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I Love My Baby Even unto Death: Child Safety Restraint Use among Drivers in Gaborone, Botswana

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Abstract This study examined the use of child safety restraints by drivers transporting children in Gaborone, Botswana. We observed 518 vehicles (329 male drivers, 189 female drivers) carrying children at four different locations in Gaborone over four days. A team of 2-4 trained observers recorded whether the child was restrained or not, where they were seated in the car, the type of vehicle (private or commercial) and model of vehicle. Children were restrained in 111 (21.4%) of the observed vehicles and unrestrained in 407 (78.6%) of the observed vehicles. Additionally, male drivers were more likely than female drivers to have an unrestrained child (chi-square = 4.465, $P=.04$); commercial vehicles were more likely than private vehicles to have an unrestrained child (chi-square= 7.387, $P=.01$); SUVs were more likely to have a restrained child (chi-square = 17.499, $P=.00$); and children in the back seat of the vehicle were less likely to be restrained than children located in the front seat (chi-square = 49.036, $P=.00$). There was also a noted difference based on location (chi-square= 19.405, P=.00), indicating socioeconomic factors at play. Most drivers in Gaborone are not restraining children in vehicles. There seems to be a general lack of knowledge among drivers about the importance of child safety restraints. It is recommended that stakeholders work to raise awareness, enforce legislation and offer incentives and subsidies for car seat use in order to improve the safety of child passengers on Botswana's expanding and developing roads.

Keywords: *Africa, Botswana, child safety, child restraint, driving behavior*

1. Introduction

Motor vehicle accidents are a leading cause of death and injury worldwide. In fact, it is a global health problem that exacts a heavy burden in developing countries, with children comprising a high percentage of victims [1]. Accidents involving children cause significant harm and damage physically, emotionally and psychologically and often result in serious but unnecessary damage. In regards to child deaths and injuries from motor vehicle accidents, research shows that properly restraining children -i.e., securely fastening them in child safety seats or other devices meant to protect and ensure their safety and that are appropriate for their weight and age - is an easy way to prevent unnecessary deaths and serious injuries [2].

One fifth of the road traffic accidents worldwide involve children [3], making children among the most vulnerable road users [4]. Part of the problem can be attributed to increasing rates of motorization, inadequate policy or legislative measures to keep pace with expansion and poor implementation of safety device recommendations [5]. Disparities are expected to increase, with predictions that road accidents will increase by 83% in low and middle income developing countries, while they are predicted to decrease by 27% in high income/developed countries [6].

There are several age- and weight-dependent devices for safely restraining children in vehicles, known as child restraints. Rear- and forward-facing cars seats are generally designed for children from birth to about 4 years old, when they cannot sit alone and are not safe just being held by an adult. Booster seats are for older children who are still too small to be restrained safely with a regular seatbelt. For older children, usually over the age of 8, seatbelts are recommended for safe transport [2]. The effectiveness of these restraints depends on appropriate and correct use. Car seats and booster seats must be installed properly and the child must be suitably fitted and seated in the restraint. Use of child safety restraints is only one aspect of child passenger safety. Seat positioning is significant as well. Children are safest sitting in the back seat of the car, as opposed to the front seat [5].

According to the U.S. National Highway Traffic Safety Administration, use of child safety seats or any other devices to restrain children reduce morbidity and mortality by 54% in toddlers and 71% in infants [7,8]. Not using a safety seat or restraint increases the odds of injury or death by 45-75% [5]. Besides the use of child restraints, rear seating is another added protection for young children [5]. Thus, a child sitting in the front seat, while not restrained in a safety device is one of the most dangerous seating arrangements for a child.

Recommendations for safely restraining child passengers are in place worldwide. For example, the American Academy of Pediatrics recommends: 1) rear-facing car safety seats for most infants up to 2 years of age; 2) forward-facing car safety seats for most children through 4 years of age; 3) belt-positioning booster seats for most children through 8 years of age; and 4) lap-and-shoulder seatbelts for all who have outgrown booster seats [9]. Similarly, Australia recommends rear-facing or forward-facing child safety seat or booster seats depending on age. Additionally, in Australia children younger than 4 years cannot travel in the front seat of a vehicle with two or more rows; children aged 4 years to under 7 years cannot travel in the front seat of a vehicle with two or more rows, unless all other back seats are occupied by children younger than 7 years in a child restraint or booster seat [10]. Such specifications are supported by evidence that there is added protection for children when they are restrained with the age- and size-appropriate child restraint [7]. For example, in 4-8 year olds, booster seats, as opposed to seat belts, reduce the likelihood of sustaining serious injury by 59% [11]. Furthermore, there are documented mortality and morbidity risks associated with not being in the correct age and size restraint [12,13,14,15].

