



A cross-sectional descriptive study to assess the factors influencing early recovery from femur fracture among femur fracture patients attending in Orthopaedic OPD in NMCH, Jamuhar, Sasaram.

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ABSTRACT

Femur fractures are the most common traumatic orthopedic injury requiring hospitalization. Full recovery from femur fracture can take anywhere from 12 weeks to 12 months. In industrialized countries, the annual incidence in people >65 years with a proximal femur fracture is about 600–900 per 100,000 population. This is the first study that attempted to identify the factors associated with early recovery specific to femur fracture among men.

Objective:

- To assess the factors that influence the early recovery of patients from a femur fracture.
- To find out the association between factors influencing early recovery from fracture with selected demographic variables of femur fracture patients

Method:

It was a cross-sectional descriptive study conducted in Orthopedic OPD, Narayan Medical College and Hospital, Jamuhar (NMCH), Sasaram, Rohtas. 73 participants were selected using convenience sampling technique. Patients between the age group of 50-65 years were included, who came for follow-up treatment in NMCH 0-3 months, 4-6 months, 7-9 months, and 10-12 months in the year 2022. The health status of the sample was assessed through a structured questionnaire

Result:

The majority of fracture patients lie in the age group of 61-65 years, i.e., 31 patients (42.46%) with a confidence index of 95% {CI 10.48±1.008}, and a BMI of 46.57% of the sample lies under the range of 18.5-25.5 which indicates within normal limit {CI 9.35±0.93}. Based on the data collected most of the patients have come for their follow-up in 0-3 months (41% patient) with a confidence index of 95% {CI 7.8±0.76} and almost 40% of patients came for follow-up at 4-6 months {CI 11.72±0.8}. The most common risk factor for femur fracture was tobacco, alcohol, and smoking habits which accounts for 46.57%, 42.46%, and 41% respectively. The most prominent medical history of femur fracture patients was diabetes (63.01%) and cardiovascular disease (41.09%). Healing involves the repair of bone, living tissues, organs, and the biological system as a whole and the resumption of functioning. In the healing process majority of patients have pain at the residual site (78.08%) along with pain/tenderness while bearing weight (75.34%). Also, 71.23% of the patients were clinically stable with motion at the fracture site (58.9%).

Conclusion:

The elderly are more prominent to get femur fractures. Body mass index is considered a moderate factor in femur fracture and with frequent follow-ups in the early months. Tobacco, alcohol, and smoking are most leading risk factors for femur fracture. Diabetes affects the bone healing process and decreases bone mineral density besides cardiovascular diseases are also a projecting factor in femur fracture recovery.

INTRODUCTION

Orthopedic injuries are public health problem worldwide and pose a serious economic burden. Among all femoral fractures is the most common bone injury that requires hospitalization. A fractured femur breaks the longest bone, the largest, the heaviest, and the strongest. This bone can break into 2 or more pieces depending upon different types of trauma and their severity. It is generally considered to be a medical emergency that requires urgent medical attention and treatment at a hospital. Treatment modalities depend largely on the type of fracture, location of the fracture, pattern, and degree. A study published in the Journal of American Academic Orthopedic Surgery estimates that 250,000 people suffer from the effects of dementia each year. Fractures of the femoral shaft in low- and middle-income countries average between

15.7 and 45.5 per 100,000 people per year. Among Asians, low rates of cervical fractures in women are registered. In Japan, it is usually 99 (100,000 per year) for men, and 368 for women. In India also femur fracture has a large incidence. According to American statistics that endanger the health of the femur fracture are alcohol use, caffeine consumption, inactivity, low weight, body weight, vision problems, dementia, smoking, aging, weak bones, diabetes, and use of steroids. A broken femur, usually need ORIF to align bones back in place and help in recovery. During open surgery, orthopedic surgeons place your pieces of bone during surgery, so that they can be restored to normal function. This is in stark contrast to the closed loop, where the healthcare provider puts your bones back in place without exposing your bone to surgery. Internal repair refers to the way you re-connect your bones physically. Special screws, plates, sticks, cords, or nails may be included and may be inserted into your bones to align your bones. This prevents your bones from freezing. To find a fracture in the long, central part of your femur, a long metal rod may be inserted into the center of your bone. Several factors that determine bone healing include the degree of spinal cord injury/bone loss, affected bone area: Metaphyseal fractures heal faster than diaphyseal, abnormal bone, fracture stiffness, and vascular disorders.

