

Parents' Attitude, Knowledge and Practice of Child Car Safety Seats: A Cross Sectional Survey in Riyadh, Saudi Arabia

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I. Introduction

Road traffic accidents are one of the major causes of fatalities in the world. The increase in the global population has led to increase in the number of road crashes despite the development of various measures to improve traffic safety, such as legislation and safety technology like traffic lights and safety belts (Ashraf et al., 2019). According to the World Health Organization, road traffic accidents are the major cause of death for young children aged between 1-14 years. Furthermore, the lack of use or improper use of a restraint system is the main cause of disabilities and mortalities related to road traffic accidents (Sango et al., 2016).

A 2016 report by the Centers for Disease Control and Prevention (CDC) indicated that 3,554 children were killed in the United States, with those aged below four years comprising 14 percent of those fatalities. Most unintentional injuries associated with road accidents occur in developing countries such as Saudi Arabia (Samuel et al., 2012). Saudi Arabia has one of highest number of deaths attributed to motor vehicles crashes among the Middle Eastern countries.

Between 1971 and 1997, deaths related to road accidents in Saudi Arabia amounted to 564,762, a figure that represented 3.5 percent of the country's population (Ansari, 2000). Another study by Mansuri et al. (2015) indicated that between 1984-1998, road traffic accidents accounted for 83.4 percent of all trauma admission in Saudi Arabia. In 2008, the number of children who died in road traffic accidents in Saudi Arabia was 995 out of the 6,458 total fatalities (Andijani, 2017).

Although Saudi law requires the use of safety belt, many drivers choose to ignore this rule, which contributes greatly to the many deaths and injuries that result when the accidents occur. Safety seats have a great capability of reducing injuries associated with motor vehicle crashes they are even more effective than safety belts. The use of child restraint system is given priority by the road safety agencies because children are most susceptible to injuries due to their unique anatomy (khodayari Zarnaq et al., 2018).

The costs associated with road traffic injuries and fatalities involving children can be grouped into direct and indirect costs. The direct costs include the medical costs such as ambulance and rehabilitation costs, value of lost time for parents and caregivers and legal costs. The indirect costs are psychological effects on the child and the families after the road traffic incidents, and human costs associated with grief and suffering avoidance (Bachani et al., 2017; Karimi et al., 2017). The low usage of safety restraints, which contributes to this damage, can be attributed to cultural pressure and traditions, lack of law enforcement, lack of health education, high cost of child safety seats and large family size (Nelson et al., 2014)

Although the use of seat belts is the cheapest safety measure for reducing the severity of injury, they are less effective than child restraint system (World Health Organization, 2015, p.15). The use of child restraint system has attracted significant attention from the government and non-governmental agencies due to studies that have indicated that their use reduce the fatalities. However, despite the increased formal attention on the use of children safety seats, the use of this system in Saudi Arabia is low compared to other countries in the Middle East such as Bahrain and the United Arab Emirates (Al-Ali et al., 2017). Relatedly, another study by Jamal et al. (2019) concluded that the injuries associated with motor vehicle crashes in Saudi Arabia are significantly higher than in neighboring countries. Despite the existence of legislation to improve road safety such as traffic laws, the number of accidents in the country has increased by 8%, despite police reports of significant decline in overall motor vehicle accidents.

The reviewed studies indicate that the number of injuries and mortalities due to road accidents involving children are high in Saudi Arabia. Parental attitudes may affect the usage of child safety seats. The

high number of road accidents involving child passenger justifies further evaluation of the knowledge, attitudes and practices toward the use of child safety seats.

Significance

Extensive literature supports the finding that children are vulnerable to injuries due to weak neck muscles; hence in the event of emergency braking or crashes, they are highly likely to face life-threatening injuries compared to adults ((Augustsson and Ageberg, 2017; Khodayari Zarnaq et al., 2018). In addition, studies consistently indicate that child restraint systems significantly reduce the severity of motor vehicle crash injuries (Samuel et al., 2012; and Sango et al., 2016). However, a survey by the CDC and Garces, Coimbra and Silva, (2016) indicated that the use of child safety seats (CSS) does not always guarantee reduction of injuries if knowledge on the proper use of the systems is lacking. In addition, guidelines from American Family Physicians show that the use of CSS is complicated and requires proper instruction, especially for inexperienced drivers (Alसानا, Masuadi and Hazwani, 2018). In fact, the use of child restraint systems is mandatory in Saudi Arabia; however the failure by the parents to comply with these regulations is worrying (Nelson et al., 2014).

This study will add a significant contribution to the issue of CSS use in Saudi Arabia. Knowledge about the attitudes of parent regarding the use of CSS will provide policymakers, road safety advocates and other stakeholders with information that can assist in the development of policies to improve public behavior with regard to the use of CSS. Additionally, knowledge obtained from this study will assist in the establishment of effective public awareness campaigns and training that can enhance public knowledge on the use of CSS. The knowledge variable includes not only the proper use of CSS but also the identification of problems with the systems. Moreover, findings obtained from this study can assist in development of an easy to use system that can decrease the barriers against the use of CSS and increase parents' compliance to them.

Providing information on the knowledge on the use of CSS can enable safety system manufacturers to develop products that meet in the Saudi Arabia customer requirements. Tailoring road safety legislations to users' needs and requirements can also improve adherence to using CSS. Finally, the information from this study could also be used as the basis of research in other regions of other country.

