


Incidence of superior etremity fractures in children at Ibnu Sina hospital Makassar 2017-2022

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Article Info	ABSTRACT
Keywords: Incident, fracture of the superior extremity, child	A fracture is a disruption in the integrity of bone tissue typically resulting from external force. The upper extremity comprises five components: the shoulder, upper arm, forearm, wrist, and hand. Among these five locations, the upper arm, specifically the humerus, is the site where fractures occur most frequently, accounting for 15% of cases. This study aimed to ascertain the frequency of upper limb fractures in pediatric patients at Ibnu Sina Hospital Makassar from 2017 to 2022. The study employed descriptive methodologies with a cross-sectional design, utilizing secondary data extracted from medical records that satisfied the predefined inclusion criteria. This investigation was undertaken at Ibnu Sina Hospital Makassar from January 2017 to June 2022. The research data was acquired via direct documentation of information extracted from medical records. This study comprised a sample of 47 participants. The findings indicate that a significant proportion of the research participants were between the ages of 6 and 18 (93.62%), predominantly male (59.57%), with humerus fractures being the most common type (40.42%), and the majority of fractures being closed (89.36%).
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INTRODUCTION

The skeletal structure of the upper extremity consists of the clavicle, scapula, humerus, radius, ulna, carpal bones, metacarpal bones, and phalanges (Abalo, 2007). A fracture is a disruption in the integrity of bone tissue that usually occurs due to the use of force. Fractures can be classified as complete or incomplete, resulting from physical injury. The upper extremity has five anatomical components: shoulder, upper arm, forearm, wrist, and hand. Fractures of the upper arm, particularly the humerus, were the most common among the five locations, accounting for 15% of cases. Upper extremity fractures usually occur due to direct impact to the upper extremity due to a fall (Addin, 2021).

The risk of fracture is greatly influenced by age, especially between the ages of 1 and 14 years. The highest number of cases occurred in the 5 to 8 year age range. This is due to the process of bone growth and maturation which continues until the individual reaches the age range of 12-16 years. The prevalence of this condition is higher in boys than girls, with

a ratio of 6 to 4. Fractures mostly occur in the left arm in 65% of cases, while in the right arm they occur in 35% of cases. The main cause of injury is a fall with a hyperextended arm, while the secondary cause is direct trauma to the elbow due to impact with a rigid object (Agustina, 2022).

Among fractures in children, closed fractures are the most common, accounting for approximately 95% of all fracture cases, whereas open fractures occur in less than 5% of total cases. Fractures in children can be caused by a variety of factors, including traumatic events such as accidents, repetitive stress from activities such as dancing or athletics, or pathological conditions such as tumors that cause pathological fractures. .

METHODS

This research uses a descriptive approach with a cross-sectional design, utilizing secondary medical record data. The researchers chose this particular research methodology to determine the prevalence of upper extremity fractures in children at Ibnu Sina Hospital Makassar from 2017 to 2022.

RESULTS AND DISCUSSION

The examination was carried out at Ibnu Sina Hospital Makassar from January 2017 to June 2022. Research data was obtained through direct extraction from medical records. This study included a total of 47 participants.

Table 1. Incidence of superior extremity fractures in children based on age at Ibnu Sina Hospital Makassar in 2017-2022

Variable	Frequency	Percentage
Age		
5 - 6 years	3	6,38
6 - < 18 years	44	93,62
Total	47	100,0

Table 2. Incidence of superior extremity fractures in children based on gender at Ibnu Sina Hospital Makassar in 2017-2022

Variable	Frequency	Percentage
Gender		
Man	28	59,57
Woman	19	40,43
Total	47	100,0

Table 3. Incidence of superior extremity fractures in children based on fracture location at Ibnu Sina Hospital Makassar in 2017-2022

Variable	Frequency	Percentage
Fracture Location		
Humerus	19	40.43

Radius dan Ulna	12	25,53
Clavicula	7	14,89
Phalang	9	19,15
Total	47	100,0

Table 4. Incidence of superior extremity fractures in children based on fracture classification at Ibnu Sina Hospital Makassar in 2017-2022

