47.1%)* was only 5.5%. Lastly, only one (1) patient had a *Non-Ambulator Level of Activity. See Table 3*

**Table 3:** Proportion of Level of Activity Age Categories, *n (%)*

| Level of Activity | Age Category | | | | Total | Sig. |
|---|---|---|---|---|---|---|
| | 65-75 | 76-85 | 86-95 | 96->100 | | |
| Community Ambulator | 123(65) | 66(35) | 2(1) | - | **191(52.6)** | 0 |
| Household Ambulator | 38(22) | 79(46) | 44(26) | 10(6) | **171(47.1)** | |
| Non-Ambulator | - | - | 1(100) | - | **1(0.3)** | |
| **Total** | **161(44)** | **145(40)** | **47(13)** | **10(3)** | **363(100)** | |

Table 4 shows the characteristics of Sex by year. Three (3) out five (5) patients were female. The number of female patients with fracture was higher compared to male patients from year 2017-2021 except year 2020.

**Table 4:** Characteristics of Sex by Year

| Sex | Year | | | | | Total |
|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020 | 2021 | |
| Male | 40(40) | 44(40) | 33(38) | 25(51) | 5(29) | 147(40) |
| Female | 61(60) | 66(60) | 53(62) | 24(49) | 12(71) | 216(60) |
| Total | 101(28) | 110(30) | 86(24) | 49(13) | 17(5) | 363(100) |

**Table 5:** Prevalence of acute Fragility fractures of the elderly admitted in Western Visayas Medical Center

| Year | n | N | Prevalence |
|---|---|---|---|
| 2017 | 101 | 1401 | 7.21 |
| 2018 | 110 | 1548 | 7.11 |
| 2019 | 86 | 1387 | 6.20 |
| 2020 | 49 | 1207 | 4.06 |
| 2021 | 17 | 1150 | 1.48 |
| Total | 363 | 6693 | 5.42 |

The table presents data on the prevalence of fragility fractures over the course of five years, from 2017 to 2021. The data is organized into four columns: Year, n (363), N (6693 population), and prevalence value. The table shows a consistent decline in prevalence over the five-year period. In 2017, the prevalence was at its highest, reaching 7.21%. However, by 2021, the prevalence had dropped significantly to 1.48%. This decline indicates potential decreases in the

number of admissions due to various COVID-19 protocols observed throughout the region. While the decline in prevalence is evident, further investigation is necessary to understand the underlying reasons and potential implications for the future

## 6. Discussion

This study provides a unique perspective on the prevalence of specific fractures in Western Visayas Medical Center Iloilo throughout a 5-year period.

We reported the demographic profile of elderly patients admitted for fractures from 2017-2021. There have been a total of 387 patients admitted for fractures with ages ranging from 65 – over 100 years old, 24 were excluded, which provided 363 total patients for the study.

In this 5 year study the prevalence of acute fragility fractures is 5.42%. During the prepandemic years the prevalence of acute fragility fractures was at its highest at 7.21% in 2017, and the following year in 2018 was the 2nd highest at 7.11% while at 2019 we see a slight decline at 6.2%, This partial decline in 2019 may be attributed to early COVID-19 lockdown protocols that reduced outdoor activities. which lessened the people's overall activities especially outside their homes. The lowest were 2020 at 4.06% and lastly 2021 where we noted only 1.48% prevalence only. The decline during these years were also noted in the total number of admissions for the 5 year study. This evident decline in prevalence warrants further investigation to understand its causes and future implications.

In a 2022 article by Wang et al Fragility fracture prevalence among elderly Chinese is no more than half of that of elderly Caucasians. They analyzed the Canadian Multicentre Osteoporosis Study (CaMos) data, in 2020 Morin *et al.* (24) compared the prevalence of low-trauma fractures between Chinese and Caucasian participants at the time of recruitment into the cohort, and 5-year incident fractures between the two groups. At baseline, the mean age was 63.2 (±8.7) and 67.0 (±7.1) years for Chinese (n=104) and Caucasian women (n=5,361); the mean age was 67.0 (±9.0) and 66.4 (±9.5) years for Chinese (n=74) and Caucasian men (n=2,044). Any low trauma fracture history was recorded in 7.7% of the Chinese women, while in 22.2% of the Caucasian women; and recorded in 6.8% of the Chinese men and 17.2% of the Caucasian men. For the 5-year incident fracture, 6.4% of Chinese women reported any incident fractures compared with 7.8% in Caucasian women; 3.0% of Chinese men reported any incident fractures compared with 4.1% any incident fractures in Caucasian men.

These findings are similar to that of the first years of the prepandemic study where we noted a prevalence average of 7.16%. In relation to sex, more females were also reported with acute fragility fractures.

According to a recent study published by Alan Bell et al Clinical and demographic characteristics of the index fracture cohort from 76 primary care centers, 778 patients (80.5% female) with a mean age of 72.2 years (range 44–105 years) were included in the full cohort. The most common index fractures occurred at the spine (21.5%, $n = 167$), radius (13.5%, $n = 105$), and hip (10.9%, $n = 85$). This is similar to the results in this study. The age group most affected by fragility fractures were patients ages 65-74. Spine is the most common location in their study whereas proximal femoral fractures ranked 3rd but was the most common fragility fracture in this study. However, females in the study were also affected more accounting for 80.5% whereas this study showed 60% of the patients admitted for fragility fractures.