MATERIAL AND METHODS-

2.1 Study design, study population, and setting

This cross-sectional descriptive study was performed on fracture patients during their follow-up. This study was performed in the orthopedic OPD of Narayan Medical College and Hospital (NMCH), Jamuhar, Rohtas. From the survey, all patients who had femur fractures under 1 year were included.

2.2 Eligibility criteria

The study subject includes male femur fracture patients who had femur fracture within 1 year, who meet our inclusion criteria and came for follow-up treatment in NMCH at the interval of 0-3 months, 4-6 months, 7-9 months, and 10-12 months. The male femur fracture patients lie in the age group of 50-65 years.

The main point of the study was during follow-up between 30 days to 183 days. Factors affecting fracture healing include parameters to assess fracture healing, fracture risk factors, medical history, and fracture history were included.

2.3 Parameters of fracture healing

All parameters of fracture healing were assessed on study subjects with femur fracture in orthopedics OPD of NMCH. The ability to weight-bearing through dumbbells, the pain\ tenderness while bearing weight, ability to walk, performing activities of daily living, motion at the fracture site, range of motion, clinically stable/asymptomatic, and residual warmth at the fracture site.

2.4 Review of Literature

A study conducted by Flipipov in Asia on the topic of epidemiology and social burden of femoral neck fracture enumerated that the incidence of femoral neck fractures, one of the most common traumatic injuries in the elderly increases continuously due to the aging of the population on the planet and urbanization. In terms of global economic instability, increasingly more funds would have to be paid by the health systems for the treatment of those fractures. Probably it will be necessary to revise and optimize some current therapeutic standards.^[1]

Thorngren in his study on the topic Epidemiology of femoral neck fracture stated that Fractures of the femoral neck, that is, "cervical hip fractures" constitute 53% of all fractures of the proximal femur (hip fractures) according to the Swedish National Hip Fracture Register linked to SAHFE (Standardised Audit of Hip Fractures in Europe).^[2]

Sandeep Krishna Avulapati Et. Al in his study topic Mortality and morbidity of proximal femur fractures in the elderly population – A three-year follow-up study in India culminated that: Proximal femur fractures in the elderly population occur with a simple history of slip and fall at home. They are difficult to treat, in presence of comorbidities of the patient, osteoporotic and comminuted fracture. Postoperatively, mobilization and control of comorbidities are difficult and can result in higher postoperative mortality and morbidity in that group. Mortality and morbidity of proximal femur fractures in the elderly population are at a significant level in India, which needs to be addressed at an early stage.^[3]

A study conducted by Besh Barcega on the topic of Lower extremity fractures concluded that Femur fractures are the most common traumatic orthopedic injuries requiring hospitalization. Most femur fractures result from a high-impact mechanism, and the patients present with obvious swelling, deformity, pain, and tenderness in the affected thigh. Shortening of the involved extremity will be evident on physical examination.^[4]

In a study conducted by Matthew costa et.al., on the topic of a Comprehensive Cohort Study of Patients with Fracture of the Proximal Femur. The study says that Fragility fractures typically affect people over 60 years of age because as we get older, our bones get weaker and break more easily. One type of fragility fracture that presents one of the greatest challenges for the medical community is the fracture of the neck of femur or hip fracture. This is an observational study that aims to supplement this data with information that is important to patients, such as their mobility after their injury, ability to do usual activities, self-care, pain, and fear of falling.^[5]

2.9 Ethical approval

This study was approved by the Institutional ethical committee of Gopal Narayan Singh University, Jamuhar, Rohtas (Bihar) on 15th Feb 2022. Written permission was taken from the hospital authority also participants gave their consent through their signature on the consent form before initiation of the session. All survey data were stored in accordance with national legislation and institutional policies Confidentiality of patient information was maintained.