Variabel	Frekuensi	Persentase
Fracture Classification		
Closed Fracture	42	89,36
Open Fracture	5	10,64
Total	47	100,0

Discussion

Study findings revealed that the primary demographic of study participants consisted of individuals aged between 6 and 18 years (93.62%), mostly males (59.57%), with humerus fractures being the most common location (40.42%), and the majority of fractures were closed (89.36%). Table 1 shows that the age group 6 – < 18 years had the largest incidence of upper extremity fractures in children at Ibnu Sina Hospital Makassar, namely 44 cases (93.62%). In contrast, the age group 5 - < 6 years had the lowest incidence, namely only 3 incidents (6.38%).

About 33% of children experience a fracture before reaching the age of 17 years. Boys have a higher prevalence of fractures than girls in all age groups. Fractures most often occur in girls between 11 and 12 years old, and in boys between 13 and 14 years old. The number is 2. Fracture cases usually occur in young people as a result of the ongoing process of bone growth and maturation. entering adolescence, around the ages of 12 to 16 years.

Based on research conducted by Yogiswara and Aryana at the Sanglah Denpasar Central General Hospital in 2013, it was found that the percentage of bone fractures in men was higher, namely 60.9%, compared to women, which reached 39.1%. Table 2 shows that at Ibnu Sina Hospital Makassar, the highest incidence of upper extremity fractures in children, based on gender, occurred mostly in boys, with 28 cases (59.57%), while the lowest incidence was reported in girls.

Boys have a higher prevalence of fractures than girls, specifically with a ratio of 2.7 to 1. The prevalence of fractures in boys is recorded at 450 per 10,000 incidents annually, and reaches its highest point at the age of 16 years. Meanwhile, the highest incidence rate occurs in girls aged 12 years, with an incidence rate of 250 incidents per 10,000 people per year. This finding is in accordance with research conducted at a hospital in Indonesia. This study shows a significant prevalence of fractures, namely 161 incidents were recorded from January to December 2015. Among the fracture incidents in minors, 79.5% were boys and 20.5% were girls. This may be related to the physiological influence of hormones that

cause boys to be usually more adventurous and more prone to participating in physical activities that risk bone fractures.

Based on research conducted by Riansyah and Putra A at Urip Sumoharjo Hospital Bandar Lampung from 2014 to 2019, supracondylar humerus fractures were found to occur more frequently in boys (74.1%) than girls (25.9%). Table 3 shows that at Ibnu Sina Hospital Makassar, the highest incidence of upper extremity fractures in children occurred in the humerus with 19 cases (40.43%), while the lowest incidence occurred in the collarbone with 7 cases (14.89). %).

Fracture is a general term used to describe common injuries to bones. Humerus fracture is a disorder of the upper arm bone tissue caused by impact or trauma, either directly or indirectly. Fractures can cause discomfort, inflammation, muscle contractions, reduced muscle strength, and muscle atrophy. Humerus fractures cause limited mobility in the shoulder and elbow, known as limited range of motion (LGS).²⁵ Supracondylar fractures refer to fractures that occur in the distal region of the upper arm bone, specifically just above the humeral epicondyle. These fractures are common in young people due to cortical remodeling, which causes thinning of the cortex and increases the vulnerability of the area to fracture.

A study conducted in Georgia revealed that a total of 1,086 children aged between 0 and 4 years were injured due to falls. According to research, humerus fractures account for 27% of all falls-related injuries, making them the most common type of fracture. Skull fractures and femur fractures ranked second and third, respectively. This is caused by changes in the physical composition of the child's body, including a reduction in head size and an increase in upper limb muscle strength as they get older. Babies have a higher ratio of head mass to body mass, so they are more susceptible to head injuries. In contrast, toddlers have a lower head mass to body mass ratio and have stronger limbs. As a result, young children often rely on their upper limbs to support their body weight, causing fractures in the upper arm bone called the humerus.

