An Analysis of Temporal Variations and Mechanism of Injury of Paediatric Supracondylar Fractures of the Humerus Presented during the Covid-19 Pandemic

Supracondylar fracture of the humerus is one of the most common fractures in children. The purpose of our study was to analyze the temporal variations and mechanisms of paediatric supracondylar fractures presenting to our hospital during COVID-19 lockdown period. As the schools and parks were closed and children were confined to their homes, thus, they were more prone to injuries while playing inside. We claim that this would be the first study in our country to provide unique information about these fractures. We conducted this descriptive study in Accident and Emergency Department Lady Reading Hospital Peshawar Pakistan from 18th March 2020 to 18th June 2020. In the enrolled children data regarding day and time of fracture occurrence, mechanism of fracture, height of furniture or play equipment from which the children fall and types of landing surfaces were noted. Important variables were compared and Chi-square test was applied to calculate P value (<0.05 was considered significant). The total number of children in our study was 160 with mean age 5.3±1.3. The most common mechanism of fracture was fall from furniture (63.1%, n=101) and the landing surface was cemented or tiled floor in majority (84.1%, n=101) children. Maximum (40.6%, n=65) number of fractures were reported in the month of April and on Monday (23.7%, n=38). Most (65.6%, n=105) children sustained fractures in PM. The peak time of occurrence of fracture was 1700 h. We concluded that majority children sustained fractures due to fall from furniture landing on hard cemented or tiled surfaces. Maximum number of fractures were reported in the month of April and on Monday. Most of these injuries occurred in the evening and were operated at night.

Keywords: Garland classification, humerus, paediatric, Supracondylar fracture, surface resilience, temporal variations, weekday

Introduction

Paediatric supracondylar humerus fractures are the most common elbow fractures and accounts for 12 to 17% of all children fractures [1-3]. Male children in their first decade, particularly between 5 to 8 years of age with left side involvement are the typical victims of supracondylar humerus fractures [4, 5]. Managing these fractures are costly because they often require admission in hospital and surgical intervention [6]. Displaced supracondylar fractures are treated with close reduction and percutaneous pinning(CRPP) under image intensifier [2, 7, 8]. Open reduction and pinning is utilized when the fracture is open, vascular injury or failed closed method [2, 7-9]. Although the demographic characteristics like age, gender and side of supracondylar fractures have been addressed by many studies, the temporal characteristics (month of injury, day of the week and hour of the day) of this fracture particularly in our region has not yet been studied [6, 10].

The first two confirmed deaths due to corona occurred in Pakistan on 18th march 2020 and both the patients were admitted in our hospital. [11] The Government of Pakistan declared health emergency and announced strict
lockdown for an indefinite period. We had been receiving increasing number of children with supracondylar humerus fractures daily during the Covid-19 pandemic lock down in Peshawar, Pakistan. This was due to the fact that children were entirely confined to their homes and were more prone to injury during play time in limited and unsafe environment. Furthermore, as peripheral and district level health care services and private clinics had been closed temporarily by the government, children were referred to our hospital as this is the largest tertiary care teaching hospital of this province.

The objective of our study was to determine the temporal variations and mechanism of injury of supracondylar humerus fractures presented to Accident and Emergency Department (A&E) Lady Reading Hospital Peshawar Pakistan during the Covid-19 pandemic lock down. We claimed that our study was the first study on this topic in our country. The results of this study will be used to anticipate the day of the week and hour of the day of arrival of supracondylar fractures to A&E. This will help us in prompt allocation of adequate resources in the form of dedicated paediatric Orthopaedic surgeons, operation theatres and supporting staff without affecting regular surgical work. Furthermore, knowledge of the exact mechanism of these fractures will help us to improve the safety profile of children’s playing environment inside home.