RESULT-

The study was performed on 73 subjects who had femur fractures in the past 1 year. Participants were assessed on the basis of a structured questionnaire including items such as sociodemographic variables, clinical parameters of fracture healing, fracture risk factors, medical history, and previous incidence of femur fracture.

3.1 Patients characteristics

a) Age group

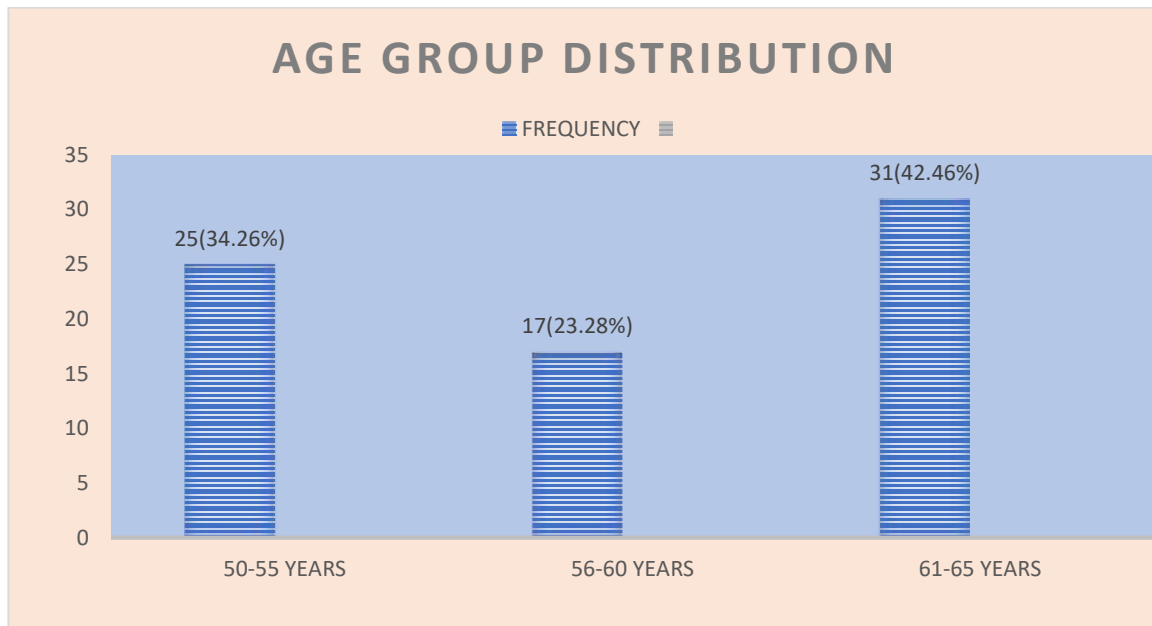


CHART 1.1

Across all survey responses, most participants were males between the age group of 50-65 years from North India. Study subjects were selected from different sociodemographic variables. Out of 73 patients, the frequency of the majority of femur fracture patients lies in the age group of 61-65 years i.e., 31 patients (42.46%) with the p-value of 0.00 and 95% CI {10.48±1.008}. Whereas 25 patients (34.26%) come under 50-55 years with p-value 0.03, 95%CI {9.52±1.014} and 17 patients (26.28%) come between 56-60 years with p-value 0.86 and CI{9.6±1.57}. The data is depicted in chart 1.1 above.

