Extended length of stay in children admitted to a quaternary orthopaedic ward with suspected non-accidental injury

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Background. Tertiary hospitals, and specifically orthopaedic surgeons, have a crucial role in identifying suspected cases of child abuse, but such facilities are not an appropriate setting for long-term management.
Objective. To compare patient profiles in a local setting with those described in international literature to address risk factors for non-accidental injuries (NAI) and those prolonging hospitalisation for suspected cases.
Methods. Records were analysed of patients admitted to the Paediatric Orthopaedic Unit at Charlotte Maxeke Johannesburg Academic Hospital and referred for investigation for suspected NAI or neglect between 1 January 2015 and 31 December 2020. Data collected included demographic information, injury details and admission data.
Results. A total of 79 cases were reviewed, of whom 44 (55.7%) were South African citizens and 35 were foreign nationals (91% undocumented). Three-quarters (75.9%; *n*=60) of the patients were <36 months. Delayed discharge was found in two-thirds (65.8%) of cases, primarily associated with younger age and significantly correlated with upper-limb fractures and involvement of governmental social welfare services. Only 9% of cases referred to a regulatory body were subsequently moved to a place of safety.
Conclusion. Despite no significant correlations found between patient demographics or caregiver characteristics and extended hospital stays, factors such as patient age (<36 months) and upper-limb fractures were associated with delayed discharge. Delays were also influenced by the time taken to complete investigations, with involvement by governmental social welfare services significantly prolonging discharge. This study highlights the need for improved resources to investigate and manage these vulnerable children.

Keywords. Abuse, admission, risk factors, non-accidental injury, neglect.

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Child abuse is a critically important health issue as it deals with a vulnerable population and revolves around a socioeconomic burden that is not often discussed or well understood in health system settings. Few members outside the specialised units that deal with these patients understand the extent of the financial resources and time investment that dealing with child abuse cases in a hospital setting demands.

The historical segregation and the economic discrepancies of the South African (SA) population create a scenario of special interest.[1] The exact extent of abuse in SA is not known. In 2016, a national prevalence study estimated that one-third of children experience physical or sexual abuse before the age of 18.[2] However, estimates from several smaller local studies are much higher, with up to 56% of children younger than 18 likely to experience physical abuse in areas of the Mpumalanga and Western Cape provinces.[2]

Following soft-tissue injuries, fractures are the most commonly seen, and observations by orthopaedic surgeons are therefore integral to identifying and flagging suspected child abuse cases.[3]

According to Fong *et al.*,[3] more than half of children presenting with fractures due to non-accidental injury (NAI) are under the age of three years. In addition to the age-related risk of physical abuse, studies have also examined various family- and child-related risk factors that could contribute to the prevalence of child abuse.

For example, Doidge *et al.*[4] studied 2 443 individuals in a birth-based population cohort in Australia and assessed 21 risk factors for child maltreatment related to family structure or child-specific aspects. Risk factors that independently and cumulatively placed children at a higher risk for maltreatment included: cognitive or behavioural challenges; immigrant parents; parents younger than 22; episodes of parental unemployment; growing up in a low-income household; parental mental health issues or substance abuse; divorced parents; and parents having experienced instability during high school years. The risk was cumulative with increased numbers of risk factors present.

Patwardhan *et al.*[5] identified parental employment status, physical and mental health, housing stability, drug abuse and domestic violence level as variables that could contribute to cumulative risk.

In 1998, the American Academy of Pediatrics recommended hospital admission for children suspected of abuse or neglect, particularly in areas lacking specialised community-based units for their care and evaluation. This approach aimed to expedite the investigation and care of abused children, emphasising the urgency of addressing suspected cases, even when medical injuries do not warrant immediate admission.[6]

Managing suspected cases of child abuse should ideally comprise a multidisciplinary team, including social workers, psychologists, paediatricians and relevant specialists trained in abuse management.

Timely investigations are crucial, as some standard procedures (e.g. ophthalmology reviews) are time sensitive, with certain injuries showing resolution within 24 hours in small children.[4]

In the paediatric orthopaedic ward at Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), cases identified as suspicious (often on the basis of age of the patient) are referred to a multidisciplinary in-house team for review, which consists of social workers, doctors, nurses and staff from the Teddy Bear Clinic (this is an in-hospital clinic that provides support, including medicolegal assistance, for suspected cases of abuse and neglect.) Cases that are confirmed as suspicious after this initial review are referred to the Department of Social Development (DSD), as required by law.

Our ward serves as a temporary place of safety for children awaiting decisions from social services. However, prolonged hospital stays pose challenges, particularly in cases of suspected abuse, when investigations and legal processes can span several weeks or months. Quantifying and addressing factors that contribute to extended hospitalisation in cases of suspected abuse is an understudied area.[7]

We assessed the demographic profile of patients investigated for NAI in our ward with regard to risk factors identified in the literature in order to explore the factors contributing to prolonged hospitalisation. Identifying and addressing these factors can reduce the length of hospital stays without the standard of care for these children being compromised.