However, there is some indication that increased use of child safety restraints may introduce greater possibility of misuse of these devices, thereby increasing the risk of certain chest, abdominal and neck injuries [16]. Age is often a factor in the inappropriate use or misuse of car seats. A study of caregivers in Canada found that children aged 7 months to 8 years had the lowest likelihood of being in the appropriate car seat as compared to infants 6 months and under and children over 9 years [8].

In Botswana, a small middle income country the size of France with a population slightly over 2 million [17], rapid expansion and development have resulted in more drivers and more cars on the road [18]. Police statistics indicate that hundreds of accidents are recorded yearly which include injury or death of children [19]. Many of those children, it is presumed, were not safely restrained in their vehicle; although, police statistics do not include data on child safety restraints**.** Therefore, it is critical to survey how drivers in Botswana are behaving in terms of using child safety restraints to secure children.

1.1. Factors Associated with the Need to Restrain Children in Vehicles

Due to infants' and toddlers' size, skeletal build and anatomy, they are more prone to bone injury, brain trauma, being thrown out of the vehicle and being crushed when in an automobile accident [20]. The purpose of recommendations for car seats is to provide additional protection than they would have if just being held by an adult passenger. Older children are also vulnerable to traumatic head injuries and broken bones if not restrained [9]. In general, unrestrained passengers are at risk for sustaining internal damage when they collide with the inside of the vehicle and when organs collide with the chest or skeletal structure [21]. These dangers are potentially greater for children.

Research also confirms that there is a significant gap in use of child restraints among drivers in high income countries and those in low and middle income countries [22,23]. One suggestion is that for drivers in the latter, child car seats are often seen as a luxury. In addition, studies point out a lack of awareness about the importance of child safety restraints in preventing death and serious injury [24,25]. It is not uncommon in many countries to see babies and young children sitting in the front seat on the laps of passengers or even drivers, or to see them standing, playing or jumping around in the back seat.

Research from low and middle income countries shows low reported use, incorrect use and lack of knowledge of child safety restraints. For example, in a study of knowledge and attitudes in Turkey, only 20% of parents reported using a car safety seat, with just 10% actually reporting correct use. Moreover, a significant number of respondents, 28%, reported not knowing what a car seat was [26]. A study of parental knowledge in Israel also showed a high rate of misuse/misinformation, with 64% of parents surveyed responding incorrectly to questions about proper car seat use, 65% not knowing what a car seat was and 54% not knowing that the proper place for it was in the back seat. In the same study, 60% of infants and 38% of toddlers were reported to be restrained incorrectly [27]. Patterns of low child restraint use have been reported in numerous countries, including Oman, China and Nigeria [22,25,28].

Even in high income countries where use of child restraints has been reported as high as 90% [29], there are some specific factors associated with their use, including higher socioeconomic status and receiving information from multiple sources about child safety seats [30,31]. Factors associated with limited use include parents' belief that the child is too big for a car seat, lack of information about booster seats and male gender [32]. The problem of high rates of misuse has been found in a number of studies globally [8,16,33,34].

There are certain dispositional and contextual factors influencing the use of child restraints. By dispositional we mean those characteristics that are peculiar to the drivers such as age, education, gender etc; while contextual/ situational variables may be the type of car, location where driving , time of the day etc. Findings on the link between certain demographics and child restraint use are pretty consistent. Correct use of car seats has been associated with female gender, higher level of education and individuals who reported that obtaining information about the correct use of child safety seats was difficult [8], perhaps an indication that having to search for the information made caregivers or drivers more committed to using the seats. A study conducted in China found that a mother being more educated increased the likelihood that her child would be seated optimally in the vehicle [35]. Low income and education levels have been correlated with low rates of child restraint use in the U.S., highlighting the possible need for awareness and car seat subsidies to promote use [36]. Other research has also pointed out that child restraint use is lower: among older children; when there are more occupants in the car; in older vehicles, pickup trucks and vans; with young drivers or those older than 60; and in rural areas [37].

Parent car owners' willingness to pay for child safety seats is another key variable in understanding child restraint use. Investigators in Iran found the mean willingness to pay amount parents reported was only $15USD, while more than 85% of respondents reported not being willing to pay the actual market price for a car seat which was significantly higher than $15USD [38]. Family income was the primary predictor of willingness to pay and was also associated with attitudes about the usefulness of car seats, again underscoring the need for free or subsidized safety seats to increase use [38].

The research literature underscores contributions of multiple parameters or demographics to understanding and predicting use of child restraints. They include driver gender [8,32], caregiver socio-economic status [35,36], whether the child is located in the front or back seat of the vehicle [29], whether the passenger is riding in a commercial or private vehicle [39,40], and the model of vehicle – i.e., car, pick-up truck, sports utility vehicle [37]. The current study is an exploratory survey to examine the rate of child restraint use and any differences in use based on these demographics.

1.2. Methods and Theories for Understanding Child Restraint Use

Among methods for investigating road user behavior, naturalistic observation has been used frequently [29,41,42,43] and demonstrated as a valid method for establishing rates of child restraint use and determining the age of child passengers [44,45]. Naturalistic observation allows for a non-intrusive approach to gauging road user behavior and may aid in examining the impact of policy measures and other interventions.