b) Body Mass Index

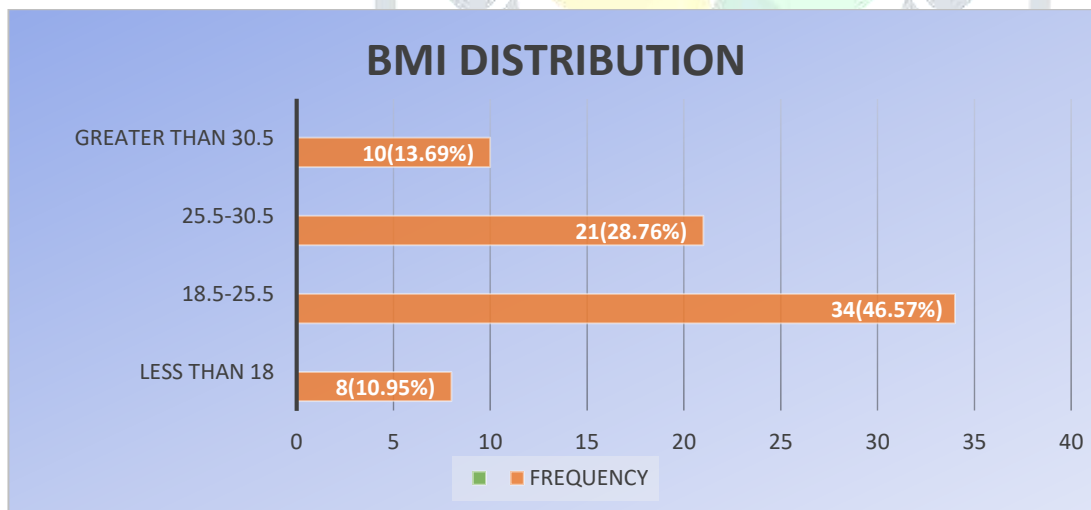


CHART 1.2

The data depicted in chart 1.2 demonstrates that the BMI of the highest proportion of subjects i.e., 34 patients (46.57%) lies under the range of 18.5-25.5 with the p-value of 0.00 and 95%CI {9.35±0.93}. This is the indication that the BMI of the highest proportion lies in the normal range. 21 patients (28.76%) were overweight with a p-value of 0.01 and CI {10.09±1.30}. The least 8 patients out of 73 (10.95%) were having BMI less than 18 representing undernourished state with a p-value of 0.04, CI {9.6±1.22} and 10 patients out of 73 (13.69%) were having BMI greater than 30.5 representing obesity having a p-value of 0.21 and 95%CI {11.9±1.75}.

