Pediatric Hand Injuries Caused by Household Products: Identifying Key Causes and Prevention Strategies

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INTRODUCTION:
Hand injuries among the pediatric population can lead to significant morbidity and functional impairment. Some of these injuries are caused by common everyday products. Identifying household objects that commonly cause these injuries in children is crucial for injury prevention at home. The purpose of our study was to investigate which household products were common causes of pediatric hand injuries that required emergency department care.

METHODS:
We utilized the National Electronic Injury Surveillance System (NEISS) database, a representative sample of consumer product-related injuries, to analyze hand injuries in patients aged less than 1 year to 18 years from 2014 to 2023. Patients were categorized into four groups: infants (<1 year), toddlers (1-3 years), children (4-12 years), and adolescents (13-18 years). Descriptive statistics were used to summarize the data, and chi-square tests were employed to assess the association between age groups and product types. Yearly incidence rates per 100,000 population were calculated. Analysis of variances (ANOVA) was utilized to explore the association between injury type at specific ages.

RESULTS:
From 2014 to 2023, a total of 48,286 pediatric hand injuries were reported to NEISS. The yearly incidence of injury was 39 per 100,000 infants, 4.37 per 100,000 toddlers, 11.73 per 100,000 children; and 10.3 per 100,000 adolescents. The average age of injury was 8.35 ± 5.88years. 98.3% of the injuries did not require hospital admission, and none were related to alcohol or drug use. The most frequent household product to cause hand injuries was doors, accounting for 21.1% (10,207 cases) of all injuries. This was followed by knives (16.1%, 7,769 cases), furniture (10.6%, 5,126 cases), and walls (5.5%, 2,666 cases). Other notable household causes included appliances (6.1%, 2,943 cases) and metal containers (3.4%, 1,632 cases). Doors were the most common product to cause hand injuries, accounting for 32.9% (1,319 injuries) among toddlers and 24.5% (5,350 injuries) among children. Furniture and knives were also significant causes, with furniture responsible for 12.1% (486 cases) of injuries in toddlers and 11.9% (2,589 cases) in children, and knives accounting for 5.9% (237 cases) in toddlers and 16.7% (3,645 cases) in children. In adolescents, knives were responsible for 24.5% (3,682 cases) and were the leading cause, followed by walls for 14.3% (2,138 cases) ($P < .001$). The most reported injury types were lacerations, followed by abrasions, and then fractures. Table 1 lists the injury types and the most common causative household item. Lacerations were most common at an average age of 9.05 years ± 5.87, abrasions at 8.4 years ± 6.10, and fractures at 9.28 years ± 5.50. An analysis of variance (ANOVA) found the differences in injury types at specific ages to be significant ($P < 0.001$).

DISCUSSION AND CONCLUSION: These results provide critical insights into the epidemiology of pediatric hand injuries and can guide medical professionals and caregivers to consider some preventive measures at home to reduce the incidence of hand injuries in the children in their care. These recommendations should be tailored to the ages of the children. Based on these findings, it is recommended that households with young children consider adding safety mechanisms to doors to prevent hand injuries in this population. In households with older children, such as adolescents, doors are likely less of a danger, but these children should be supervised and instructed in proper knife use and storage. Additionally, the study found that only 1% of children who presented to the emergency room with a hand injury required admission, highlighting the fortunately generally non-life-threatening nature of these injuries. The analysis revealed minimal association of pediatric hand injuries with alcohol or drug use. The most common hand injuries in children are: lacerations, abrasions and fractures. Medical providers should counsel families to consider safety mechanisms and practical strategies to prevent hand injuries in their children.