Research on interventions to increase child restraint use shows that interventions are generally helpful [46]. There is moderate support for community-based programs that encourage and promote use of child restraints across the age range and evidence that behavioral counseling in primary care settings may increase correct use – at least in the short-term [47]. A review of general intervention research found strong evidence for legislative measures, community awareness with enforcement campaigns, and incentives plus education [46]. Similarly, research specifically on interventions to increase booster seat use in children 4-8 years old found that education along with distribution of booster seats or other incentives were more effective than education alone in increasing booster seat use [48]. There is also evidence that standard enforcement of existing legislation increases safety belt use among groups who historically have had low rates of use [49].

A number of psychological and behavior theories have been put forth to try to explain the discrepancy between drivers' knowledge and information about restraints and their actual use of restraints. The theory of risk homeostasis says that people make comparisons between their perceived risk of a particular behavior and their individual target level of acceptable risk [50]. Therefore, parents who do not use child safety restraints may be guided by their subjective cost-benefit analysis of that behavior [50]. Another salient model is the theory of reasoned action. It suggests that volitional behavior is most immediately preceded by behavior intention which is determined by individually and socially influenced norms [51]. In terms of child restraint use, prevailing social and cultural norms would be important considerations in evaluating reasons for limited use and strategies for increasing use. For example, cultural beliefs the about fatalistic nature of injuries may be especially relevant in many LMICs and may influence drivers' and parents' decision to use restraints [52].

Additionally, the health belief model provides a framework for understanding why individuals do or do not engage in health related behaviors based on their desire to avoid illness and belief that certain health related behaviors will prevent illness [53]. Specific dimensions of the health belief model, including perceived susceptibility, severity, barriers, and net benefits have been shown to be significantly related to risky driving behaviors [54]. A slightly different theory, the immunity fallacy, examines the role of an individual's reduced perception of risk in the decision to adhere to health safety recommendations. Research suggests this erroneous perception of risk among some drivers may necessitate that awareness campaigns shock parents into using safety seats [55] and increase their risk perception of misusing safety seats [56].

1.3. Current Study

This study investigates the use of child safety restraints in vehicles transporting children. In light of the high rate of child injuries and deaths in automobile road accidents [19], awareness of and use of child safety restraints continues to be an issue of concern across Botswana. It is important to explore the question, *what is the driving culture in Botswana with regards to child passenger safety?* Specifically, there is a need to investigate the rate of child safety restraint use by motorists and seat positioning of child passengers in Gaborone, Botswana. The findings have implications for road safety policies, road safety education approaches, and strategies for increasing compliance with child safety restraint recommendations.

Research questions for the study were: How many drivers use some form of restraint – car seat, booster seat or seatbelt – for child passengers? Where in the vehicles are children sitting and is there a difference in their likelihood of being restrained or not based on seating location? Is there a gender difference in drivers who have restrained children versus drivers who have unrestrained children in the vehicle? Are there differences in restrained versus unrestrained children based on whether the vehicle is private or commercial and based on vehicle model? Are there any differences based on geographic location, which may be an indicator of socioeconomic status?

Based on previous findings in the research literature, the current study posited the following hypotheses: 1) There would be a low rate of child safety restraint use in Gaborone; 2) Children seated in the back of the vehicle would more likely be unrestrained than children seated in the front; 3) Male drivers, as compared to female drivers, would more likely have unrestrained children in the vehicle 4) Children in commercial vehicles would more likely be unrestrained than children in private vehicles; 5) Children in cars would more likely be restrained than children in other vehicle models; 6) Children in the city's high socio-economic (SES) neighborhood would more likely be restrained than children in other locations.

2. Methodology

2.1. Design

This study utilized a naturalistic observation design to identify cars carrying at least one child and determine whether or not the child was restrained (i.e., either in a car seat, booster seat or by seatbelt), where the child was located in the car (i.e., in the front seat or back seat) and other driver and vehicle variables. Members of a traffic behavior research team observed cars at various locations in Gaborone, Botswana during morning rush hour over a 4-day period. The trained observers stood unobtrusively at select intersections approximately 1-2 meters from where cars passed to allow them to accurately observe restraints and positioning. There was significant pedestrian activity at each site which allowed observers to avoid standing out. The sites included areas where several schools and nurseries are situated. One of the sites, Northside, is a high income neighborhood where some of the city's most expensive private schools and nurseries are located. Two groups were used in order to observe a sufficient number of motorists and for reliable data collection.

2.2. Setting

Data were collected in Gaborone, the capital of Botswana. Gaborone is a rapidly developing and expanding area which has seen an influx of migrants from rural outskirts and is now home to Batswana (Botswana nationals) from various regions of the country as well as a multicultural mix of people from neighboring African countries and other parts of the world. The population of Gaborone is just under 200,000 [17].

