



Investigating head injury and dental trauma related to shopping carts amongst children under the age of 12 years old: A meta-analysis of observational studies

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ABSTRACT

Background: Understanding the epidemiology of traumatic head injuries (THI) is essential to shape public health (PH) policies, implement prevention strategies, and justify the allocation of resources towards public safety, education, and research ¹. The World Health Organization (WHO) has recognized a gap in data and the high financial cost of THIs. Falls from shopping carts (SCs) are the most common cause of such injuries. This study aimed to investigate trauma related to SCs amongst children under 12 years of age, to help design safety strategies and effective intervention ².

Methods: A systematic review was conducted using the search engines PubMed, Medline, Web of Science, and Cochrane Library databases between 1999 and 2020. A meta-analysis approach was adopted to evaluate the effect size, confidence level, and odds ratios of head and teeth injuries attributed to SCs. The search resulted in a total of 38,402 studies, of which 38,317 were excluded for not meeting the first level criteria. 7 out of 20 were further excluded due to primary outcome and variable relations.

Results: 13 studies were subject to full meta-analysis (Table 1). The review involved an overall total sample of 180,857 children, the weight of 100%, and a confidence interval (CI) of 5.47 and 9.05 as the lower and upper limits; respectively. The result of the analysis showed the heterogeneity of the study was statistically significant at a 5% level ($p = 0.000 < 0.05$). There was a strong relation between falling from a shopping cart and head injuries (Figure 1) with high incidence rates (up to 72%).

Conclusion: Trauma associated with SCs is a major PH concern, attributed to poor adult supervision, unrestrained child, or cart misuse. It is imperative to develop a national safety strategy plan to reduce or prevent serious injuries, involving public awareness through verbal prompts, posters, flyers, and stickers ³. Further investigation into associated dental trauma is needed.

Keywords: Trauma, Shopping carts, Children, Safety, Prevention

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Table 1. Studies related to shopping cart injuries, subject to full meta-analysis.

ID	Author	Title	Year	Mean	SD	Sample size (N)	Incidence of injuries (year)	Public intervention	Effect size	CI
1.	Burrows et al.	Head injury from falls in children younger than 6 years of age	2015	6.94 (6.84)	2.75(1.36)	1,775	25%	Yes	-	95%
2.	Ferrari et al.	Promoting Safety Belt Use in Shopping Carts: "Buckle-Up Your Baby"	2015	21.4 (21.8)	11.4(15.5)	80	-	Yes	90.6	95%
3.	Parry et al.	Shopping trolley-related injuries to children in New Zealand, 1988-97	2002	10.6	3.4	282	0.01%	Yes	-	99%
4.	Marcotte et al.	Injuries from shopping carts and strollers in the pediatric population	2004	5.6	1.1	241	70.3%	Yes	-	99%
5.	Wright et al.	The incidence of shopping cart related injuries in the United States, 2002-2006	2007	37.8	30.7	114,684	0.1%	Yes	-	95%
6.	Vilke et al.	9-1-1 Responses for shopping cart and stroller injuries	2004	7.03	4.75	241	-	No	89%	-
7.	Martin et al.	Pediatric shopping-cart-related injuries treated in US emergency departments, 1990-2011	2013	4.33	3.80	24,113	71.8%	No	-	-
8.	Clayton et al.	Child safety in Grocery stores: The impact of verbal prompts and reinforcement on safety strap use in shopping carts	2014	14.6	5.6	21,065	58%	Yes	-	95.2
9.	Kim et al.	Analysis of pediatric head injury from falls	2015	52.9	46.1	729	2%	No	-	-
10.	Smith et al.	Shopping Cart-related injuries to children	2006a	4.5	0.4	24,200	-	Not clear	-	48%
11.	Khan et al.	Falls from shopping carts versus household products among young children	2019	63.0	42	18,821	65.2%	Yes	75%	99%
12.	Smith et al.	Improving safety-restraint use by children in shopping carts: evaluation of a store-based safety intervention	2006b	6.9	2.63	967	-	Yes	-	95%
13.	Ibrahim et al.	Influence of age and fall type on head injuries in infants and toddlers	2012	4.2 (28.0)	3.4(10.3)	285	4.21%	Yes	71%	95%

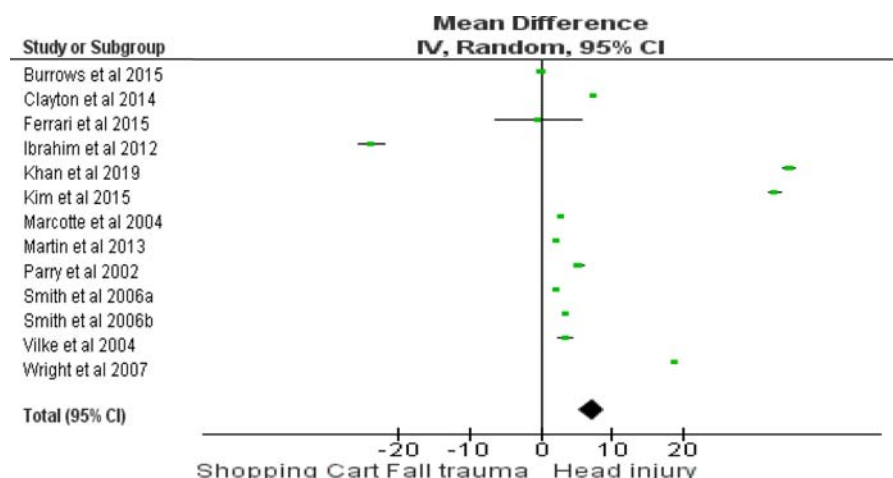


Figure 1. Forest plot of the retrieved studies.

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