Statement of the problem

Saudi Arabia is facing the challenge of trying to minimize the deaths and injuries associated with traffic accidents. The country has one of largest number of deaths and injuries associated with traffic accidents. The country has one of largest number of deaths and injuries associated with motor vehicle crashes (Jamal et al., 2019). Numerous studies such as surveys by the WHO indicate that children from a significant portion of fatalities associated with motor vehicle crashes. Despite the importance of CSS and legal requirements for their use, usage in Saudi Arabia is low (AlSallum et al., 2019). The low use of CSS is caused by various factors, such as traditions, large family size, lack of enforcement and limited health education (Nelson et al., 2014). Therefore, the problem that the study will attempt to address is whether there are factors related to attitude, knowledge and beliefs that affect parents' use CSS.

Purpose of the study

The purpose of this study is to analyze parents' attitudes, knowledge and practices of using children safety seats (CSS) and restraint system in Riyadh, Saudi Arabia. Specifically, the study aims to assess whether knowledge and attitudes influence the practice of using CSS.

Research question

The research question to be answered in this study is as follows: "What is the relationship between attitudes and knowledge of child safety seats and the practice of using them in Riyadh, Saudi Arabia?"

Aim of the study

The study aims to evaluate knowledge, attitudes and practice of parents toward the use of CSS and establish whether there is statistically significant relationships between these factors —*i.e.*, do knowledge and/or attitudes of the parents significantly affect usage of CSS?

Objectives

- i. To assess the practice of usage of CSS among parents.
- ii. To examine the relationship between parental attitudes and the use of CSS.
- iii. To examine the association between parental knowledge of CSS usage and laws and their usage of CSS.

II. Literature Review

For this review of the literature, DCU Library, Google Scholar, PubMed, Research gate, CINAHL, PLOS ONE and MEDLINE were accessed using the following keywords: child safety seats, child restraint systems/ seat laws, child safety seats in Saudi Arabia, practice and attitudes towards child safety seats, effective of CSS, Saudi restraint laws and statistics on road accidents. Governmental websites such as the Ministry of Transport (Saudi Arabia), the World Health Organization and World Life Expectancy were also used, and the reference lists from peer-reviewed sources were reviewed. The literature review was limited to articles that were published between 2006 and 2020 to include the periods where women (parents) were newly allowed to drive in Saudi Arabia as well as the periods where restrictions were high. The sources also capture the evolution of concepts behind the modernization of Saudi society. The concepts related to the study that was divided into five main sections, which Statistics on motor vehicle accidents, Awareness and usage of child seat belts in Saudi Arabia, comparative studies across the globe, Types of injuries and finally effectiveness of CSS. A total of 16 articles were reviewed, seven of which are quantitative, six qualitative, and three with a mixed-methods approach.

Statistics on motor vehicle accidents

Motor vehicle accidents are one of the leading causes of morbidity among adult and children. According to the World Health Organization, road traffic accidents are the leading cause of death among individuals aged between 0-19 years. Children constitute 21% of the total road accident mortalities globally. Middle Eastern countries such as Saudi Arabia have a high number of road accidents that contribute to a significant number of morbidity and mortalities. A 2017 report by the World Life Expectancy organization indicated that road accidents in Saudi Arabia contributed to 8.89% of total of deaths, ranking the country 34th in the world for the highest number of road accidents. The higher number of accidents in the Kingdom justifies further research on attitudes and practices concerning child car seats.

Awareness and usage of child seat belts in Saudi Arabia

Child restraint systems (CRS) are not in common use among parents in Saudi Arabia, and this lack of safety measures predisposes children to injuries, death and trauma during accidents. Several authors sought to probe the phenomenon, with a majority concluding that seat belts during car rides or helmets during bicycle rides were uncommon. Alsanea, Masuadi and Hazwani (2018) conducted a cross-sectional study using questionnaires administered to parents on their driving practices when traveling with minors. The purpose of the study was to identify CRS usage patterns. The scholars used the theory of planned behavior to establish whether knowledge about the child restraint system had any influence on the use of the systems. A total of 385 samples from across Riyadh answered a Likert questionnaire to determine the parents' perception and practices. This study found that only 30% of the children in this age category had CRS in the car while traveling with their parents. As the authors found, 54.5% of parents alluded to having the children sit on their lap while making journeys. This finding meant that for most of the journey, the children did not have CRS but instead depended on the adult passengers. They concluded that 63% of children in Riyadh are never protected during car journeys. As presented, this was among the only studies in Riyadh on CRS. The article compares the results with other countries, especially developed ones. According to the authors, the results for Riyadh were far below the 90% usage in the United States and Australia, although they were higher than the 22% seen in China and Turkey. Practices in Riyadh were found to be similar to the 40% seen in Brazil. Thus, this study identifies the practice of low safety measures while driving as common to developing countries. The major limitation of the study is that the use of self-reporting measures was a weakness because the drivers' responses could be affected by social desirability and opt to give responses that they deem suitable for the researchers. The fact that women did not drive in Saudi Arabia this time also affects the comparability with other studies.

It is important to focus on the contrast between awareness and usage. This was the focus of the study by Andijani (2017). The study was conducted in Riyadh, Saudi Arabia, using a cross-sectional research design. The purpose of this study was to establish the mismatch between the number of parents who were aware of the security provided by seat belts for children and their overall usage of the same. The study was carried between February and May 2013 on 400 parents with children below five years. This study found awareness on the role of seat belts for children to be high (85.3%). It was, however, found that use of the same was critically low (30%). This necessitated Andijani (2017) to propose that education of parents on the need to use belts was being undertaken in earnest. The study did not rely on any theoretical framework. Its main limitation was that the researchers used questionnaires to obtain data, which could have affected the accuracy of the data due to self-reporting biases.