2.3. Participants

Participants were 518 drivers (329 males, 189 females) who drove on roads near school locations. Four hundred and eighty-four (93.4%) participants drove private cars and 34 (6.6%) drove commercial vehicles. The study was conducted during heavy traffic times on Tuesday through Friday for a week. Three hundred and forty-five (66.6%) of the vehicles were classified as cars, 124 (23.9%) as SUVs (sports utility vehicles), 24 (6.6%) as vans and 12 (2.5%) as combis. Observations were made at the following locations throughout the city: 119 (23%) cars at UB Mondial and Northside Primary School, 37 (7.1%) were at Phase II, and 243 (46.9%) at the Rainbow Circle.

2.4. Procedures

The observation locations were: University of Botswana (UB Mondial) traffic intersection on Tuesday; Northside School on Wednesday; Phase II on Thursday; and Rainbow Circle on Friday. These four sites were chosen considering that they are among the areas where several schools are located and are a gateway into the city from surrounding villages. As such, they were considered strategic for traffic flow and presence of children in cars.

At each site, data were collected during the morning rush hour (7:30 am – 8:30 am) by a team of 2-4 trained observers which included at least one recorder and one observer. The criterion was such that all cars with a child inside would be observed and recorded. Using a ready-made record sheet, the following information was recorded: the gender of the driver, type of vehicle (i.e., private or commercial), model of vehicle (i.e., car, SUV, van or combi), whether the child was restrained or unrestrained, location of the child in the car (i.e., front seat or back seat), and the location of the data collection. Two out of the four times of data collection there were two teams of data collectors (4 researchers). However, at all times there was at least one team collecting data.

Type of vehicle was specified as either private or commercial (taxis). The vehicle models were cars, SUVs, vans or combis. Cars were defined as 2- or 4-door vehicles. SUVs or sports utility vehicles were larger 4-door vehicles wider and higher than cars. Vans were 2-door vehicles with a flatbed back and only one row of seats. Finally, combis were 15-passenger minivans used primarily for commercial transport. The table below presents the logbook that was used.

S	Gender	Type (Private/ Commercial)	Model (Car/SUV/ Van/Combi)	Child Restrained (Yes/No)	Location of Child (Front seat/Back seat)
1	Female	Private	**SUV	Yes	*BS
2	Male	Commercial	Car	No	*FS

BS=back seat, FS= front seat; **SUV=sports utility vehicle

3. Results and Discussion

Descriptive statistics and frequency crosstabs are presented for each of the variables. Of the observed cars, 111 (21.4%) had a restrained child, either with child safety seat, booster seat or seatbelt, and 407 (78.6%) were unrestrained (Figure 1). Three hundred and forty-five of the cars (66.6%) had a child located in the back seat, while 168 (32.4%) had a child in the front seat.

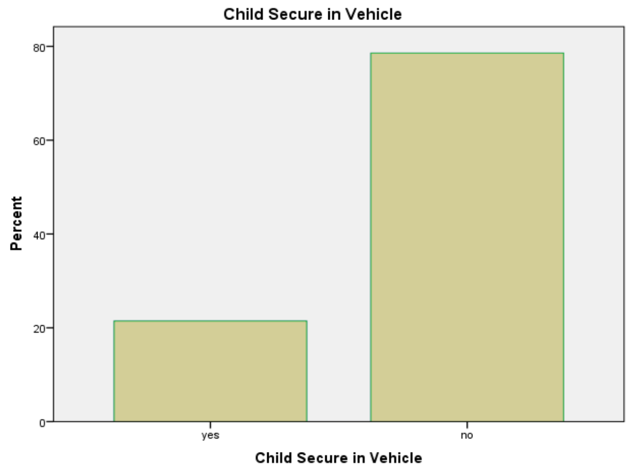

Figure 1. Frequency – Child Secure in Vehicle

Crosstabs and chi-square analyses (Table 1) indicate that there were significant differences in whether the child was restrained in the vehicle by driver gender, type of vehicle, vehicle model, location of child in the car and location of observation. Male drivers were more likely than female drivers to have an unrestrained child, chi-square = 4.465 ($P<.05$). Commercial vehicles were more likely than private vehicles to have an unrestrained child, chi-square=7.387 ($P<.01$). SUVs were more likely than cars, vans and combis to have a restrained child, chi-square = 17.499 ($P<.01$). Children in the back seat of the vehicle were less likely to be restrained than children located in the front seat, chi-square = 49.036 ($P<.01$). Children observed in the Northside location- the site that is an upscale, high SES neighborhood and school location - were more likely to be restrained than children observed in the UB Mondial, Phase II and Rainbow Circle locations, chi-square= 19.405 (P<.01).