Methodology

This descriptive study was conducted in Accident and Emergency Department Lady Reading Hospital Peshawar Pakistan. The duration of our study extended from Covid-19 Pandemic lockdown from 18th March 2020 ("Strict Lockdown") till 18th June 2020 when relaxation in the lock down ("Smart lockdown") was allowed and partial elective hospital services of our hospital were resumed. The questionnaire and methodology for this study was approved by the Ethical Review Board (ERB) Lady Reading Hospital Peshawar Pakistan. The principal investigator has obtained Good Clinical Practice Certificate from National Institute on Drug Abuse (NIDA), Center for Clinical Trials (CCTN) and Clinical Trials Network (CTN) and has ORCID ID: http://orcid.org/0000-0001-7894-0340. Children of either gender and age up to 12 years with supracondylar fractures received in A & E department within 3 days after sustaining the fracture were included. Children operated in other hospitals were excluded. The sample size for the study was 160 and calculated with the help of formula n=Z²P(1-P)/d² Whereas n=Sample size, Z=level of confidence (95% or 1.96), P=prevalence (0.12) [1] and d=Precision (5% or 0.05). All children of supracondylar fractures received in Accidents and Emergency Department of Lady Reading Hospital Peshawar were thoroughly assessed and resuscitated according to ATLS protocols. The children were given analgesics for pain relief and the fractures were splinted. Radiographs of the elbow joint antero posterior and lateral views were done and fractures were classified according to the Gartland classification system [12]. Distal neurovascular status was documented. Patients of supracondylar fractures
fracture meeting the inclusion criteria were admitted and operated as per protocol. In the included children complete history and physical examination was done and informed written consent was taken from parents. All the patients of Gartland type I fractures were treated in splint while type II and III were treated with closed reduction/percutaneous pinning under image intensifier or open reduction and pinning as required. Temporal variations or day and time of fracture occurrence, exact details of fracture mechanism, height of furniture or equipment from which the child fall and the type of landing surfaces were inquired from parents of each and every child and recorded. For convenience we divided the fracture mechanisms into six categories as follows [13]:

I. **tumble**, on outstretched elbow at ground level while playing and running.

II. **fall**, on outstretched elbow from above ground level (climbing, bicycle, chair, bed, table, stairs etc.)

III. **lateral bend**, the elbow during sports or accidents

IV. **direct hit**, smashed by an object or the elbow got caught in the door.

V. **throw**, injured after throwing a ball or other object.

VI. **unknown**.

Statistical analysis was done by using SPSS version 20. Categorical variables like gender and fracture side was represented as frequency and percentage while mean±SD was calculated for numerical variables like age. A comparison important variables like day and time of occurrence of supracondylar fractures, heights of furniture and landing or impacting surfaces were done and Chi-square test was applied to calculate the *P* value and was considered statistically significant if <0.05. Results presented in tables where necessary.

**Results**

The total number of children in our study was 160. Boys were 121 (75.6%) and girls 39 (24.3%). Mean age of our patients were 5.3±1.3 years (range 3 to 9 years). Right supracondylar was fractured in 26 (16.2%) and left in 134 (83.7%). Bilateral fractures were not reported in our series. In our study 18(11.2%) children had associated injuries namely clavicle fractures in 8 (5%), proximal humerus fractures in 6 (3.7%) and physeal injury to distal radius in 5 (3.1%) children. Majority (80%, n=128) children were received in our hospital within 24 hours of sustaining the fracture while 28 (17.7%) in 24 to 48 hours and 4 (2.5%) children were received in 48 to 72 hours of sustaining the fracture. Delayed presented children (2.5%, n=4) were initially treated with splints by traditional bone setters. Radiologically all fractures were of extension types with Gartland type I fracture in 28 (17.5%) children, type II in 27 (16.8%) and type III in 105 (65.6%) children. The mechanism of fracture in
majority (75.6%, n=121) of children was fall from height and 101 (63.1%) children had fracture due to fall from furniture inside home. (Table 1) Overall 138(86.2%) children sustained fractures indoor while 22 (13.7%) children sustained fracture outside home in nearby street. Majority (40.6%, n=65) of fractures were reported in the month of April followed by May (25%, n=40), June (21.2%, n=35) and March (12.5%, n=20). We noted that children sustained fractures more on Monday (23.7%, n=38) and Friday (19.3%, n=31) than on other week days (P > 0.05) as shown in table 2. Most (65.6%, n=105) children sustained fractures in PM while 55 (34.3%) children had fractures in AM. The peak time of occurrence of fracture was 1700 h and majority (86.2%, n=138) children were received in our hospital in 1800-2000 hr.

We identified four impact absorbing surfaces beneath the furniture or play equipment on which the children landed after fall from height and sustained fractures. These surfaces were carpet or mattress, cemented or tiled floor, grass and mud or sand. (Table 3) Majority (88.4%, n=84/95) of children falling from height on cemented or tiled floor sustained Gartland type III fractures than other types (P< 0.05) while only 1 out of 13 (7.6%) children got type III fracture (P < 0.05) falling on mud or sand. Similarly, no type III fracture was noted in children who landed on mud or sand surface after falling on outstretched elbow at ground level (P< 0.05).