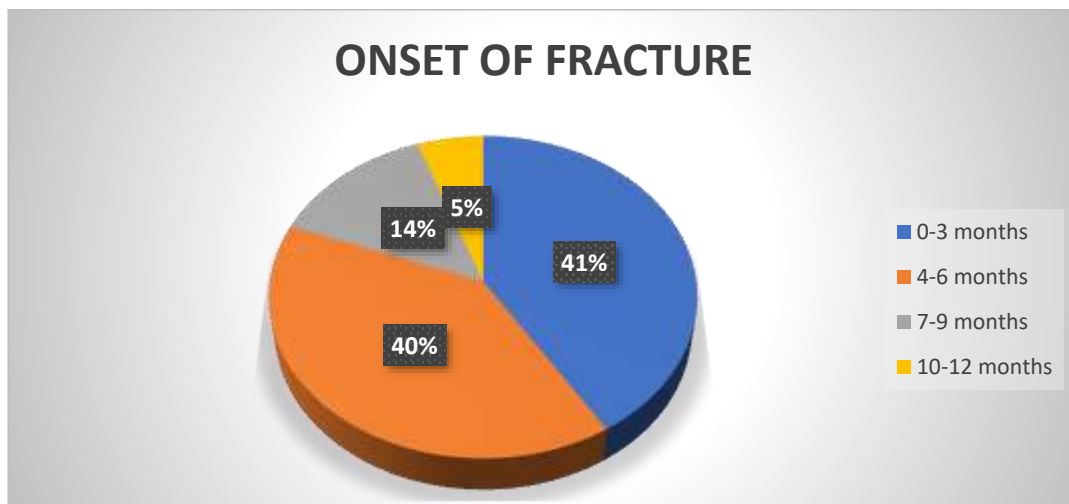
c) **Onset of fracture**

CHART 1.3

Chart 1.3 portrays that most of the patients i.e., 30 patients (41%) had fractures 0-3 months before with a p-value of 0.65 and 95% CI {7.8±0.76} and 29 patients (40%) had fractures 4-6 months ago with a p-value 0.27, CI {11.72±0.8} and came for follow-up treatment at Narayan Medical College and Hospital. Out of 73, the frequency of 10 patients (13.69%) had come for follow-up between 7-9 months with a p-value of 0.00 and 95% CI {11.4±1.58} and the least 4 patients (5.47%) had come between 10-12 months with a p-value of 0.30 and CI {9.75±2.78}.

3.2 **Clinical parameters of fracture healing**

S.NO.	CLINICAL PARAMETERS	FREQUENCY	PERCENTAGE
1.	ABILITY TO BEAR WEIGHT	31	42.46%
2.	PAIN/TENDERNESS WHEN BEARING WEIGHT	55	75.34%
3.	ABILITY TO WALK	33	45.20%
4.	PERFORM ACTIVITIES OF DAILY LIVING	40	54.79%
5.	RESIDUAL PAIN AT FRACTURE SITE	57	78.08%
6.	MOTION AT FRACTURE SITE	43	58.90%
7.	FULL RANGE OF MOTION AT ADJACENT JOINT	25	34.24%
8.	CLINICALLY STABLE/ ASYMPTOMATIC	52	71.23%
9.	RESIDUAL WARMTH AT FRACTURE SITE	35	47.94%
10.	FULL RANGE OF MOTION AT ADJACENT JOINT WITHOUT PAIN	32	43.83%

Table 1.1

The data depicted in Table 1.1 represents the clinical parameters of the femur fracture patients which is the indication of fracture healing. According to the table majority of the patient were feeling residual pain at the fracture site i.e., 57 patients (78.08%). Approximately 55 patients (75.34%) were having pain at the fracture site while bearing weight and 52 patients (71.23%) were clinically stable. The least number of patients were able to bear weight as previously i.e., 31 patients (42.46%).