Table 1. Crosstabs

	Child Restrained in Vehicle		Total	Pearson Chi-Square
	Yes	No		
Gender of Driver				
Male	61	268	329	4.465*
Female	50	139	189	P<.05
Total	111	407	518	
Type of Vehicle				
Private	110	374	484	7.387*
Commercial	1	33	34	P <.01
Total	111	407	518	
Vehicle Model				
Car	61	284	345	17.499*
SUV	43	81	124	P < .01
Van	6	28	34	
Combi	1	12	13	
Total	111	405	516	
Location of Child in Car				49.036*
Back Seat	44	301	345	P < 01
Front Seat	67	101	168	
Total	111	402	513	
Location of Vehicle				
UB Mondial	14	105	119	19.405*
Northside	41	78	119	P <.01
Phase II	9	28	37	
Rainbow Circle	47	196	243	
Total	111	407	518	

The data were also subjected to a contingency chi-square analysis - 2 (yes vs. no) x 2 (male vs. female) x 2 (front seat vs. back seat). Table 2 shows the comparison between male and female drivers, where each group put the children (front or back seat), and whether they used the child restraint or not. For males who did not use child restraint, the majority (194 or 73.49%) put the child at the back seat, probably believing that the child would be safer, while 70 (26.51%) put at the front seat; whereas among those who used the child safety seat, only 22 (36.07%) put the child in the back seat while 39 (63.93%) male drivers put the child in the front seat with the seat belt on. This difference is significant at X^2 = .296 (*P<.01*).

Among the female drivers, the same trend was observed in that for women who did not use a child restraint, the majority (107, i.e. 77.54%) put the child at the back seat, probably believing that the child would be safer, while 31 (22.46%) put the child at the front seat; whereas among those who used a child restraint, only 22 (44%) put the child in the back seat while 28 (56%) female drivers put the child in the front seat with the seat belt on. This difference is significant at X^2 = .304 (*P<.01*).

When this was compared across gender, it was observed that 301 (74.88%) drivers overall put the child in the back seat without restraint, while 101(25.12%) put the child in the front without restraint. On the other hand, only 44 (39.64%) drivers ensured that the child was restrained when in the back seat, whereas 67(60.36%) of the drivers who put the child in the front ensured that the child restraint was on. So, generally speaking, most drivers put the child in the back seat without a child restraint.

Table 2. Cross tabulation - Location of Child in Car * Child Secure in Vehicle * Gender of Driver

Gender of Driver and Location in Car		Child Restrained in Vehicle		Total	X^2
		Yes	No		
Male					
	Back Seat	22	194	216	.296*
Location in Car					P <-01
	Front Seat	39	70	109	
Total		61	264	325	
Female					
	Back Seat	22	107	129	.304*
Location in Car					P <.01
	Front Seat	28	31	57	
Total		50	138	188	
Total					
	Back Seat	44	301	345	
Location in Car					
	Front Seat	67	101	168	

These findings support hypotheses 1, 2, 3, 4 and 6. There was a high prevalence of unrestrained children among drivers in Gaborone, children were more often seated in the back of the vehicle, men were more likely than women to be driving with unrestrained children, commercial vehicles were more likely to be carrying unrestrained children, and children were more likely to be restrained in the city's high SES neighborhood. The fifth hypothesis, however, was not supported. SUVs, not cars, were the most likely of the four vehicle types to have a restrained child.

These findings confirm general observations that using child safety seats and restraining children in the car are not treated as important behaviors by drivers in Gaborone. Specifically, it reveals that most child passengers in Gaborone, Botswana were not restrained in the vehicles. This finding is in line with numerous studies in developing countries [22,25,26,27]. The finding that men were less likely to use child restraints has also been shown consistently in previous research [8,32]. One explanation is that there are differences in risk perception [55] between male and female drivers. Additionally, women's higher use of child restraints may also be related to their caretaker roles [57]. These hypotheses should be investigated among drivers in Botswana.

The finding that children seated in the back were more likely to be unrestrained is also consistent with previous research [29] and highlights an interesting trend. In such instances, the child is in the optimal position in the car (back seat), but is not safely restrained. This type of seating may be due to similar misinformation and lack of knowledge shown in previous studies [26,27]. Drivers may, falsely, believe that as long as the child is in back he or she is safe.

Commercial vehicles had very low rates of child restraint use. In general, commercial drivers face unique challenges because they may have less control over the child passengers in their vehicles, as presumably children fall under the responsibility of any caregiver in the vehicle or decide for themselves if old enough. Additionally, their vehicles may not be adequately equipped for proper child restraint use [40]. Among other barriers, there is also the issue of how financially feasible and practical it is for transient passengers to use child restraint devices.

Despite the prediction that children would more likely be restrained in cars, it was actually SUVs that had a higher rate of restraint use. This may be due to the fact that the SUV's observed tended to be newer vehicles, therefore introducing the influence of economic status on child restraint use as reported in previous research. In this study, vehicles in the most affluent school area had higher rates of restraint, as found in other investigations on SES status and car seat use [30,31,36]. It would be important to investigate further whether drivers of SUVs have higher incomes and whether vehicle factors, such as SUVs being better equipped for car seat and booster seat installation, make it easier for SUV drivers to restrain children in the vehicle.