According to research conducted by Yang H et al, using data from hospitals collaborating with medical universities in Chongqing, China, it was found that humerus fractures had the largest incidence rate, namely 45.6% of cases. In table 4, it was found that the highest incidence of superior extremity fractures in children based on the fracture classification at Ibnu Sina Hospital Makassar was 42 cases (89.36%) in the closed fracture classification, while the lowest was 5 cases (10.64%) in the open fracture classification.

Closed fractures, also called simple fractures, are a type of fracture in which the bone fragments remain inside the body and do not penetrate the skin, so they remain isolated from the external environment. The high rate of disability throughout the world is caused by closed fractures. One of these fractures, called a humerus fracture, often results from an injury. Fracture problems can arise due to internal factors, such as bone abnormalities, or external factors, such as traffic accidents, falls, or trauma due to sharp or blunt objects.⁶ Closed fractures commonly occur in children, usually due to accidents while playing. On the other hand, open fractures are usually caused by high-energy trauma, such as traffic accidents, which can cause additional problems for the patient.

According to World Health Organization figures in 2018, there were 5.6 million deaths and 1.3 million cases of fractures. Accidents are a common cause of closed fractures, with approximately 40% of accidents resulting in fractures. Fractures occur as a result of a fast and strong impact, usually due to trauma or physical activity that places excessive pressure on the bone.

The most common type of fracture in children is closed fracture, which accounts for approximately 95% of all fractures, while open fractures represent less than 5% of cases. Based on research conducted in Indonesia, it shows that single bone fractures are the most common type of fracture in children, followed by compound fractures, greenstick fractures, and epiphyseal fractures. In contrast, comminuted fractures are rare. Fractures in children are generally caused by traffic accidents, with the upper extremities being most commonly affected. Therefore, there is an urgent need to increase focus on road safety in Indonesia. According to research conducted by Sya'ban S et al at Dr Seotomo Hospital, the majority of fractures were classified as closed fractures (75.9%), compared to open fractures.

This difference in numbers is due to the fact that Closed Fractures include various forms of fractures, such as Avulsion fractures, Greenstick fractures, Hairline fractures, Comminuted fractures, and Compression fractures. The diverse spectrum of Closed Fractures requires varying levels and types of damage, ranging from mild to severe. In contrast, Open Fractures are usually caused by high-energy trauma, which often causes additional problems for the patient.

There are various obstacles associated with this research. First, this research is cross-sectional, meaning it is limited to a certain time period and can only provide evidence of the conditions that existed during that time period. It is incapable of observing any changes that may occur or may occur in the future. In addition, this research only combines points of view from a limited number of theories that explain the relationships between variables. However, it is important to acknowledge the existence of other alternative theories that offer different perspectives on the subject matter, including a variety of additional influential variables.

The advantage of this research is that the design is relatively easy to implement. Researchers have the ability to collect all variables simultaneously. Multiple outcomes can be investigated simultaneously. It is possible to measure the prevalence of all factors.

CONCLUSION

Based on the research results, conclusions can be drawn, namely: The results of the study showed that the incidence of superior extremity fractures based on age in children in 2017 - 2022 at Ibnu Sina Hospital Makassar was 44 cases (93.62%) aged 6 - <18 years. The results of the research showed that the incidence of superior extremity fractures based on gender in children in 2017 - 2022 at Ibnu Sina Hospital Makassar was mostly boys, 28 cases (59.57%). The research results showed that the incidence of superior extremity fractures was based on fracture type (open fracture and closed fracture) in children in 2017 - 2022 at Ibnu Sina Hospital, Makassar. the most common were closed fractures at 42 cases (89.36%). The results of the study showed that the highest incidence of superior

extremity fractures based on fracture location in children in 2017 – 2022 at Ibnu Sina Hospital Makassar was humerus fractures at 19 cases (40.43%).

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