3.3 Fracture risk factors

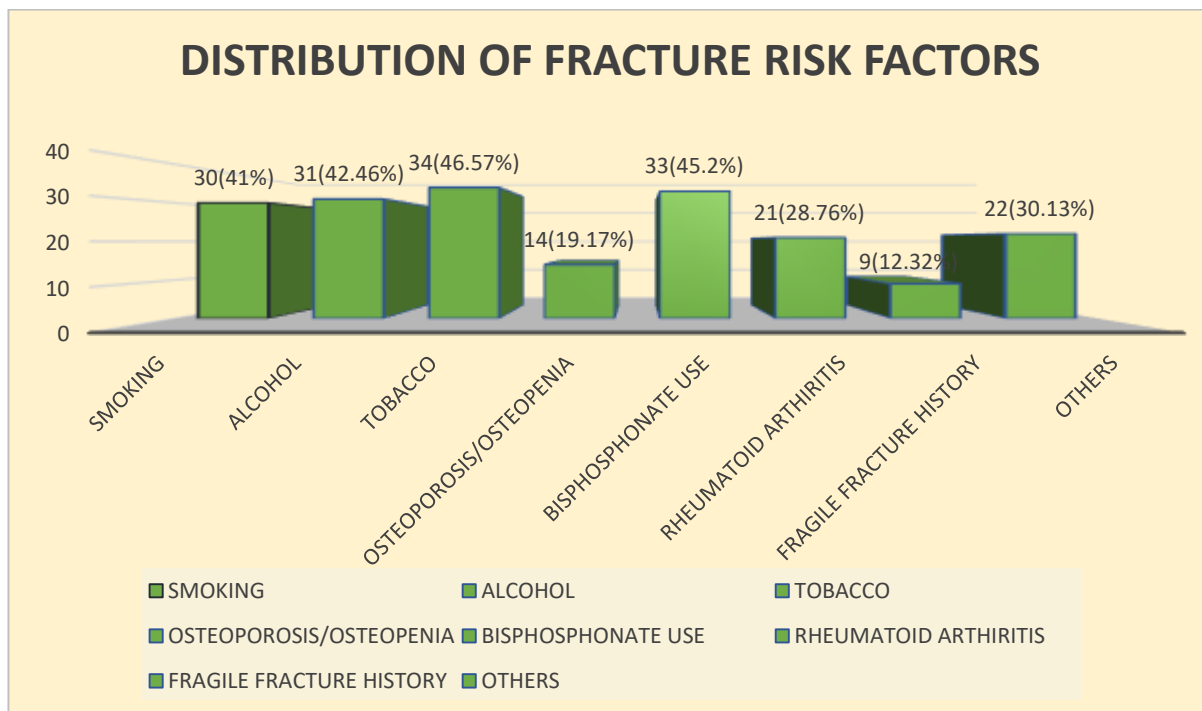
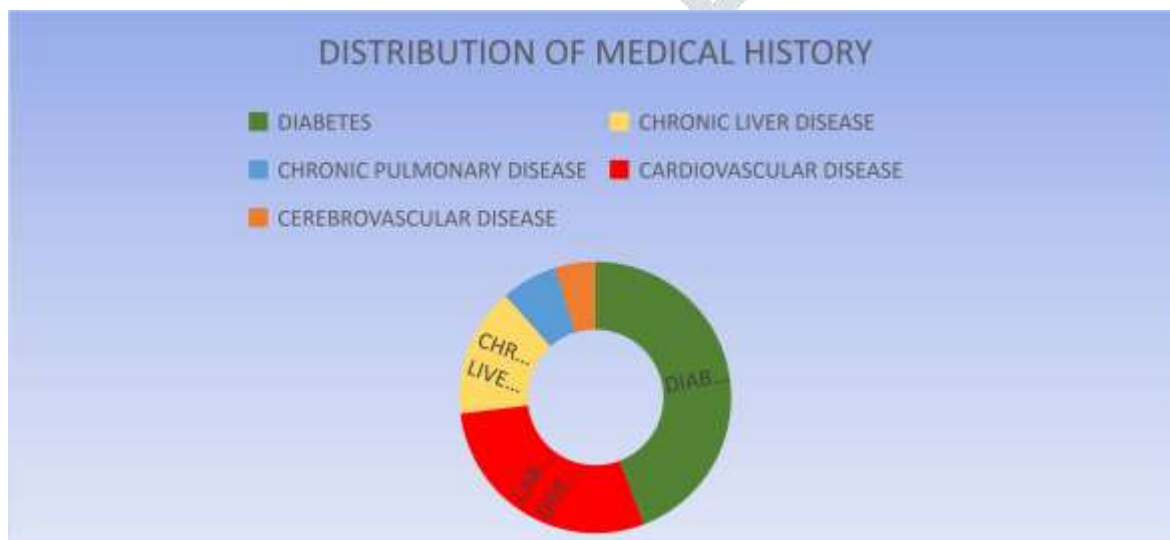


CHART 1.4

A complete or partial breakage in the femur bone that more likely increases the chance to get the disease or condition is known as a fracture risk factor. These factors increase the risk of fracture including tobacco use, smoking, alcohol abuse, osteoporosis/osteopenia, bisphosphonate use, rheumatoid arthritis, fragile factor history, and other factors.