One way of understanding these findings, supported by previous research [36,38], is that there could be economic reasons for not prioritizing the purchase of child safety seats or devices. In addition, there could be general lack of knowledge and awareness of how important it is for children to be restrained [25,26,27,28], as many children were observed standing unrestrained or in the front seat. Even among children who were observed as being restrained, many had just a seatbelt instead of the age appropriate child safety seat or booster seat, or they were restrained in the front seat, which still put them at risk for injury and death in an accident [12,13,14,15]. In addition to lack of knowledge, it would be important to consider the influence of risk perception [55] and social norms [51,57] on drivers' child restraint use.

During data collection, a number of children were actually observed standing up in the back or front seat, sitting in the drivers lap or otherwise unsafely positioned. These observations were beyond the scope of analysis, but their prevalence as high risk behaviors should be investigated further. Likewise, in order to better understand reasons for the observed low rates of child restraint use, research should be conducted on parental and caregiver attitudes and knowledge, their assessment of car safety and injury risk, and the effectiveness of community education campaigns.

Botswana has recommendations and legislation regarding seatbelt use [58]. While there are official recommendations for child restraint use, specific legislative measures have yet to be enacted [58]. Ambiguity on the part of enforcement officials about if and how to intervene was apparent. There were many instances where police or traffic officers were observed looking at unrestrained children, but did not follow up with the drivers. Regulations are most helpful when enforced and when drivers are educated about the importance of properly restraining children while driving. Research has also shown that it is important to get the message out about the appropriate ways to restrain babies and young children while driving, and do so early and often [30].

The current study was limited by the researchers not being able to determine whether or not observed drivers were the children's' parents or caregivers, as well as not detecting the age of the children or whether child restraints were used inappropriately.

3.1. Conclusion

Since hospitals, schools, private doctors and other institutions have contact with parents, they are well-positioned to raise awareness about child safety while driving and we consequently recommend that all these stakeholders work together to ensure that children in Botswana are restrained. Education campaigns that speak to caregivers' attitudes about child safety in cars and target their underlying perceptions of risk should be developed upon further investigation of these dynamics among Batswana drivers. Additional information and targeted interventions may also be needed for drivers with low rates of use – i.e., men and commercial drivers. Traffic and safety policy makers may also consider developing programs that provide financial subsidies for car seat purchase and incentives for proper use of child safety restraints. Working with private industry may ease the financial burden on government of trying to develop these initiatives. All in all, the picture of child car safety in Gaborone, Botswana is poor and it seems that when it comes to driving, parents and other adults may love their children, unto death.

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References

[1] Ameratunga, S., Hijar, M., & Norton, R. (2006). Road-traffic injuries: Confronting disparities to address a global-health problem. *Lancet, 367,1-8.*

[2] Safe Kids. (2009). *Car Seats, Booster and Seat Belt Safety Fact Sheet.* Retrieved March 2, 2013 from http://www.safekids.org/our-work/research/fact-sheets/car-seats-booster-and-beltsafety-fact-sheet.html.

[3] Peden, M. M. (2008). *World Report on Child Injury Prevention*. World Health Organization.

[4] World Health Organization. (2009). *Global Status Report on Road Safety: Time for Action.* Retrieved on June 1, 2013 from http://www.who.int/violence_injury_prevention/road_safety_status/2009

[5] Will, K. E. (2011). Young children and "tweens". In Bryon E. Porter (Ed). *Handbook of Traffic Psychology*. Academic Press.

[6] Peden, M. M. (2004). *World Report on Road Traffic Injury Prevention.*

[7] Rice, T. M., & Anderson, C. L. (2009). The effectiveness of child restraint systems for children aged 3 years or younger during motor vehicle collisions: 1996 to 2005. *Journal Information, 99*(2*), 252-257*.

[8] Snowdon, A. W., Hussein, A. A., & Ahmed, S. E. (2008). Children at risk: predictors of car safety seat misuse in Ontario. *Accident; analysis and prevention, 40*(4*), 141-148.*

[9] Committee on Injury, Violence and Poison Prevention. (2011). Policy statement – child passenger safety. *Pediatrics 127:788-93*. Doi: 10.1542/peds.2011-0213.

[10] NSW Government Transport Roads and Maritime Services (2011). *Child Restraints*. Retrieved March 3, 2013 from http://www.rta.nsw.gov.au/roadsafety/children/childrestraints/index.html.

[11] Ehiri, J. E., Ejere, H. O., Hazen, A. E., Emusu, D., King, W. D., & Osberg, S. J. (2006). Interventions to increase children's booster seat use: a review. *American journal of preventive medicine*, *31(2), 185-192*.

[12] Bilston, L., & Brown, J. (2007). Inappropriate restraint use by child occupants-injury implications and factors in inappropriate use. *Infants, Children, and Young People and Road Safety, 2007, Sydney, New South Wales, Australia*.