The analysis of height of furniture or playing equipment revealed that average height was 4.3±2 feet (range 2.6 to 6 feet). A total of 55 (45.4%) children falling from height of up to 4 feet had Gartland type III fractures while 66 (54.5%) children sustained type III fracture fallen from height of above 4 feet (P > 0.05).

Majority (89.3%, n=143) of the fractures were closed while 17 (10.6%) children had open fractures. All the children were managed appropriately as per protocol. Closed reduction and percutaneous pinning under image intensifier was done in 92 (87.6%) children with type III fractures while open reduction and stabilization with k wires in 13 (12.3%) children after failed attempts of closed reduction. Gartland type I fractures (17.5%, n=28) were treated with immobilization in a splint while and type II fractures (16.8%, n=27) were treated with closed reduction and splinting. Pre-operative anterior interosseous nerve injury was noted in 4 (2.5%) patients while post-operative ulnar nerve injury was documented in 7 (4.3%) patients.
Table 1. Aetiology and Gartland Types of Supracondylar Fractures in Children

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Mechanism of Fracture</th>
<th>Number of children</th>
<th>Percentage</th>
<th>Number of Gartland fractures (n=160)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Type I</td>
</tr>
<tr>
<td>1</td>
<td>Tumble</td>
<td>26</td>
<td>16.2%</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>Fall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>From Furniture</td>
<td>101</td>
<td>63.1%</td>
<td>04</td>
</tr>
<tr>
<td></td>
<td>From Bicycle</td>
<td>11</td>
<td>6.8%</td>
<td>01</td>
</tr>
<tr>
<td></td>
<td>From Stairs</td>
<td>5</td>
<td>3.1%</td>
<td>00</td>
</tr>
<tr>
<td></td>
<td>From tree</td>
<td>4</td>
<td>2.5%</td>
<td>00</td>
</tr>
<tr>
<td>3</td>
<td>Lateral Bend</td>
<td>3</td>
<td>1.8%</td>
<td>03</td>
</tr>
<tr>
<td>4</td>
<td>Direct Hit</td>
<td>5</td>
<td>3.1%</td>
<td>04</td>
</tr>
<tr>
<td>5</td>
<td>Throw</td>
<td>2</td>
<td>1.2%</td>
<td>02</td>
</tr>
<tr>
<td>6</td>
<td>Unknown</td>
<td>3</td>
<td>1.8%</td>
<td>02</td>
</tr>
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</table>

Table 2. Day and Time of Supracondylar fractures of Humerus in Children

<table>
<thead>
<tr>
<th>S.No</th>
<th>Day of Injury</th>
<th>Number of fractures</th>
<th>Percentage</th>
<th>AM</th>
<th>PM</th>
<th>P value</th>
<th>Time of Injury</th>
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<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0000-1159</td>
</tr>
<tr>
<td>1</td>
<td>Monday</td>
<td>38</td>
<td>23.7%</td>
<td>14</td>
<td>24</td>
<td>0.2</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>Tuesday</td>
<td>21</td>
<td>13.1%</td>
<td>07</td>
<td>14</td>
<td>0.3</td>
<td>07</td>
</tr>
<tr>
<td>3</td>
<td>Wednesday</td>
<td>18</td>
<td>11.2%</td>
<td>07</td>
<td>11</td>
<td>0.4</td>
<td>07</td>
</tr>
<tr>
<td>4</td>
<td>Thursday</td>
<td>22</td>
<td>13.7%</td>
<td>06</td>
<td>16</td>
<td>0.3</td>
<td>06</td>
</tr>
<tr>
<td>5</td>
<td>Friday</td>
<td>31</td>
<td>19.3%</td>
<td>10</td>
<td>21</td>
<td>0.2</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>Saturday</td>
<td>17</td>
<td>10.6%</td>
<td>06</td>
<td>11</td>
<td>0.3</td>
<td>06</td>
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<tr>
<td>7</td>
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<td>13</td>
<td>8.1%</td>
<td>05</td>
<td>08</td>
<td>0.4</td>
<td>05</td>
</tr>
</tbody>
</table>

Table 3. Frequency of Different Supracondylar Fractures Sustained on Different Landing Surfaces