The findings of the two previously-mentioned studies are similar to another study conducted by AlSallum et al. (2019), which aimed to decode not just knowledge but also consequent practices relating to car seats for children with specific reference to Unaizah City in the AlQassim region. The researchers utilized a cross-sectional descriptive approach to study 350 parents with children below seven years. As with the other

two, this study also used questionnaires. This results revealed that 56.7% of the parents use seat belts for their own safety. Yet, according to the study, 57.3% of the parents did not have or use seat belts for their children. The conclusion in the study was that more parents secured children using their own seat belts. This was further emphasized by the fact that 56.7% of the usage was to satisfy the existing regulations on seat belts. The study recorded both usage and knowledge about seat belts to be low; hence, the recommendation for increased awareness on the role of seat belts for children was put forth.

These three studies have all concluded that parents' attitudes towards the use of the child seat safety system is positive in both Riyadh and Unaizah city in Saudi Arabia. However, the knowledge on the use is low, which undermines the proper use of the system. Nelson et al. (2014) used a qualitative study design to research beliefs among Saudi women on the use of child seat safety systems. Although this study was conducted six years ago, it was important to include it in this review because it provides an in-depth analysis on Saudi women's perspectives (at the time of study, women in Saudi Arabia were not yet allowed to drive). The research used Ajzen's theory of planned behavior to identify normative, behavioral and control beliefs of women regarding the use of children's safety seat systems. Twenty participants were placed into two focus groups and their behavior was observed at Dallah Hospital in Riyadh. The study found that cultural pressure and tradition, lack of knowledge on the use of car infant restraints, family factors such as influences from their parents and husbands, car size and family size were the main determinants of the use of safety systems. The major limitation of the study was the small number of the respondents, although this should not affect the accuracy of the results because this was a qualitative study. This study is important because it indicated that the use of safety seat systems is influenced by family factors, cultural factors and family size. Moreover, just like other discussed studies, the lack of knowledge on the use of systems has been found to be a significant factor that contributes to the lack of use of the child restraint system.

Comparative Studies across the Globe

There are studies that have been conducted outside Saudi Arabia that have applied different methodologies, such as quantitative, qualitative and mixed study designs. Al-Ali et al. (2017) studied the practice and knowledge of the use of child car seat safety systems in Bahrain using a cross-sectional design. The data were collected from 427 drivers across the country. Contrary to the aforementioned studies, the study in Bahrain showed that knowledge on the use of safety systems was high while corresponding attitudes towards use were only moderate.

In addition, Lei et al. (2016) used a mixed-method design (cross-sectional survey and observation) to study knowledge and attitude on the use child restraint systems in Shantou, China. The researchers considered a sample of 3,464 children. This sample comprised of children aged 17 years and below. Additionally, a survey was conducted with a sample of 1,003 drivers. The researcher found out that the majority of divers and students had knowledge of the use and importance of child restraint systems due to public campaigns; however, corresponding attitudes towards their use was low. The low attitude caused some of the subjects to not use the systems. The major strength of this study is that it used a mixed methods design, thus offsetting the weaknesses associated with solely using qualitative or quantitative methods. For instance, the use of observation in addition to questionnaires compensated for the social desirability bias associated with the use of questionnaires alone. Moreover, Liu et al (2016) used semi-structured interviews to collect data from a sample of 242 parents of newborns and pregnant women. The setting comprised maternity units in two hospitals in China. The study showed that knowledge on the use of child restraint systems was high for both parents of the newborns and pregnant women. The attitude towards the use of CSS was positive; however, the use was low due to the lack of laws to mandate the use of the system. The major limitation of this study was the use of convenience sampling, increasing the risk for selection bias.

Siddiqui (2017) supported the previous findings through a case-control study examining the factors that cause the lack of use of child restraint systems in Pakistan. From a sample of 848 drivers, he found that the lack of effective laws was one of the main causes of lack of use of safety systems including child restraint systems. However, the presence of laws alone does not guarantee increased usage of child restraint systems, as established by Jones and Ziebarth (2017), who used social-economic theory to argue that social and economic benefits associated with the use of the child-restraint systems warranted the establishment of effective laws to increase usage. The researchers reviewed 1978-2011 data from US Fatality Analysis Reporting System (FARS) and concluded that although there are laws to enforce the use of child restraint systems, their applicability and enforcement is ineffective, which limits the use of the system.

The low usage of the child restraint system is not unique to developing countries and countries in the Middle East. A 2017 survey by Trotta et al. in the European Union indicated that although the knowledge and attitude towards the use of the system were high, the usage remained low, leading to increased fatalities associated with road accidents.

Governments play important roles in reducing child fatalities due to non-compliance to safety requirements. An article by Wolf et al. (2017) sought to identify the role of the state, and thus, state-based predictors for child mortality from vehicle accidents. In essence, the article looks at how the existence of policy and enforcement in the different US states influenced behaviors that averted exposure of children to fatal injuries during accidents. The study targeted a reporting system on fatalities for the period between 2010 and 2014 involving 18,116 children in various states in the US, including Massachusetts and Mississippi. The study undertook a quantitative approach using retrospective analysis. The findings revealed connection with restrictive laws such as laws prohibiting children from riding in front seats. They found that of all accidents where children died, 20% did not have restraints, 13% were not well seated, and 9% had the driver carrying the child. These results can be linked to countries where there is laxity in implementing traffic laws. Most accidents where children died occurred on highways (62%) as opposed to rural roads (18%).