[13] Howard, A. W. (2002). Automobile restraints for children: a review for clinicians. *Canadian Medical Association Journal*, *167*(7*), 769-773*.

[14] Lane, J. C. (1994). The seat belt syndrome in children. *Accident Analysis & Prevention*, *26(6), 813-820*.

[15] Winston, F. K., Durbin, D. R., Kallan, M. J., & Moll, E. K. (2000). The danger of premature graduation to seat belts for young children. *Pediatrics*, *105*(6)*, 1179-1183*.

[16] Campbell, H., Macdonald, S., & Richardson, P. (1997). High levels of incorrect use of car seat belts and child restraints in Fife--an important and under-recognised road safety issue. *Injury Prevention*, *3(1), 17-22*.

[17] Central Intelligence Agency. (2013). *The World Factbook – Botswana*. Retrieved March 3, 2013 from https://www.cia.gov/library/publications/the-world-factbook/geos/bc.html.

[18] Koptis, E. and Cropper, M. (2003). *Traffic fatalities andeconomic growth*. Policy Research Working Paper No. 3035, World Bank, Washington, DC.

[19] Botswana Traffic Headquarters. (2012). *Road Accident Statistics.*

[20] Children's Hospital and Research Center Oakland. (2013). *Car Seats*. Retrieved March 1, 2013 from http://www.childrenshospitaloakland.org/healthcare/depts/injury_car-seats.asp.

[21] FIA Foundation for the Automobile and Society. (2009). *Seat-Belts and Child Restraints: A Road Safety Manual for Decision Makers and Practitioners*. Retrieved on June 7, 2013 from http://whqlibdoc.who.int/road_safety/2009/9780956140302_eng.pdf

[22] Olufunlayo T.F., Odeyemi K.A., Ogunnowo B.E., Onajole A.T., Oyediran M.A. (2012). An observational survey of child car safety practices in private pre-primary and primary schools in two local government areas of Lagos State, Nigeria. *Injury Prevention, 18(4):216-20*. doi: 10.1136/injuryprev-2011-040047. Epub 2011 Dec 20.

[23] World Health Organization. (2009). Global plan for the decade of action for road safety 2011-2020. *Geneva: World Health Organization*.

[24] Lee, J. W., Fitzgerald, K., & Ebel, B. E. (2003). Lessons for increasing awareness and use of booster seats in a Latino community. *Injury prevention*, *9(3), 268-269*.

[25] McIlvenny, S., Al Mahrouqi, F., Al Busaidi, T., Al Nabhani, A., Al Hikmani, F., Al Kharousi, Z., & Al Kharousi, I. (2004). Rear seat belt use as an indicator of safe road behaviour in a rapidly developing country. *The journal of the Royal Society for the Promotion of Health*, *124*(6*), 280-283*.

[26] ŞEVKETOĞLU, E., HATİPOĞLU, S., ESİN, G., & Oztora, S. (2009). Knowledge and attitude of Turkish parents regarding car safety seats for children. *Turkish Journal of Trauma & Emergency Surgery*, *15(5), 482-486*.

[27] Hemmo-Lotem, M., Urkin, J., Endy-Findling, L., & Merrick, J. (2006). Parental knowledge on car safety for children: An Israeli survey. *The Scientific World Journal*, *6, 30-34*.

[28] Purc-Stephenson, R. J., Ren, J., & Snowdon, A. W. (2010). An exploratory study of parents' use and knowledge of car safety seats in Beijing, China. *International Journal of Injury Control and Safety Promotion*, *17(4), 231-238*.

[29] Lennon, A. J. (2005). Where do children sit in Australian passenger vehicles? Results of an observational study.

[30] Safe Kids (2008). *Report to the Nation: Trends in Unintentional Childhood Injury Mortality and Parental Views on Child Safety*. Retrieved March 2, 2013 from http://www.safekids.org/assets/docs/ourwork/research/research-report-safe-kids-week-2008.pdf.

[31] Hletko, P.J., Hletko, J.D., Shelness, A.M. & Robin, S.S. (1983). Demographic predictors of infant car seat use. *American Journal of Diseases of Children, 137(11):1061-1063*.

[32] Ebel, B.E. Thomas D. Koepsell, T.D., Elizabeth E. Bennett, E.E., & Frederick P. Rivara, F.P. (2003). Too small for a seatbelt: Predictors of booster seat use by child passengers. *Pediatrics, 111(4): 323-327*.

[33] Desapriya, E. B. R., Iwase, N., Pike, I., Brussoni, M., & Papsdorf, M. (2004). Child motor vehicle occupant and pedestrian casualties before and after enactment of child restraint seats legislation in Japan. *Injury Control and Safety Promotion*, *11(4), 225-230*.

[34] Vesentini, L., & Willems, B. (2007). Premature graduation of children in child restraint systems: an observational study. *Accident Analysis & Prevention*, *39*(5*), 867-872*.