<table>
<thead>
<tr>
<th>Aetiology</th>
<th>Carpet/Mattress</th>
<th>Cemented/Tiled Floor</th>
<th>Grass</th>
<th>Mud/Sand</th>
<th>Total (n=147)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type I</td>
<td>Type II</td>
<td>Type III</td>
<td>Type I</td>
<td>Type II</td>
</tr>
<tr>
<td>Tumble</td>
<td>01</td>
<td>02</td>
<td>01</td>
<td>01</td>
<td>04</td>
</tr>
<tr>
<td>Fall</td>
<td>02</td>
<td>03</td>
<td>13</td>
<td>02</td>
<td>05</td>
</tr>
<tr>
<td>Furniture</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>01</td>
<td>02</td>
</tr>
<tr>
<td>Bicycle</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>Stairs</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>01</td>
</tr>
<tr>
<td>Tree</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>01</td>
</tr>
<tr>
<td>Total</td>
<td>03</td>
<td>05</td>
<td>14</td>
<td>04</td>
<td>12</td>
</tr>
</tbody>
</table>

Discussion

Due to the Covid-19 outbreak and the government of Pakistan strict instructions to the public to stay inside home children were forced to remain and play inside home. This was reflected from the findings of our study as majority (86.2%, n=136) of our children sustained fractures indoor while only few children (13.7%, n=22) sustained fracture outside home in nearby street. In
an epidemiological analysis of 488 paediatric elbow fractures, Okubo and his colleagues [13] reported that supracondylar fractures were the commonest (43.8%, n=214) followed by lateral condyle fractures (22.3%, n=109). Overall the most common cause of fracture in their study was also indoor fall noted in 242 (49.5%) children with indoor causes like fall from chair in 18(3.6%) children, sofa in 11 (2.2%) and bed in 6 (1.2%) children. Outdoor fall from playground equipment was responsible for fractures in 14 (2.8%) children with fall from tree in 11 (2.2%), iron rod in 11 (2.2%) and aerial ladder in 10 (2%) children. Analysis of other fracture mechanism revealed that tumble had caused fractures in 214 (43.8%) children, lateral bend in 9 (1.8%), direct hit in 11 (2.2%), throw in 10(2%) and unknown mechanism in 10 (2%) children. These authors, however narrated that this aetiology was not for supracondylar fractures alone but for all paediatric elbow fractures. Furthermore, the frequency of fractures were highest in May (11.4%, n=56) and August (5.1%, n=25) in comparison to our study where we had noted highest frequency of supracondylar fractures in April (40.6%, n=65) and May (25%, n=40). These authors concluded that the frequency of paediatric elbow fractures could not be attributed to environmental temperature only because there were many other factors which could influence fracture rate namely urban/rural sitting, culture and holidays. Other studies [14, 15] also reported the peak incidence of supracondylar fractures in summer because children preferred to play in warm than in cold environment. Loder [6] documented 48 (13.5%) supracondylar fractures in the month of June, 46 (13%) in May, 30 (8.4%) in March and 27 (7.6%) in April. Seasonal variations of supracondylar fractures are important to understand in regions where great climate variations exist because effective resource utilization and cost planning can be improved.

In our study right supracondylar was fractured in 26 (16.2%) and left in 134 (83.7%) children. This finding was similar to other studies [6, 10]. The most likely explanation could be the possibility of dominant upper limb in use during play while the non-dominant hand assumed the position of protection during fall or injury. We considered this finding important because most (91%, n=123) children in our series were right handed and parents could expect ease in feeding, dressing and ability to accomplish written school home work in these children.

Days and time analysis of our fracture data showed that children sustained fractures more on Monday (23.7%, n=38) and Friday (19.3%, n=31) than on other week days (P > 0.05). Majority (65.6%, n=105) of the children were injured in PM while 55 (34.3%) in AM. The peak time of occurrence of fracture was 1700 h and most (86.2%, n=138) children were received in our hospital in 1800-2000 hr. It could be expected that since majority of these children would be operated at night and dedicated Orthopaedic surgeons and efficient operating theatre staff would be of paramount importance. Somewhat similar to our study Loder [6] noted that children sustained fractures more on Saturday (17.2%, n=61) and Friday (17.2%, n=61) followed by Tuesday (14.4%, n=51) and Monday (13.5%, 48). He documented that maximum fractures (68.2%, n=241) occurred in PM while 37(10.4%) fractures occurred at AM. The peak time of fracture was 1800h in his study. Chai [16] noted male
predominance of supracondylar fractures in his series with majority sustained inside home and peak time of occurrence of majority fractures were at 1800. Mc Rae [10] and his colleagues examined the clinical record of 569 patients who were treated for supracondylar fractures between 2004 and 2014. Most of the fractures were presented to the hospital around 1700-17:59 h.