Methods

Study setting and data collection

The study was conducted in the Paediatric Orthopaedic Unit of CMJAH, based on records of all patients referred to the Teddy Bear Clinic from 1 January 2015 and 31 December 2020. Cases with incomplete records were excluded from the study. Data collected included demographic information and specific details of the admission. Demographic information included details regarding the home environment and possible family and social risk factors, the type of injury sustained, and mechanism of injury. Admission data included the length of hospital stay after patients were medically fit for discharge, as well as the time taken to complete various investigations per case.

Data analysis

Descriptive statistics were used to summarise the data and are presented as medians, interquartile ranges, percentages and frequencies. Associations between categorical variables were assessed by means of Fisher's exact test. Associations between continuous variables and categorical variables were investigated using the Mann-Whitney U test or the Kruskal-Wallis test, depending on the number of categorical variables to be considered. Univariate and multivariate binary logistic regression were performed with discharge delay as the dependent variable.

Ethical considerations

Ethics clearance was obtained from the University of the Witwatersrand Human Research Ethics Committee (Medical) (ref. no. M210361).

Results

Over the six-year period for which records were analysed, 80 cases from the paediatric orthopaedic ward were found to have been investigated for NAI. Of those, one case was excluded because of incomplete data.

In the total cohort of 79 cases, 39 were female patients and 40 were male, with a median age of 20 months (range: 1 month - 14 years). Three-quarters (75.9%; n=60) of the patients were younger than 36 months. Five children (6.3%) had some form of disability.

The social circumstances of the children were also reviewed. Of the total group, 44 children (55.7%) were SA citizens and 35 were foreign nationals, of whom 31 (88.6%) were undocumented (residing in the country without necessary documentation). Most patients (n=60; 75.9%) lived in the inner-city areas surrounding the hospital; only two of those from areas outside city centre were living in informal housing.

Parents were the primary caregivers in 72 cases (91.1%), while six children were cared for by grandparents, nannies, children's homes or friends. One child lived alone on the street. The age of the caregivers ranged from younger than 20 years (n=6) to over 35 years. Parents cohabited in 40 of the 72 cases in which they were the primary caregivers (54.8%); 16 (21.9%) were formally married and close to a quarter (n=17, 23.3%) were single parents. Marital status was not noted for six cases (8.3%). Caregivers reported that they had support at home in 67 cases (84.8%).

With regard to the reason for orthopaedic admission, isolated limb fractures made up 73 (92.4%) of the presenting injuries, of which lower-limb fractures were identified in 54 cases and upper-limb fractures in the remaining 19 cases. There were two cases of multiple long-bone fractures. Of note is that 38 of the lower-limb fractures were of the femur.

Delayed discharged (i.e. later than when the patient was fit for discharge) was seen in 52 (65.8%) of the records analysed. A minimum of one day extra and a maximum of 233 additional days of hospital stay were noted in cases with delayed discharge (median = 15.5 days; interquartile range: 6 – 32 days).

Delayed discharge was significantly associated (p=0.014) with patient age <36 months. No statistically significant correlations were found between caregiver demographics and delayed discharge.

A statistically significant correlation (p=0.002) was found between an admission diagnosis of upper-limb fracture and delayed discharge.

Family history of abuse, previous patient admissions, the reason for suspected NAI, mechanism of injury and outcomes of investigations were used to assess the likelihood of delayed discharge. No statistically significant correlations were found for any of these factors (p>0.05).

The likelihood of delayed discharge was found to be significantly related to investigations taking longer to be completed (p=0.047). DSD involvement in the investigation was found to increase the delay of discharge to 32 days, whereas it was, on average, 7 days when DSD was not involved.

There was a significant association (p=0.001) between referral to DSD and delayed discharge (Table 1). More than a third of the cases (n=28, 35.4%) were deemed concerning enough for referral to DSD; however, on discharge only seven (8.9%) children were moved to a place of safety pending further investigation. All other patients were discharged directly back to their caregivers (Fig. 1).

Discussion

The demographic profile of patients in our cohort is mostly consistent with that seen in literature. Of the 79 patients, 60 (75.9%) were younger than 36 months, similar to the findings of Fong *et al.*[3] Sink *et al.*[6] suggested that it was unnecessary to raise the alarm for suspected abuse over the age of 3 years. However, if an absolute cut-off were in place, 24% of our patients referred for investigation would not have been considered.

Patwardhan *et al.*[4] and Doige *et al.*[5] both suggested clear parental and home factors that could place children at a higher risk of a NAI. Owing to the retrospective nature of our study, we could not fully

Table 1. Relationship between discharge delay and DSD involvement

	Delayed discharge		
DSD involvement	Yes (*N*=52), *n* (%)	No (*N*=27), *n* (%)	*p*-value
No	27 (51.9)	24 (88.9)	0.001*
Yes	25 (48.1)	3 (11.1)	

*Statistically significant at $p<0.05$.