Types of injuries

When unprotected, children tend to be ejected from vehicles in the event of an accident. This results in serious injuries on vital body sections and organs. A study by Grivna, Eid, and Abu-Zidan (2013) confirmed that lack of protection of children during rides is a major cause of trauma, injuries and death during accidents. This study was done between 2006 April and 2007 October. Their study was done on children who were injured or admitted with serious trauma or who had been reported dead on arrival at two of the Al Ain City trauma hospitals. A total of 245 samples were studied, with 79% being male and 2% female. The authors investigated the history of the incidents to determine how the accidents occurred, where the occupants sat, whether they used seat belts and whether they were driving. The study targeted only children between one and 19 years. As it was found, the accidents were mostly vehicle rollovers (37%) and collision with other vehicles (32%). Most of the accidents involved the occupants being ejected, with a majority of the victims having been in the back seat. They found that the most common trauma involved were head injuries. The evidence was summarized by the authors to show that the ejections happened mostly because the children were not protected by seat belts. It was also concluded that without a seat belt, children are most vulnerable. Further, the authors believe that ejection is a serious risk to children. The authors found that most of the accidents occurred in older children who would have been able to use seat belts if directed to do so by their parents. Finally, through this study the authors also established that only 2% of children who were passengers had used seat belts. In all of the samples, there was no single use of CRS.

In their review of road traffic accidents in Saudi Arabia, Ghaffar and Ahmed (2015) established that road accidents continue to occur and more deaths are occurring than in previous years. The purpose of the study was to document common injuries arising from accidents as a way of informing the design of the needed interventions for those who experience accidents. The study also undertook a review of articles published within the last ten years. As the study found, there was a high prevalence of injuries among children and young adults because of the tendency for the group not to use seat belts. The article also found that this group formed a greater portion of those who abuse traffic rules. The study described the problem as a neglected epidemic that will claim many lives. The exponential increase of road accidents and injuries is alarming, especially when one considers the technological advancements that should promote the quality of safety on roads. The study revealed the neck and general head area as the most commonly affected areas during accidents at 63.9%, with the chest area coming in second at 27.8%. The study found high-speed driving to be the highest cause of accidents (43.1%).

Studies done by Grivna, Eid, and Abu-Zidan(2013) and Ghaffar and Ahmed (2015) highlighted that injury and death cases are increasing because many people do not know all the traffic rules. In addition, those who know also fail to practice the right things. There is a high level of negligence on the road, and this should be mitigated through government interventions that should incorporate training of all drivers, education and deployment of law enforcers to reinforce traffic rules.

Effectiveness of CSS

The practice of using child safety seats (CSS) has attracted many researchers. The studies on this topic have used various approaches such as focusing on effectiveness of CSS. This review compares three articles on the effectiveness of CSS. First, Doyle and Devitt's (2008) article aimed to assess the effectiveness of child safety seats at preventing injuries for children aged two to six years. The data used for the research was collected from the Wisconsin Crash Outcome Data Evaluation System, the New Jersey Department of Transportation and General Estimates System (GES), and document analysis was used as a study design method. The sample used included cases from Wisconsin (74,791), GES (46,205) and New Jersey (76,343). The study established that the use of CSS reduced serious injuries in the study period by 25%.

Another study conducted by Rice and Anderson (2009) aimed at estimating the effectiveness of the child restraint system for preventing fatalities among children aged three years or less. The authors used mixed-

cohort design and worked with the accident reports obtained from the American Fatality Analysis Reporting System, using a sample of 6,303 crashes. The study concluded that restraint systems were more effective for preventing deaths due to traffic collisions than seat belts.

Another study was titled by Elliott et al. (2006) estimated the benefits associated with the use of CSS over seat belts for reducing the fatalities of children aged two to six years. The research used a document analysis design to review 7,813 samples from the United States Fatality Analysis Reporting System. The study concluded that properly used CSS reduced accidents by 28% compared to seat belts, which reduced accidents by 21%.

All of the three above-mentioned studies used documented records for their analysis. Additionally, the researchers did not use theories to form the basis of their studies. Another similarity among the articles is that the authors agree that properly used child restraint systems are effective at reducing injuries and fatalities associated with road accidents. The issue with these articles is that they discuss the use of seat belts among children aged below five years despite CDC recommendations that they should be used among children aged more than five years old.

Doyle and Levitt's (2008) argument was more persuasive because instead of using one database for their comparison, they used three databases; hence, the bias and errors associated with relying on one database were minimized. These three articles are crucial in the research of parents' attitudes, knowledge and practices of CSS use because they provide important statistical information on child fatalities and injuries due to motor vehicle crashes and on the effectiveness of CSS at reducing deaths and injuries.

Summary

The reviewed studies have indicated that the prevalence of using child restraint systems is low in Saudi Arabia. This tendency predisposes children to fatal injuries, including head injuries, chest injuries and neck injuries. The findings collectively show that the primary cause of low usage practices is the lack of knowledge on how to use the system. However, the attitude among the Saudis toward using the system is positive, despite the low knowledge. Utilizing the theory of planned behavior, low usage can be attributed to family and cultural factors. The studies conducted outside Saudi Arabia indicate that knowledge on the use of child restraint systems is high; however, the attitude is low or moderate, which leads to low usage. The studies have revealed that the issue of the low usage of child safety systems is not unique to developing countries, but also occurs in developed regions such as European Union and the United States. From the literature review of the studies conducted in Saudi Arabia, there are knowledge gaps on why the country has low knowledge on the use of child restraint systems and on the effectiveness of the law mandating the use of child restraint systems (Consunji et al., 2019) for influencing the attitudes toward usage.

III. Theoretical framework

The study will apply the Health Believe Model as the basis for understanding the practice of the parents towards the use of CSS. The model was developed in the 1950s by researchers from the U.S Public Health Service (Champion and Skinner, 2008, p.46). The aim of this model was to understand why individuals failed to adopt the recommended strategies for prevention of disease such as early screening. According to this model, individuals are likely to take preventative action only if they perceive the health risk to be significant, where "significant" means that people feel that the preventative benefits outweigh the costs (Laranjo, 2016). The model states that there are six constructs that predict healthy behavior. These constructs are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue of action and self-efficacy (Champion and Skinner, 2008, p.47). Based on these tenets, the model can be used to explain why the parents fail to use child-restraint systems despite their proven benefits.

