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Pediatric Vehicular Heatstroke: Analysis of Cases when Children Gained Access to Vehicle

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Introduction

Since 1998, 937 children have died from Pediatric Vehicular Heatstroke (PVH), while this number is small regarding childhood mortality, it is still an important concern because the deaths of these children could have been prevented (Null, 2022). Previous research has analyzed the deaths that occurred when children were left in the vehicle knowingly and unknowingly but does not discuss the cases where children gained access to the vehicle (Hammett et al., 2020). The goal of this research is to determine what went wrong in the cases where children gained access to the vehicle and what parents were doing at the time of the incident, to understand if it could be prevented.

Methods

We reviewed 627 cases of pediatric hyperthermia that occurred in the United States between 2000 and 2016. To locate these cases of fatal hyperthermia, we used the website Heatstroke Deaths of Children in Vehicles (<http://noheatstroke.org/>) that was created by Jan Null, CCM of San Jose State University.

We reviewed the public knowledge (e.g. newspaper articles, online reports) regarding cases to see if there was a clear description about what led to the death in these cases. We checked to make sure that the child had gained access to the vehicle on their own. We eliminated cases that involved the caregiver leaving the child in the car, leaving us with 128 cases. We then examined the circumstances surrounding the fatal events and were able to code 128 cases regarding the type of events that led to the deaths.

Results

In the fatal cases where children gained access, results show that the average age of children is 3.47 years old ($M=3.47, SD=2.20$; See Figure 1), while the average age for children who were left in the car intentionally or unintentionally was 1.11 years old ($M= 1.11, SD= 1.25$). This finding indicates that the children who gained access were significantly older than those who were left in vehicles $t(625)= -15.95, p < 0.05$.

We also looked at the known circumstances of how the children gained access (see Table 1), in most cases the children got into the car voluntarily (42.19% of cases; See Figure 2).

The most common activities parents reported was being asleep or napping (17.19% of cases; See Figure 3) and being home at the time of the fatal incident (16.40% of cases). A very small number of these cases involved parental drug use (1.56% of cases).