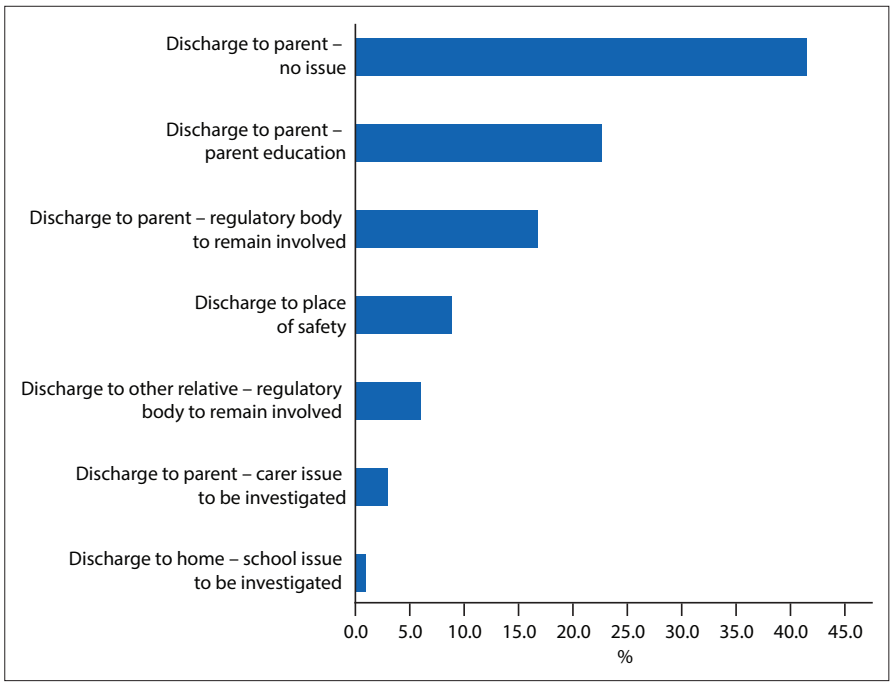

Fig. 1. Discharge decisions.

explore all the risk factors as records did not always reflect all the risk factors mentioned in definitive literature. However, from our findings we could confirm several risk factors as being statistically insignificant in our population, namely: having single parents; a history of domestic violence; previous admissions; and previous fractures.

The only risk factor that could be clinically significant in our study was that of children having undocumented immigrant parents. Of the 79 cases reviewed, 35 (44.3%) were foreign nationals, of whom 32 were undocumented with Home Affairs. This is of major concern as these children are not accommodated in the social service system and cannot be referred to places of safety, and assistance through the diplomatic processes is difficult.

Fong *et al.*[3] described the types of fracture associated with a high specificity for NAI. Only 5.1% of our cases were referred for investigation based on the fracture type. Fracture patterns with a high specificity for NAI were rare within the patient group.[8]

Our unit policy aligns with the statement of the American Academy of Orthopaedic Surgeons, which recommends that children with suspected NAI be admitted for care and investigation owing to poor community support structures.[9] However, the hospital environment is not optimal for long-term management of these children and admission should ideally serve only as a temporary intervention.[7] Unfortunately, the paediatric orthopaedic ward often becomes the temporary refuge for many of these children, leading to inadequate schooling, beds for children requiring specialised care being taken up, and higher daily costs of care compared with that in appropriate places of safety.[10]

Our analysis showed that two-thirds of patients were not discharged on the day they were medically fit for discharge. Neither patient demographics nor caregiver characteristics showed any variables significantly increasing the risk of extended hospital stay.

Patient age <36 months and upper-limb fractures emerged as the only independent patient factors associated with delayed discharge. There was a higher likelihood of suspicious circumstances in children with upper-limb fractures being investigated for NAI. Upper-limb fractures are more commonly treated on an outpatient basis and admission is more commonly specifically due to suspicion of NAI. Conversely, lower-limb fractures were referred for investigation based on the unit policy rather than actual suspicion and could be cleared more quickly. Thus, the correlation of upper-limb fractures and delayed discharge may be due to bias in the results rather than a reflection of true association.

Another independent risk factor for an extended length of stay was the time needed to complete investigations. Waiting lists and delays are not uncommon in a busy state hospital. The correlation between referral to DSD and delayed discharge was perhaps the most significant of the findings. This was not surprising, as cases referred to DSD were the more concerning and complicated ones, which remained suspicious for NAI after review by the multidisciplinary team. The longest delay to discharge was 233 days. The average delay to discharge increased from 7 to 32 days once DSD was involved.

The orthopaedic team, hospital social worker, and Teddy Bear Clinic doctor collaborate to assess patients admitted for suspected NAI. Each case is thoroughly investigated, and only those that remain suspicious are referred to DSD. Despite 28 cases being referred, DSD deemed only seven (25%) to require protection in a place of safety for further investigation and legal processes. This low rate is attributed partly to the improper practice of the hospital ward being used as a temporary place of safety.

Even after significant delays in discharge, at least two children were returned to the care of abusive families. This resulted in readmission for NAI in one case and, tragically, death in another.

Conclusion

There is a paucity of literature that examines the nature of NAI in the SA state health sector. Our analysis shows that there is a pressing need to establish better channels for referrals to temporary places of safety to accommodate patients admitted for suspected NAI. This should be done without compromising the safety of these children or inappropriately expediting their return to abusive or neglectful situations.

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