Perceived susceptibility is the individual perception of the probability of acquiring a particular disease (Champion and Skinner, 2008, p. 47). In the context of this study, this tenet can be used to show that the parents who perceive the susceptibility of road accidents to be low are less likely to use CSS than those who perceive the risk to be high. Perceived severity is the perception of the seriousness of contracting the disease (Champion and Skinner, 2008, p. 47). In relation to this study, the perceived severity is the perception of the seriousness of being involved in motor vehicle crashes and of the associated injury. Low usage of CSS can be attributed to low perceived severity. Perceived benefits are the perceived efficacy of the available actions to prevent a particular disease (Champion and Skinner, 2008, p. 47). This variable can be used in the study to explain the tendency of the drivers to use the restraint system due to evidence of their effectiveness at mitigating injury or, in contrast, low usage due to low perceived benefits. Perceived barriers are the obstacles that can be encountered during the use of CSS, for instance, lack of knowledge of effective use and financial constraints. This tenet can be used to explain how negative attitude and lack of knowledge, among other factors; can result in low utilization of the child restraint systems.

Cue of action is the stimulus needed to make a particular health strategy acceptable to individuals (Champion and Skinner, 2008, p.49). This variable encompasses the strategies that can be used to increase the practice of using CSS. The final variable (self-efficacy) is a person's confidence in their ability to perform a specific behavior (Bandura 1988, as cited in Champion and Skinner, 2008, p.49). The concept of self-efficacy is used to indicate individuals' beliefs in their ability to effectively always use CSS when driving. Appendix 1 shows the Health Belief Model's components and linkages. The present study will also attempt to use the health belief model to indicate the effects of the lack of increased public campaigns on CSS and the limited policy implementation have had on the failure of Saudi drivers to adopt the use of children restraint systems.

IV. Methodology

This section discusses the study design to be used, setting, sample and sampling size, instruments, ethical consideration, and data collection procedures.

Research design

The proposed study will use a cross-sectional quantitative survey as the methodology for analysis. This type of research design is suitable because it facilitates quantitative decryption of various characteristics of the study population such as perception, trends and opinions. The choice of cross-sectional study will enable the researcher to understand the prevalence of practicing usage of the child car safety seat and the parents' attitude towards it in Riyadh, Saudi Arabia. It will also be relevant in suggesting the treatment for and other outcomes arising from this problem as well as factors associated with such outcomes. Similarly, cross-sectional design is suitable for quantitative analysis especially because of its lower cost, lower losses and the direct observations of phenomenon (Zangirolami-Raimundo, Echeimberg and Leon, 2018, pp. 356-360)

Settings

The study will take place paediatric clinics at the two hospitals in Riyadh, Saudi Arabia.

Sample

According to Elfil and Negida (2017), it is important for the researcher to take into consideration various factors such as sample size, sampling errors and sampling design if the census approach is not being used. In this study, these three considerations will be considered to prevent inaccurate conclusions due to having a biased sample. The researcher will target parents who will be driving with children aged five years and below. For the purposes of this study, parents will be defined as individuals who are considered to be custodians of the child (i.e., not necessarily the biological parent). The inclusion of children aged five years and below is justifiable because they require the restraint systems (to use seat belts, they must also use a booster seat) (CDC 2014, para.8) Hence, the authorities recommend that this age group should also use restraint systems along with seat belts.

The researcher and the assistants will approach the parents taking their children into paediatric clinics at the two hospitals. Depending on whether they meet the inclusion criteria, the participants will be informed on the purpose of the study and asked to sign the consent form if they are willing to participate. Therefore, a convenience sample of parents visiting paediatric units will be selected. The convenience sampling is appropriate for the study because it will enable access to participants depending on their availability.

An equal number of questionnaires will be dropped at each centre. The sample size of centres is unknown; therefore, the Raosoft sample size calculator will be used to estimate the sample size: According to Raosoft and also National Business Research Institute "If the sample size is unknown, 20,000 should be used as a sample size".

Sample size

Three factors, namely significance level, power and magnitude and effect size determine the sample size. Significance level is the "measure of the hypothesis being true when compared to a specified level of certainty" while effect size assesses the magnitude of the effect (Tenny and Abdelgawad, 2020, p.5). Because the study population is unknown, 20,000 will be used as recommended by National Business Research Institute. There are various online calculators that assist in the calculation of sample size. This study will use the Raosoft online calculator. Using a 5% error margin, 95% confidence interval, and 50% distribution, the sample will be 377 parent drivers.

Inclusion and exclusion criteria

Inclusion criteria

- Parents who are driving with the children aged five years and below
- Parents have a valid driver's licence and are aged 18 years and above
- Parents are able to read and understand Arabic.
- Participants are residents of Riyadh.

Exclusion criteria

- Due to ethical concerns, participants who are mentally unstable will be excluded.
- Respondents who are unable to read and write Arabic will be excluded.
- Non-residents of Riyadh and those without a valid driver's licence will be excluded.