Figure 1

Bar Graph of Average Age of Children

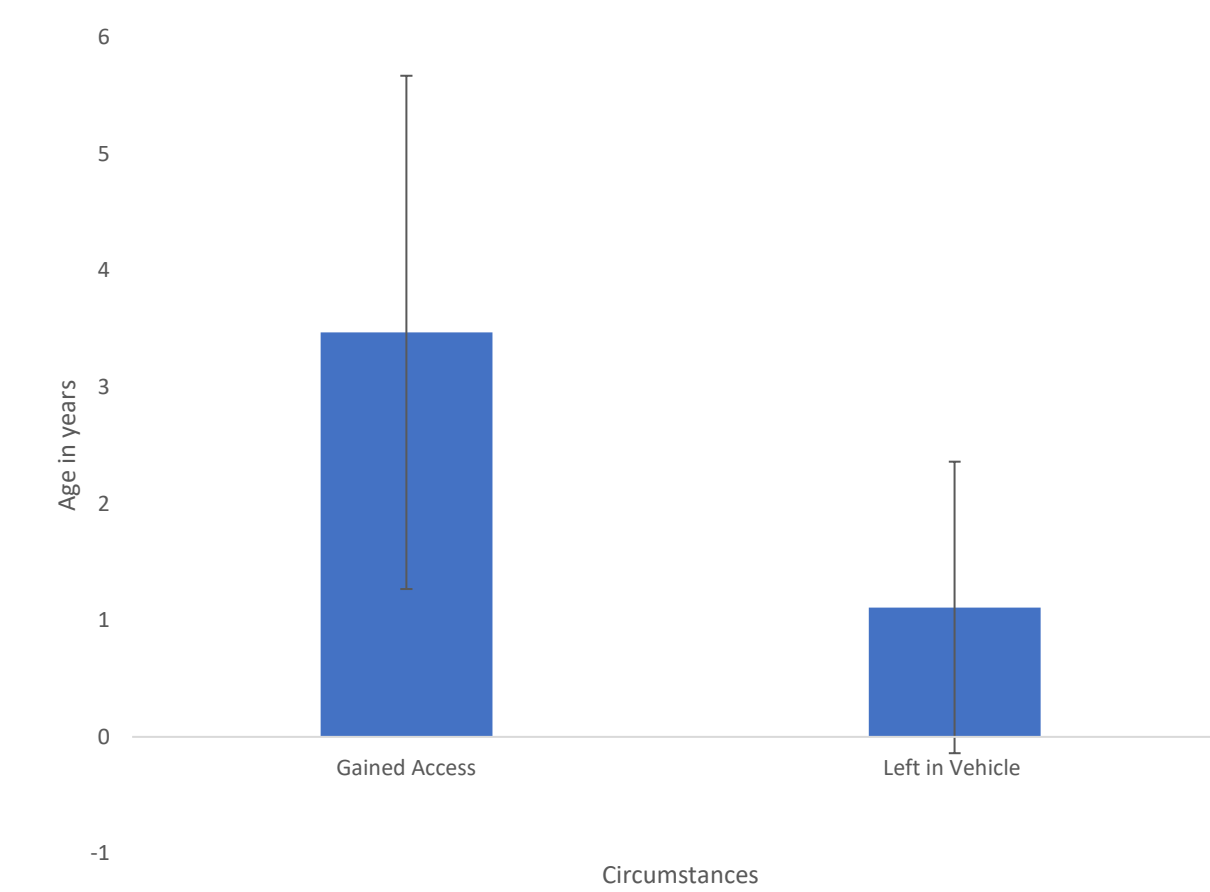


Figure 2

Bar Graph of Frequency of How Children Gained Access to Vehicle

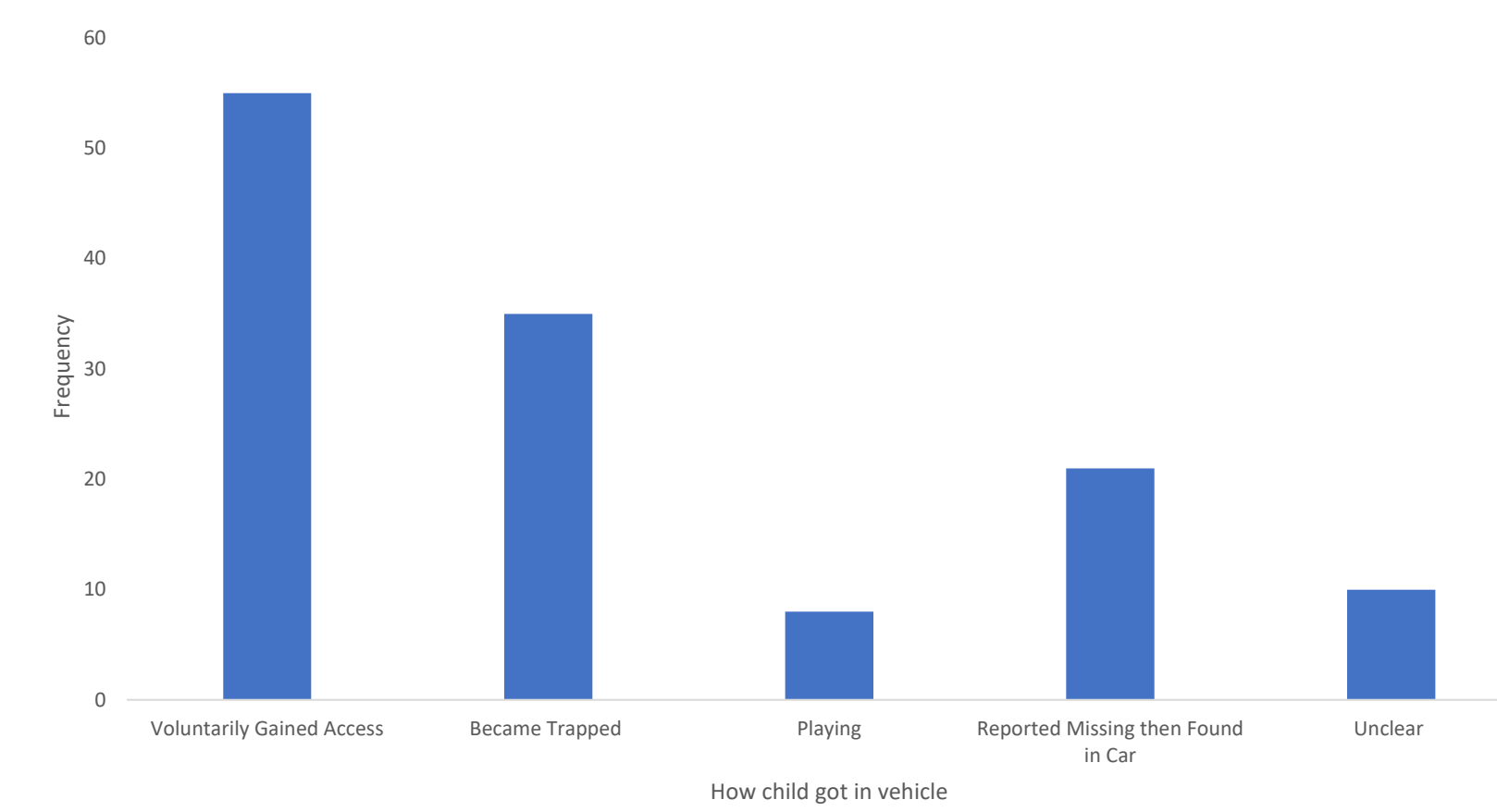


Figure 3

Bar Graph of Frequency of Parent/Caregiver's Behavior

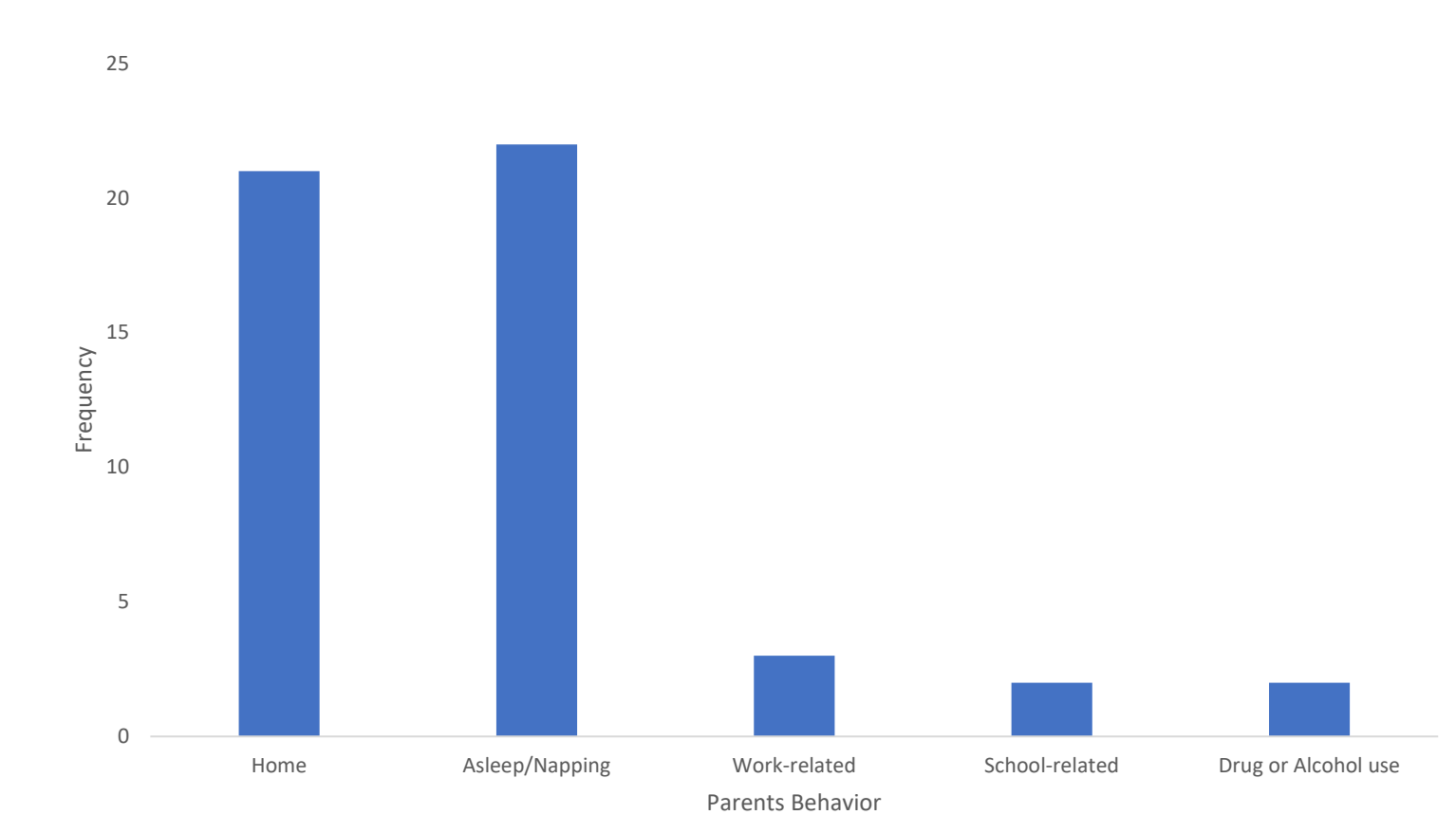


Table 1

Examples of Case Scenarios

Child Gained Access – Voluntarily
A mother in South Carolina was napping when her three-year-old son wandered out of the home with car keys, unlocked car and got in. The family dog followed the boy and also died.
In California, a mother was driving her nieces home, her two-year-old daughter got into the wrong car that was parked in the drive-way and was left there until mother returned home and a sibling found her inside the other car.
Child became Trapped in Vehicle
A two-year old in Georgia entered a car that had been left open and the toddler was able to climb in and shut the door, trapping herself inside.
A mother in Louisiana came home from work early one morning. Her children were all asleep when she went to bed. Her two- and three-year-old went outside and started playing in the car. The three-year-old got out and accidentally locked the doors. The three-year-old and two older sibling (five and seven) tried to get the two-year-old out of the car and tried waking their mother, but she couldn't be woken up. They reported that the two-year-old cried for a little while and then "went to sleep." It wasn't until a relative stopped by the house that the children where able to get the boy out, but unfortunately it was too late.