Chart 1.4 indicates that among 73 femur patients the greater part i.e., 34 patients (46.57%) were consuming tobacco, and approx. 2/3rd of the population including 31 patients (42.46%) were consuming alcohol and 30 patients (41%) were having smoking habits. Also, a total of 33 patients (45.2%) were on bisphosphonate use participating as a major risk factor for fracture. Rheumatoid arthritis accounts for 28.76% of femur fracture risk factors. The least risk factor was osteoporosis/Osteopenia and fragile fracture history contributing 19.17% and 12.32% respectively. Several other factors were found responsible for fracture risk factors in many subjects (30.13%).

3.4 Medical history



The medical history of patients influences the healing process of fracture and had a great influence on recovery. Disease conditions such as diabetes and cardiovascular disease alter the mechanism of body functions and affect the immune system of the body.

In the study majority of patients who suffer from diabetes including 46 femur fracture patients i.e., 63.01% of the population and 30 femur fracture patients (41.09%) were having a history of cardiovascular disease. The least common factors were chronic pulmonary disease including 7 femur fracture patients (9.58%) and cerebrovascular disease including 5 femur fracture patients (6.8%).

3.5 Previous incidence

Among the study subjects, 1/3rd of the participants was having an incidence of the previous fracture. The affected site may be at the same location or maybe at a different site.

DISCUSSION-

This study was performed on femur fracture patients who came for follow-up treatment in orthopedic OPD, NMCH. We found that there are several factors associated with femur fracture healing such as sociodemographic variables (age, BMI, and onset of fracture), fracture risk factors (Tobacco, smoking, alcohol, bisphosphonate use, osteoporosis/osteopenia, rheumatoid arthritis, and fragile fracture history), medical history (diabetes, cardiovascular disease, chronic liver disease, chronic pulmonary disease, cerebrovascular disease).

The study results reveal that 42.40% of participants are within the age group of 61-65 years. 46.57% of participants are within the BMI range of 18.5-22.5. The majority of 41% participants have come for follow-up within 0-3 months.

41% of participants were having smoking habits, while 42.46% samples were taking alcohol and 42.57% of participants were tobacco users. It was also found that 45.2% of the patients were on bisphosphonate use.

Diabetes and cardiovascular disease were most prominently found in participants with 63.01% and 41.09% respectively.

The aim of this study is to determine the characteristic of patients with a femoral fracture in the Department of Orthopedic RSUD Dr. Soetomo Surabaya. This research is a retrospective observational study of the 972 enumerated, 112 subjects with femoral fractures who were analyzed for the study. The observed variable of patients' profiles includes sex, age, cause of fracture, type of wound, location of the fracture, place of accident, and time of the accident. The most common causes of fracture have occurred at the age of 15 – 24 with 40 cases (36%). Most of the cases is dominated by the male gender (72%). Traffic accident (92%) is the major cause of fracture, which mostly occurred on the street (92%) from 06:01 A.M. until 12:00 A.M (28%). A closed wound (71%) is commonly found in femoral fractures. The most common type of femoral fracture has a closed wound (71%) and is located in the column of the femur (46%). The most common causes of femoral fracture are occurred in male at the productive age due to traffic accident injury (Noorisa, Riswanda et.al.).^[6]

In the present study the incidence of all different fractures, regardless of location, in adults ≥ 16 years treated at the only care provider for patients with fractures within a catchment area of approximately 550,000 inhabitants, during 2015–2018 are described. Age, gender, and fracture location (according to AO/OTA classification) were used for the analyses and presentation of fracture incidences. The mean age at fracture was 57.9 years (range 16–105 years) and 64.5% of the fractures occurred in women. The five most common fractures accounted for more than 50% of all fractures: distal radius, proximal femur, ankle, proximal humerus, and metacarpal fractures (Camilla Bergh et.al.)^[7]

The aim of this study was to investigate the association of high body mass index (BMI) in patients with proximal femur fractures with intra- and postoperative adverse events, as well as with functional outcomes after successful surgery. The cohort included 80 (8.4%) underweight patients, 570 (60.0%) normal-weight patients, 241 (25.4%) overweight patients, and 59 (6.2%) obese patients. We found more femoral neck

fractures (506, or 53%) than trochanteric fractures (444, or 47%). However, patients with intermediate BMI levels (18.5–30 kg/m²) tended to achieve the best results, as represented by a higher Barthel index score and the patient's ability to walk on crutches ([Michael Müller et.al.](#))^[8]