Instrument

The study will use a self-administered questionnaire. The questionnaire will be adopted from Alsanea, Masuadi, and Hazwani's study (2018) with the objective of investigating not only the utilization of child restraint systems but also the patterns of child transportation in Saudi Arabia. The permission will be obtained from the authors (shown in Appendix 2). The questionnaire comprises eighteen items measuring demographics, safety practices and perception regarding the use of restraint systems. Questions 1-7 will collect the demographic information (gender, age, education level, relationship with the child, family member number, children aged less than five years, and monthly income). Questions 8-13 will collect information on the use of CSS and seat belts. The final section (14-18) will contain five-point Likert scale questions assessing the use of CSS (refer Appendix 3). The authors conducted a pilot test on a sample of 55 subjects to test the questionnaire's validity and reliability. Result from reliability analysis yielded a Cronbach's alpha score of 0.71, which suggests that the questionnaire is a reliable tool (Alsanea, Masuadi, and Hazwani, 2018). The questionnaire translated to Arabic as attached in Appendix 4.

Ethical aspects

Although the study is non-experimental, various ethical issues will be considered. The research will not require the respondents to include identifying information in the questionnaires. Participation in the study will be voluntary, and the respondents will be assured that the information collected from them will be used for research purposes only. There will be no financial incentive. If anxiety is triggered by the nature of the questions, the participants will be dismissed from the research and offered psychological counseling if needed.

Data will be stored in secured hard drives and shared using encrypted email. The questionnaire collected from participants shall be protected will be protected with the lockets cabinets. Prior to conducting research, permission will be obtained from the university and the hospital instructional review board. The consent form will also be used to inform the participants of the overall purpose of the study, that they have the right to leave the research at any time and of the benefits and risks of participation, confidentiality, security of data, period of data storage and contact information of the researcher and the approving institutional review board. The consent form is attached in Appendix 3.

Data collection

Before commencing the data collection, permission will be obtained from the respective hospitals' research departments. In addition, the researcher will obtain permission from the university research department. The researcher will make a schedule with the two hospitals to visit weekly over a three-month period. The questionnaire will be accompanied with an introduction letter, and the consent form will be distributed to the two hospitals in Riyadh city. The researcher will meet the target participants (parents taking their children to pediatric clinics at the two facilities) and assess whether they meet the inclusion criteria. If they meet the specified criteria, they will be informed of the study and its purpose and encouraged to fill the consent form and participate. After filling the consent form and the questionnaires, the participants will hand them to the researcher or drop them in designated areas at each center. Specifically, there will be boxes where the participants can drop the filled questionnaires and the accompanying consent forms. The respondents will be given 30 minutes to complete the questionnaire. Respondents who face difficulties when filling the questionnaires will be assisted by the researcher. The researcher will identify various issues that the participants may face, such as difficulty in answering questions or invalid questionnaires. If many invalid questionnaires are identified, additional questionnaires will be provided. The completed questionnaires will be collected and stored in secured places using locked cabinets in an office to prevent exposure of information.

Data analysis

Data will be checked for completeness and objectivity before beginning the data analysis. For the purposes of data analysis, the Statistical Package for Social Science (SPSS) Version 25 will be used. SPSS will enable descriptive presentation of data using means, percentages and frequencies. The data will be recorded in SPSS, eliminating the need for spreadsheet applications. The prevalence of the use of CSS will be presented using point and interval estimates. To assess the relationship between the use of CSS and socio-demographic variables (level of education, gender, age, monthly income, number of children aged below five years and parent relationship with the child), Chi-squared tests will be used. The test will also be used to establish relationship

between gender and use of CSS. These tests will be conducted at 5% levels of significance. The results of the data analysis will be presented in tables to indicate the baseline characteristics of the respondents and their relationship with CSS use and availability (level of education, monthly income, relationship with the child and number of children <5 years, $p = 0.05$). The second table will indicate the association between the use of CSS and gender based on the responses of five-point Likert scale questions, where the answers include "never", "rarely", "sometimes", "often" and "always," $p = 0.05$). The third table will assess the relationship between use of seat belts and their availability of CSS; <0.05 .

V. Discussion

This study is important because although there are studies conducted in Saudi Arabia on the use of child restraint systems, the research thus far has indicated that there is low usage of CSS, even though usage is legally mandatory. To address this gap, the present research could help to identify whether knowledge and attitude play a role in the use of restraint systems. The study will be guided by the Health Belief Model, which will be used as the basis for understanding the practice of parents towards the use of CSS. The research will test the hypothesis whether there is a significant relationship between attitudes and knowledge and practice of usage of child car seat systems. As outlined in the literature review, various scholars have established that attitudes and knowledge may influence the use of CSS. The information obtained from these scholarly sources justifies further testing of hypothesis on different populations and geographical locations.

The study will be important for the general population because it could act as the basis for the government to establish initiatives aimed at enhancing the use of CSS. Some of these initiatives could include public education on the use of CSS, public awareness on the importance of CSS and implementation of legislation on the use of restraint systems. These initiatives by the government will have a positive impact on the general population due to their potential to reduce the number of child fatalities and injuries associated with road accidents. Also, the initiatives will reduce the psychological stress on parents and siblings associated with injuries to children or death in motor vehicle crashes.

Strengths and weaknesses of the research

The research instrument that will be used for the research will be simple and will not contain many questions to avoid the risk of fatigue or frustration among participants and improve response rate. Nevertheless, this study is subject to several limitations. The major limitation is that the data will be collected from the residents of Riyadh; hence it may not be generalizable in other areas with different demographic characteristics. The study also has limitations due to the use of cross-sectional design; hence it is not possible to determine cause and effect, whereby one event causes another (e.g., whether the perception of CSS causes accidents). Also, the use of self-report measures may result in response bias and may also lead to confusion due to difficulty in interpreting questions.