[35] Pan, S., Du, W., Jiang, F., Bilston, L. E., Brown, J., & Shen, X. (2012). Exploring child car passenger safety practices in China: experience from a parental survey in Shanghai. *Injury Prevention*, *18*(2), *133-137*.

[36] Winston, F. K., Chen, I. G., Smith, R., & Elliott, M. R. (2006). Parent driver characteristics associated with sub-optimal restraint of child passengers. *Traffic Injury Prevention*, *7(4), 373-380*.

[37] Agran, P. F., Anderson, C. L., & Winn, D. G. (1998). Factors associated with restraint use of children in fatal crashes. *Pediatrics*, *102*(3*)*.

[38] Jarahi, L., Karbakhsh, M., & Rashidian, A. (2011). Parental willingness to pay for child safety seats in Mashad, Iran. *BMC Public Health*, *11(1)*.

[39] Routley, V., Ozanne-Smith, J., Li, D., Hu, X., Wang, P., & Qin, Y. (2007). Pattern of seat belt wearing in Nanjing, China. *Injury prevention*, *13*(6), 388-393.

[40] Tun, J., Avner, J. R., & Khine, H. (1999). Seat belt use by children brought to an inner-city hospital. *Pediatric Emergency Care*, *15*(3), 176-178.

[41] Snowdon, A., Rothman, L., Slater, M., Kolga, C., Hussein, A., Boase, P., & Howard, A. (2010). Methodology of estimating restraint use in children: Roadside observation or parking lot interview survey. *Accident Analysis & Prevention*, *42*(6), *1545-1548*.

[42] Campbell, H., Gorman, D., & Richardson, P. (1993). An observational study of car occupant restraint in Fife: impact of recent legislation. *Public Health*, *107*(6*), 429-435*.

[43] Baijal, E., Carter, H., & Davie, A. (1993). Car occupant restraint use in Fife: an observational study. *Public Health*, *107(1), 31-35*.

[44] Webb, G. R., Bowman, J. A., & Sanson-Fisher, R. W. (1988). Studies of child safety restraint use in motor vehicles—some methodological considerations. *Accident Analysis & Prevention*, *20*(2), 109-115.

[45] Moeller, S., Berger, L., Salvador, J. G., & Helitzer, D. (2002). How old is that child? Validating the accuracy of age assignments in observational surveys of vehicle restraint use. *Injury Prevention*, *8(3), 248-251*.

[46] Zaza, S., Sleet, D. A., Thompson, R. S., Sosin, D. M., & Bolen, J. C. (2001). Reviews of evidence regarding interventions to increase use of child safety seats. *American Journal of Preventive Medicine*, *21(4), 31-47*.

[47] Turner, C., McClure, R., Nixon, J., & Spinks, A. (2005). Community-based programs to promote car seat restraints in children 0-16 years: a systematic review. *Accident Analysis and Prevention*, *37(1), 77-83*.

[48] Ehiri, J. E., Ejere, H. O., Hazen, A. E., Emusu, D., King, W. D., & Osberg, S. J. (2006). Interventions to increase children's booster seat use: a review. *American Journal of Preventive Medicine*, *31(2), 185-192*.

[49] Eby, D. W., Vivoda, J. M., & Fordyce, T. A. (2002). The effects of standard enforcement on Michigan safety belt use. *Accident Analysis & Prevention*, *34*(6), 815-823.

[50] Wilde, G. J. (1998). Risk homeostasis theory: an overview. *Injury Prevention*, *4(2), 89-91*.

[51] Parker, D., Manstead, A. S. R., Stradling, S. G., Reason, J. T., & Baxter, J. S. (1992). Intention to commit driving violations: An application of the theory of planned behavior. *Journal of Applied Psychology*, *77(1), 94-101*.

[52] Forjuoh, S. N. (2003). Traffic-related injury prevention interventions for low-income countries. *Injury Control and Safety Promotion*, *10*(1-2), 109-118.

[53] Janz, N. K., & Becker, M. H. (1984). The health belief model: A decade later. *Health Education & Behavior*, *11(1), 1-47.*

[54] Morowatisharifabad, M. A. (2009). The Health Belief Model variables as predictors of risky driving behaviors among commuters in Yazd, Iran. *Traffic Injury Prevention*, *10(5), 436-440.*

[55] Will, K. E. (2005). Child passenger safety and the immunity fallacy: Why what we are doing is not working. *Accident Analysis & Prevention*, *37(5), 947-955.*

[56] Will, K. E., & Geller, E. S. (2004). Increasing the safety of children's vehicle travel: from effective risk communication to behavior change. *Journal of Safety Research*, *35*(3), *263-274.*

[57] Dowling, R. (2000). Cultures of mothering and car use in suburban Sydney: a preliminary investigation. *Geoforum*, *31*(3), 345-353.

[58] Government of Botswana. (2002). *Botswana Road Traffic Act.*