A study conducted on the relationship between bone mass index and fracture risk involved 2199 women and 1351 men aged 60 years or older. BMI was derived from baseline weight and height. Overall, 774 women (35% of total women) and 258 men (19%) had sustained a fracture. Approximately 21% of women and 20% of men were considered obese (BMI 30). In univariate analysis, greater BMI was associated with reduced fracture risk in women (hazard ratio [HR] 0.92; 95% confidence interval [CI], 0.85 to 0.99) and in men (HR 0.77; 95% CI, 0.67 to 0.88). After adjusting for femoral neck BMD, higher BMI was associated with a greater risk of fracture in women (HR 1.21; 95% CI, 1.11 to 1.31) but not in men (HR 0.96; 95% CI, 0.83 to 1.11). It was found that the majority of BMI's effect on fracture risk was mediated by femoral neck BMD. These analyses suggest that there is no significant direct effect of BMI on fracture and that the observed association between BMI and fracture risk is mediated by femoral neck BMD in both men and women. ([Mei Y Chan et.al.](#))^[9]

In the study in case of traumatic femur fractures, schedule a clinic follow-up visit at 2 weeks, 6 weeks, 3 months, 6 months, and 1 year. The study discussed that the femur fracture should be healed within 3 months. Once a bony union is complete, treatment is focused on muscle rehabilitation. For femoral stress fractures, a minimum time of 6 weeks is necessary for bone healing to occur before the patient is able to resume full activity ([Nicholas M Romeo et.al.](#))^[10]

To determine the factors affecting the amount of weight-bearing during gait training in the elderly patients who underwent internal fixation after femur or pelvic fractures and how well they performed the weight-bearing restriction as directed by the physiatrist. In this retrospective chart review study, we measured the amount of weight-bearing on the affected side in 50 patients undergoing internal fixation surgery and rehabilitation after femur or pelvic fracture using a force plate. Furthermore, regression analysis was performed to determine the effects of postoperative complications, age, cognitive function, and pain on weight-bearing restriction. The weight-bearing restriction adherence rate was significantly lower, at 22%, for patients aged ≥65 years as compared to 73% for those <65 years ([Seo, Hyeunsuk et.al.](#))^[11]

In fracture healing, Tobacco smoking has been found to be a contributory factor to delayed union, and smokers are significantly disadvantaged, as healing times are often prolonged. Smoking adversely affects bone mineral density, lumbar disc degeneration, incidences of hip fractures, and the dynamics of bone and wound healing. Clinical trials and demographic studies have been more widespread than biochemical analyses, and have reported poor prognosis for fracture patients who smoke ([A Sloan et.al.](#))^[12]

The purpose of this study was to evaluate the impact of tobacco abuse on the consolidation of fractures. Retrospectively all patients with a diaphyseal fracture (femur, tibia, or humerus), between January 1999 and December 2010, in our orthopedic trauma registry (Erasmus Hospital, Brussels, Belgium) were identified. Thirty-eight diaphyseal non-unions (ten femurs, 16 tibias, and 12 humerus) were identified. Each non-union was paired (on age, sex, and location) with two control-healed fractures (76 control patients). Tobacco is confirmed as a deleterious factor for diaphyseal bone healing ([Jacques Hernigou et.al.](#))^[13]

Conclusion

In this study, we observed that most of the femur fracture incidence occur at age ≥65 years with BMI under normal range. Smoking, tobacco and alcohol abuse emerges as a leading risk factor of fracture. Bisphosphonate use was also responsible for decreasing bone mineral density. Diabetes and cardiovascular disease were most commonly found in patients with femur fracture and interrupts fracture healing.

Declaration of competing interest

None.

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Data availability-

Data is available in the form of hard copies.

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