Implications for practice

CSS is the most efficient method of protection of children from the injuries associated with motor vehicle crashes. The high number of road accidents in KSA that lead to child injuries warrants further research on the impacts of knowledge and attitude of the parents on the practice of using CSS. Thus, this study, as the first step within a research program targeting child seats safety systems in SA, is expected to have implications for public health, nursing practice and health policy. This study may uncover ways to improve how child safety seats are used, knowledge on the use of CSS and attitude towards use of CSS. Findings from this study could aid health practitioners and public health personnel design targeted/customized awareness campaigns and workshops to increase the knowledge of parents regarding the use of CSS.

Moreover, the research may also shift the focus of law enforcement agencies from penalizing non-compliance with the use of CSS to improving public education to change behavior. The limitations associated with the study could warrant replication of the study using different geographical locations and a wider scope, which could then further increase the possibility of a wide impact on the community. Further research is required using different variables such as marital status, driving record, place of work, maternal vs. paternal education and maternal employment status.

VI. Conclusion

There have been studies that have been conducted in Saudi Arabia to determine the knowledge, attitudes and practices of parents towards the use of CSS. Despite the evidence from the literature on the importance of child restraint system for reducing the injuries and deaths associated with road accidents, they are still underutilized in the KSA. The mandatory law that requires the use of CSS has not had a notable impact on their use. Therefore, it is important to study the association between attitudes and knowledge and practices of using CSS in the KSA. Findings from this study will contribute to the existing literature on parents' attitude and

practices on the use of CSS—doing so will help the government to take the necessary steps towards improving CSS use in the country.

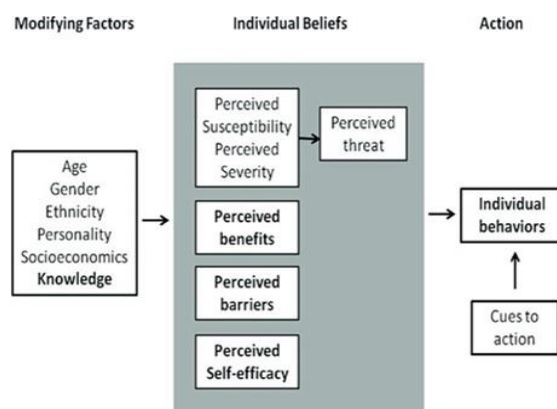
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Appendices

Appendix 1: Health Belief Model components and linkage diagram



(Champion and Skinner, 2008, p.49)

Appendix2:

Request for Permission to Use Data Collection Instrument

Date 1 July 2020

My name is Ghadeer Alshammari from Dublin City University Masters in Nursing program and I am conducting a research study about Parents' Attitude, Knowledge and Practice of Child Car Safety Seats in Riyadh, Saudi Arabia. The purpose of this research is to analyze parents' attitude, knowledge and practice of use children safety seats (CSS)/restraint systems in Riyadh, Saudi Arabia. This research will help health care providers discover more about child restraint system. The aim of this research is to evaluate knowledge, attitude and practice of the parents on the use of CSS.

I am requesting your permission to use children safety seats survey instrument of which you are the author/creator/contact person. The instrument is well suited for my proposed study about children safety seats I appreciate your kind consideration for this permission. Please email me with any questions you may have about my proposed research.

Thank you.

Best regards,

Ghadeer Alshammari

Masters Student, Nursing

DCU-College of Nursing

Email: Ghadeer.alshammari2@mail.dcu.ie

APPENDIX 3:

Consent and Informational Letter for Participants

Date 1 July 2020

My name is Ghadeer Alshammari from Dublin City University Masters in Nursing program and I am conducting a research study about Parents' Attitude, Knowledge and Practice of Child Car Safety Seats in Riyadh, Saudi Arabia. The purpose of this research is to analyze parents' attitude, knowledge and practice of use children safety seats (CSS)/restrain systems in Riyadh, Saudi Arabia. This research will help health care providers discover more about child restraint system. The aim of this research is to evaluate knowledge, attitude and practice of the parents on the use of CSS.

I am requesting your assistance in my research by completing a survey that should take approximately 30 minutes. Your participation is completely voluntary, and you may withdraw from the study at any time. .

The benefit to you for participating is knowing you contributed to research that may improve child safety. The risks involved in this study are minimal and no more than one would experience during normal daily activities. There may be the risk of emotional stress when asked about any question. The remedy would be to skip any questions you choose to or discontinue participation in the survey. There are no other known adverse effects of participating in this study. Responses will be completely anonymous, and your name will not appear anywhere in the final write up of the survey results. All documents related to the study will be kept completely confidential in locked storage and only accessible to the researchers. Completion and return of the survey conveys agreement to participate. In addition please sign below to consent to participate.

If you have any questions regarding this research, please contact me by Ghadeer.alshammari2@mail.dcu. If you have any questions regarding your rights as a research subject, please contact the Dublin City University Division of Research.

Ghadeer Alshammari
Masters Student, Nursing
College of Nursing
Dublin City University
Ghadeer.alshammari2@mail.dcu.
Informed Consent Signature

I, hereby consent to participate in this study about Child safety seats

I have been informed of the purpose, risks, and benefits of the study and understand I may withdraw from this study at any time.