Child was Playing in Vehicle
Parents of a five-year-old boy in Illinois thought their child was indoors playing on his tablet, but the child had gone outside and into the car to plug tablet into car charger.
A two-year-old boy in Mississippi was playing and hid in car while playing hide and seek.
Child was Reported Missing then found in Vehicle
A three-year-old boy from Texas was reported missing by parents, after a massive hunt he was found by police in car.
In Texas, an eighteen-month-old was reported to have gone missing from home and in less than one hour was found in a neighbor's car.

Discussion

The overwhelming majority of these deaths are not caused by parents who are abusive or who are under the influence of drugs or alcohol. These cases of hyperthermia are tragic accidents that could unfortunately happen to almost anyone with children. It is important for parents and caregivers to monitor their children and keep car keys out of children's reach.

Since the average age of the children gaining access to vehicles is older than the children who were left in vehicles, it could be advantageous to educate children about the dangers of PVH. Currently there are very few recommendations or research on how to educate children about the dangers of PVH and if educating the children decreases death or incident rates. Future research should investigate the efficacy of educating children on the dangers of PVH and whether the education could help decrease incidents.

However, education alone is not enough to prevent these fatalities, technology is needed that can take some of the burden off parents/caregivers. Currently, there is an occupant detection system and alert technology that can be added to cars that uses motion, radar, lidar, carbon dioxide, etc. sensing to detect the presence of a living being inside a vehicle. Occupant detection can help to decrease these cases of hyperthermia if put in every vehicle to alert parents if a child is left or gains access to a vehicle. This type of technology is inexpensive and could be regulated to all vehicles in order to prevent these tragedies.

References

- Grand View Health. (2020, June 25). *Prevent Childhood Deaths in Hot Cars*. Gvh.org. <https://www.gvh.org/prevent-childhood-deaths-in-hot-cars/>
- Hammett, D. L., Kennedy, T. M., Selbst, S. M., Rollins, A., & Fennell, J. E. (2020). Pediatric heatstroke fatalities caused by being left in motor vehicles. *Pediatric Emergency Care*, 00, 1-6.
- KidsAndCars.org. (2023). *Kids and Car Safety*. Kidsandcars.org. <https://www.kidsandcars.org/>
- Null, J. (Updated 2022). *Heatstroke Deaths of Children in Vehicles*. Noheatstroke.org. <https://www.noheatstroke.org/index.htm>