In our study the analysis of landing surfaces after fall and height of furniture or play equipment revealed that the frequency of type III fractures were more in children landing on cemented or tiled surfaces ($P < 0.05$). The frequency was however, low on mud or sand landing surfaces ($P < 0.05$). No significant increased frequency of type III fracture was noted in children falling from 3 or more feet height ($P > 0.05$). Many authors studied the impact of surfaces characteristics and height of play equipment or furniture on the incidence of supracondylar fractures in children. Laforest [17] showed that children falling from equipment height greater than 2 meter sustained injuries 2.6 times more than those falling from lesser height. Furthermore he advocated that the resilience of the surface (g max) on which children fall should be less than 200 g to reduce the incidence of injuries. They advised that sand should be used beneath the equipment as it reduced the severity of injuries. In an earlier study the same author [18] analyzed the data of 930 injured children and found that most children sustained injuries at home than at public play grounds. He observed that 698 (75%) fractures were sustained when children fall down on grass while 568 (61%) fractures were sustained on sand beneath the play equipment. The author claimed that his study was the first epidemiological study to prove that grass was not a good protective surface beneath playing equipment. He therefore, recommended that grass should be replaced by sand beneath playing equipment. Bar [19] analyzed the data of supracondylar fractures in children over a 3 year period at a district general hospital. He documented that these injuries were more common during summer school holidays. Playground equipment were responsible for 38% of fractures while falls from furniture had caused fractures in 16% children his series. Bar advised that since children could not be stopped from playing, only preventative strategies could be adopted to make playing area more safe. Lowering the height of play equipment, application of softer landing surface beneath the furniture or equipment and play supervision by parents or adults would expected to reduce the incidence of supracondylar fractures. Bar’s safety and preventative measures were endorsed by Park [20].

Gartland type III was the predominant type (65.6%, $n=105$) of fracture noted in our study. This was consistent with previous studies [21, 22] but in contrast to Houshian [23] who reported type I to be the predominant type of fracture and the possible reasons he stated was either low energy trauma in his series or increased sensitivity of radiographs to detect undisplaced supracondylar fractures. Fiissel [24] was of the opinion that minor fractures in children were caused by fall from standing heights while major fractures were caused by fall from height and 3.9 times more likely required reductions.

In our study pre-operative anterior interosseous nerve injury was present in 4(2.5%) patients while post-operative ulnar nerve injury in 7 (4.3%) patients. A
study of 272 children in Malaysia [25] reported pre-operative nerve injury in 9 (3%) children and post-operative ulnar nerve injury in 34 (12.5%) children, radial nerve in 3 (1.1%) and median nerve injury in 2 (0.7%) children. Bar [19] noted nerve injury in 3 (3.5%) children upon presentation while post-operative neurological compromise was reported in 2 (0.7%) children in his series of 84 supracondylar distal humerus fractures of extension type. In a meta-analysis by Babal [9] data of 5154 supracondylar fractures revealed that pre-operative anterior intersosseous injury was present in 34.1% children. Post-operative iatrogenic ulnar nerve injury was noted in 4.1% and median nerve injury in 3.4% children. Babal was of the opinion that lateral pinning was associated with more chances of median nerve injury whereas ulnar nerve injury was more frequently seen with medial pinning. Mangwani and colleagues [26] shared their ten year experience (1993-2003) of 291 supracondylar fractures and noted neurological deficit in 12 (4.1%) children on presentation and 9 (3%) children post operatively.

In our study the peak time of occurrence of fracture was 1700 h and majority (86.2%, n=138) children were received in our hospital in 1800-2000 hrs and were operated at night. Although Ricci and colleagues [27] reported adverse outcome with delaying surgical management of Orthopaedic cases, others [28-31] on contrary reported that delaying surgery of a supracondylar fracture did not affect the outcome significantly.