(Signature)

APPENDIX 3:

Questionnaire

Please answer all the following:

1. **Gender:** Male [] Female []
2. **Age:** years
3. **Education level:**
1/ less than secondary school [] 2/secondary school []
3/ Bachelor [] 4/ Higher Study []
4. **Relationship to the child:**
1/Father [] 2/Mother [] 3/Sibling [] 4/ Other
5. **Family member number:**
6. **Family member number less than 5 years**
7. **Monthly income in Saudi Riyal**

Less than 5,000 <input type="checkbox"/>	5,000-10,000 <input type="checkbox"/>	10,000-15,000 <input type="checkbox"/>	15,000-20,000 <input type="checkbox"/>	More than 20,000 <input type="checkbox"/>
--	---------------------------------------	--	--	---

8. How often do you use car seat belt?

- a. Never [] 2. Rarely [] 3. Sometimes [] 4. Often [] 5. Always[]

9. Is child restraint system available in your car at this moment?

1. Yes [] 2. No []

10. If the answer is (Yes), how often do you use child restraint system?

1. Never [] 2. Rarely [] 3. Sometimes [] 4. Often [] 5. Always[]

11. If you use child restraint system, how old is the child using? if there is more than on child, mention all the ages of children using

- a. Mention child/children age

12. If child restraint system is unavailable, how does your child sit in the car? You can pick more than one answer

1/ No injury[]	2/ Simple wounds or bruises[]	3/ Fracture[]
4/ Critical injury that required ICU admission[]	5/ Death []	

- If adult passenger is available, child sits on passenger's lap in front seats
- If adult passenger is available, child sits on passenger's lap in back seats
- If vacant, child sits in back seat with car seat belt use
- If vacant, child sits in back seat without car seat belt use
- If vacant, child sits in front seat without car seat belt use
- If vacant, child sits in front seat with car seat belt use
- Child sits on driver's lap while driving

13. Have you ever encountered a car accident while driving with a child?

1. Yes [] 2. No []

If the answer is (Yes), what was the protection method used for the child?

- 1/ Car seat belt [] 2/ Child restraint system []
 3/ No protection [] 4/other []

What happened to the child during the accident?

Please answer the following sentences

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
--	--------------------------	-----------------	----------------	--------------	-----------------------

14. Child restraint system is an essential device while driving with children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. I have enough information about child restraint system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Child restraint system is expensive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Child restraint system is only important when driving fast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Child restraint system is not important for children more than two years old	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(Alsanea M, Masuadi E and Hazwani T, 2018)

APPENDIX 4:

Arabic questionnaire

نرجو الإجابة على جميع الأسئلة

1. الجنس : ذكر انثى
2. العمر : سنة
3. مستوى التعليم : 1/ أقل من ثانوي 2/ ثانوي 3/ جامعي 4/ دراسات عليا
4. صلة القرابة بالأطفال : 1/ أب 2/ أم 3/ أخ أو أخت 4/ أخرى: حدد.....
5. عدد أفراد الأسرة :
6. عدد أفراد الأسرة ممن هم أقل من 5 سنوات:
7. الدخل الشهري بالريال السعودي

أقل من 5.000	5.000 - 9999	10.000 - 14.999	15.000 - 20.000	أكثر من 20.000
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. ما مدى استخدامك لحزام الأمان؟
 1. لا أستخدم 2. نادرا 3. بعض الأحيان 4. معظم الأحيان 5. دائما
9. هل يتوفر حاليًا الكرسي المخصص للأطفال في سيارتك الشخصية؟
 1. نعم 2. لا
10. إذا كانت الإجابة (نعم)، ما مدى استخدامك للكراسي الأطفال؟
 1. لا أستخدم 2. نادرا 3. بعض الأحيان 4. معظم الأحيان 5. دائما
11. في حال استخدامك للكراسي المخصصة للأطفال ، ماهو عمر الطفل المستخدم ؟ في حال وجود أكثر من طفل ، انكر أعمار جميع الأطفال المستخدمين للكراسي المخصصة
 1. انكر عمر الطفل/الأطفال

12. في حال عدم استخدام الكراسي المخصصة للأطفال، ماهي طريقة جلوس الطفل في السيارة؟ بإمكانك اختيار أكثر من اجابه

1. في حال وجود الأم او من يلوب عنها، يجلس الطفل في حجر (حضن) الراكب في الكرسي الأمامي.
2. في حال وجود الأم او من يلوب عنها، يجلس الطفل في حجر (حضن) الراكب في الكرسي الخلفي.
3. في حال عدم وجود احد، يجلس الطفل على كرسي السيارة الأمامي مع استخدام حزام الأمان.
4. في حال عدم وجود احد، يجلس الطفل على كرسي السيارة الأمامي مع عدم استخدام حزام الأمان.
5. في حال عدم وجود احد، يجلس الطفل على كرسي السيارة الخلفي مع استخدام حزام الأمان.
6. في حال عدم وجود احد، يجلس الطفل على كرسي السيارة الخلفي مع عدم استخدام حزام الأمان.
7. يجلس الطفل في حجر (حضن) السائق أثناء القيادة.

13. هل سبق وأن تعرضت إلى حادث سير مع وجود طفل مصاحب ؟

1. نعم 2. لا

■ إذا كانت الإجابة (نعم)، كيف كانت طريقة حماية الطفل ؟

- 1/ حزام امان السيارة 2/ الكرسي المخصص للأطفال
- 3/ لا يوجد حماية 4/ اخرى : انكر

■ ماذا حدث للطفل أثناء الحادث ؟

- 1/ لا يوجد اصابات 2/ جروح بسيطة او كدمات 3/ كسور
- 4/ اصابة حرجة استدعت الدخول للعناية المركزة 5/ وفاة

الرجاء الإجابة على العبارات التالية:

موافق جدا	موافق	محايد	غير موافق	غير موافق أبدا	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14. لدي معلومات كافية عن كراسي السيارات المخصصة للأطفال
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15. تعتبر كراسي السيارات المخصصة للأطفال جزء أساسي في السيارة أثناء التنقل مع الأطفال
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16. كراسي الأطفال مهمة فقط إذا كان السائق يقود بسرعات عالية
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17. كراسي الأطفال غير مهمة لمن هم فوق سنتين
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	18. كراسي الأطفال مكلفة