Lastly, the decreasing number of admitted patients for fracture was likely associated to the recent pandemic. The total number of patients admitted for any injuries had decreased. The years 2020-2021 were the least number of patients logged in the study. Most elderly patients had decreased their activities at home or outside due to the recent protocols to combat spread of the Covid 19 Pandemic.

## 7. Conclusion

Based on the results, the patients age, sex and level of activity have a significant association with their chances of having acute fragility fractures

The fracture location that most commonly occurred in elderly patients in the study is proximal femur accounting to 37.9% of all fractures in the study in all age groups and sex.

The prevalence for acute fragility fractures in this study is slightly lower than that of other studies at 5.42%. However, during the prepandemic years it was similar with an average of 7.16% in the first 2 years of the study. The decline in the prevalence in the last 3 years of the study indicate a parallel decrease in total number of admissions. While the decline is evident further investigation is necessary to understand the underlying reasons and its future implications.

Most fracture types occurred in the 65-74 year old age group. This age group also accounts for the highest number of community ambulators. Females were more affected accounting for 3 out of 5 patients in all age groups in every year the study was recorded. This could be associated with the increased risk for osteoporosis in females at postmenopausal age.

The level of activity of the patient also was significant in the study. Community ambulators were affected more than the household ambulator group at 52.6%.

Thus, this study has shown that age, sex and level of activity have significant association with an elderly's susceptibility to fragility fractures. It is safe to conclude from this study that fragility fracture management should start before an injury occurs. Elderly patients, especially postmenopausal females should be evaluated for osteopenia/osteoporosis as to prevent occurrence of fragility fractures

## 8. Recommendation

Based on the results of the study, the researcher recommends the following:

1) More stringent record keeping and data collection for a more consistent and complete data.

2) To include a more detailed characteristic in profiling of patients, including specific test for osteoporosis (FRAX, BMD)
3) To look at association of economic status, dwelling, environmental and factors on severity and outcome of fragility fractures
4) To compare these data with other Regions in the Country.

## References

[1] Tornetta, P., Ricci, W. M., Ostrum, R. F., McQueen, M. M., McKee, M. D., & Court-Brown, C. M. (2020). Biomechanics of Fractures and Fracture Fixaiton. In *Rockwood and Green's fractures in adults*. essay, Wolters Kluwer.

[2] Ramachandran, M. (2018). Structure. In *Basic Orthopaedic Sciences: The Stanmore Guide, second edition* (pp. 117–118). essay, Chapman and Hall/CRC.

[3] Li, N., Hiligsmann, M., Boonen, A., Van Oostwaard, M. M., De Bot, R. T. a. L., Wyers, C. E., Bours, S. P. G., & Van Den Bergh, J. P. (2021). The impact of fracture liaison services on subsequent fractures and mortality: a systematic literature review and meta-analysis. *Osteoporosis International*, *32*(8), 1517–1530. https://doi.org/10.1007/s00198-021-05911-9

[4] Wáng Y. X. J. (2022). Fragility fracture prevalence among elderly Chinese is no more than half of that of elderly Caucasians. *Quantitative imaging in medicine and surgery*, *12*(2), 874–881. https://doi.org/10.21037/qims-21-876

[5] Bergh, C., Wennergren, D., Möller, M., & Brisby, H. (2020). Fracture incidence in adults in relation to age and gender: A study of 27,169 fractures in the Swedish Fracture Register in a well-defined catchment area. *PLoS ONE*, *15*(12), e0244291. https://doi.org/10.1371/journal.pone.0244291

[6] Ensrud, K. E. (2013). Epidemiology of fracture risk with advancing Age. *The Journals of Gerontology Series A*, *68*(10), 1236–1242. https://doi.org/10.1093/gerona/glt092

[7] Moncatar, T. J. R., Nakamura, K., Siongco, K. L., Rahman, M., & Seino, K. (2020). Prevalence and Determinants of Self-Reported Injuries among Community-Dwelling Older Adults in the Philippines: A 10-Year Pooled Analysis. *International journal of environmental research and public health*, *17*(12), 4372. https://doi.org/10.3390/ijerph17124372

[8] GBD 2019 Fracture Collaborators, Wu, A.-M., Bisignano, C., James, S. L., Meretoja, T. J., & others. (2021). *Global, regional, and national burden of bone fractures in 204 countries and territories, 1990–2019: a systematic analysis from the Global Burden of Disease Study 2019.* **The Lancet Healthy Longevity, 2**(9), e580–e592. https://doi.org/10.1016/S2666-7568(21)00172-0

[9] Perry, J., Garrett, M., Gronley, J. K., & Mulroy, S. J. (1995b). Classification of walking handicap in the stroke population. *Stroke*, *26*(6), 982–989. https://doi.org/10.1161/01.str.26.6.982