The incidence of supracondylar fractures and its surgical treatment is on the rise globally [32-34]. Irrespective of any type of treatment long term morbidity had been reported in 25% of children with supracondylar fractures [35]. The preventive measures are thus justified and must focus on environmental, biological and behavioral factors and our study aids in understanding these factors. Paediatric injury rates and severity due to hazards of equipment can be reduced significantly when optimal safe equipment height and landing surfaces are maintained [36-38].

In this study 92 (87.6%) type III fractures were treated with closed reduction and percutaneous pinning under image intensifier while open reduction and k wires fixation was done in 13 (12.3%) children after failed attempts of closed reduction. Khoshbin et al [15] reported 78.7% closed reduction and k wire fixation and 21.3% open reduction and k wire fixation in their series of 3235 supracondylar fractures. Other studies [39-41] documented conversion rate of percutaneous to open surgery in 22.4% to 47.2% cases. This debate of closed versus open surgery is important due to the fact that some previous studies [42, 43] had reported decreases range of elbow motion and increased carrying angle when supracondylar fractures were treated with open reduction rather than closed reduction and percutaneous k wire fixation.

In our study we were unable to document the exact nutritional status of children but it is important because good nutritional status and adequate calcium and vitamin D have been shown to increase bone mineral mass and are protective against fractures in children [44]. Furthermore low socioeconomic status and excessive consumption of carbonated drinks have also been shown to increase the risk of fractures in children [45, 46]. Majority of our study
participants were although poor but apparently healthy and without any genetic disorders or chronic debilitating diseases.

In literature vascular injury have been reported with supracondylar fractures particularly in Gartland type III fractures [47, 48] but luckily we have not noted any vascular injury in our series.

Supracondylar fractures due to child abuse although reported in upto 20% cases in literature [49] had not been noted in our series.

In our series majority (75.6%, n=121) of study participants were boys while girls were 39 (24.3%). This is in accordance with previous studies [50]. However few other studies [51, 52] had documented no significant difference in the incidence of supracondylar fractures among boys and girls rather a higher incidence noted in girls.

About 17 (10.6%) children had open supracondylar fractures in our study. This was slightly higher than reported in previous studies whereby 1% to 3.4% children had been reported to had open supracondylar fractures [50, 53].

We noted that 18 (11.2%) children had associated injuries along with supracondylar fractures. These injuries included clavicle fractures in 8 (5%), proximal humerus fractures in 6 (3.7%) and physeal injury to distal radius in 5 (3.1%) children. Other studies [50, 53-55] had reported the incidence of various associated injuries in up to 5% children with supracondylar fractures and ranging from forearm fractures, clavicle fractures, proximal humerus fractures and physeal injuries to the distal radius.

Majority (80%, n=128) children were received in our hospital within 24 hours of sustaining the fracture while 28 (17.7%) in 24 to 48 hours and 4 (2.5%) children were received in 48 to 72 hours of sustaining the fracture. Delayed presented children (2.5%, n=4) were initially treated with splints by traditional bone setters but no complication was noted. Usually our hospital received many children who had been initially treated by local bone setters and even few with complications like compartment syndrome and gangrene as a result of improper treatment. However during Covid-19 lock down people were only allowed to travel to hospitals and this could be the possible explanation of only few cases treated by bone setters. Anjum and colleague [50] reported that 39.9% children in their study were received in hospital within 48 hours after sustaining the injury and they had not been treated by local bone setters while 60% children reported after 48 hours and mostly were managed by bone setters initially. In developing countries of Asia and Africa traditional bone setters are more prevalent [56]. Many authors [57, 58] had documented that in rural areas more than 70% of skeletal injuries were initially treated by local traditional bone setters. Arora [59] had reported that more than 70,000 traditional bone setters are treating people only in India. The usual reasons to consult these bone setters instead of qualified doctors or hospitals were superstitious beliefs, illiteracy, fear of surgery and inability to afford hospital cost [56].

Our study had few limitations. The design of our study was descriptive and we were not able to measure the resilience of the impact absorbing surfaces beneath furniture or play equipment (g max). The exact co relation between falling height and impacting surfaces could not be determined. Moreover
indoor playing activities of children vary due to socioeconomic and cultural differences and our results might not be generalized directly for other areas or countries. We suggest further large scale well designed studies to address these limitations.

Conclusion

Majority children sustained fractures due to fall from furniture landing on hard cemented or tiled surfaces. Maximum number of fractures were reported in the month of April and on Monday. Most of these injuries occurred in the evening and were operated at night.

References


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