SEATBELT RESTRAINT USE IN THE EASTERN PROVENCE OF THE KINGDOM OF SAUDI ARABIA

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Abstract:
This study set out to examine seatbelt wearing in the Kingdom of Saudi Arabia (KSA), based on the premise that an increase in seatbelt wearing will significantly reduce personal injury in traffic crashes. It was expected that local data will help identify intervention strategies necessary to improve seatbelt wearing in the region. The research involved two proven methodologies. First, face-to-face interviews of 1389 male and female adults in regional shopping plazas of their own, and their children’s, seatbelt wearing behaviour in their vehicles and reasons for these attitudes and beliefs. Second, two on-road observation studies involving obtrusive and unobtrusive observations of adult and child seat belt wearing rates by trained observers in approximately 5000 passenger vehicles stopped at representative traffic signalised intersections. Results showed front seat wearing rates of between 43% and 47% for drivers’ and 26% to 30% for front seat passengers were observed, while rear seat belt wearing rates were poor. Reasons for these rates are discussed and recommendations for improving seat belt wearing in KSA are discussed.

Key Words:
Seat belts, Child Restraints, Safety, Passenger Cars, Evaluation, Survey, Observation Study, Prevention

Disclaimer
This report is disseminated in the interest of information exchange. The views expressed here are those of the authors, and not necessarily those of the Saudi Aramco, University of Dammam or Monash University.
PREFACE

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<th>Term</th>
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<td>Car</td>
<td>Four-wheel passenger vehicle sedan or station-wagon</td>
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<td>CCTV</td>
<td>Closed Circuit Television</td>
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<td>CDC</td>
<td>Center for Disease Control</td>
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<td>Chi Squared</td>
<td>Non-parametric Statistical Test</td>
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<td>CRS</td>
<td>Child Restraint Systems</td>
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<td>Dammam</td>
<td>Capital of the Eastern Province of Saudi Arabia</td>
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<tr>
<td>Dhahran</td>
<td>Regional township in the Dammam Municipality</td>
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<td>GCC</td>
<td>Gulf Cooperation Council</td>
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<td>GRSG</td>
<td>United Nations Global Road Safety Group</td>
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<td>Khobar</td>
<td>Regional township in the Dammam Municipality</td>
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<td>KSA</td>
<td>Kingdom of Saudi Arabia</td>
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<td>MUARC</td>
<td>Monash University Accident Research Centre</td>
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<tr>
<td>NHTSA</td>
<td>National Highway Traffic Safety Administration (US)</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<tr>
<td>Pre-tensioners</td>
<td>Pyro-technique devices that remove slack in the belt during impact</td>
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<tr>
<td>Pickup</td>
<td>Light duty commercial utility vehicle</td>
</tr>
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<td>SACTS</td>
<td>Saudi Aramco Chair of Traffic Safety</td>
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<tr>
<td>Seat Belt</td>
<td>3-point restraint belts fitted in the front and rear seats</td>
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<tr>
<td>SPSS</td>
<td>Statistical Package for the Social Sciences</td>
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<td>SUV</td>
<td>Sports and Utility Vehicle</td>
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<td>WHO</td>
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EXECUTIVE SUMMARY

An important study as part of the Saudi Aramco Chair of Traffic Safety research activities was to provide a comprehensive account of seatbelt wearing in the region of Dammam and the reasons why drivers and passengers (adults and Children) did or did not wear their seatbelt when driving.

The project objectives identified for this research included (i) what the residents of Dammam understood about the importance of wearing seat belts in cars; and (ii) what the level of seat belt wearing was on roads in the Dammam region. This was to cover both adults and children.

Two separate studies were designed to address these objectives; first, was a community survey aimed at obtaining motorists stated practices and attitudes towards seatbelt wearing, and second, an on-road observation study of what was occurring at varying times across the Dammam Metropolitan region.

It was expected that local data will help identify intervention strategies necessary to improve seatbelt wearing in the region. A number of research questions were formed at the commencement of the study to help guide the research.

A literature was initially undertaken to uncover issues of relevance to the seat belt project in the Eastern Provence of KSA which highlighted critical aspects of seat belt wearing challenges and the potential to make large inroads in reducing deaths and serious injuries in the region if seat belt wearing can be enhanced in KSA.

Community Survey

Face-to-face interviews were conducted in 5 shopping malls in the Dammam Municipality involving 1,389 people of whom 72% were male, 62% had current driving license, 66% were KSA nationals, 83% lived in Dammam region, and 59% were married. The interview questionnaire is shown in Appendix 2.

Responses to Adult Questions

On particular interest, approximately one-third claimed to always wear their seatbelt, another one-third said they sometimes did, while the remaining 30 percent, hardly ever did. Those who always wore their belts noted that safety was their main reason, while habit and not breaking the law (avoid being penalised) was also mentioned.

Reasons expressed by those who hardly ever wore their belts involved I don’t want to, I’m lazy, don’t need it, uncomfortable, not the Arab culture, and I forget. Interestingly, many of these declared “non-users” did admit to wearing their belts at police check-points, illustrating the important role of enforcement in this area.

Those who were licensed to drive (males) were more likely to admit to always wearing their seatbelt than those not licensed (predominantly females). Sixty-six percent of the respondents knew that seat belts definitely saved lives but that this was fewer for Saudi nationals, singles, and younger motorists. Education, licensing, or the regions they lived in had little influence.

Reasons included improved body kinematics, and fewer ejections in a crash while negative comments included don’t have any safety benefits at all, sometimes yes and no, they are dangerous and seat belts can cause injuries. Not surprisingly, many of the negative comments can from those who didn’t use seatbelts.

A high proportion of respondents knew that legally, they were required to wear their seat belts including both young and old, married and single, and those born and living in the KSA. This tended to be more males and those licensed. It has been claimed seat belt legislation in KSA appears to only targets front seat occupants.

Sixty percent of the respondents acknowledged that those seated in the rear seats also needed to be belted. Reasons included that injuries were more likely to occur in the front seat, it’s not a legal
requirement in Saudi Arabia, women and children tend to sit in the rear, it’s not a cultural requirement, they are uncomfortable, and inappropriate for large-sized people.

Responses to Child Questions
A number of questions were related to restraint issues and the use of Child Restraint Systems (CRS) for children in passenger vehicles. There was strong agreement that children aged up to 5 years should be restrained in a suitable CRS and this increased with education and those licensed.

Reasons included safety and comfort and to stop the children from moving within the vehicle, while those who disagreed thought that children were well protected spiritually, that an adult seat belt was not suited to children (correct) and that they could be adequately restrained by their parents (false).

Approximately one-half thought it was an offense for children to be unrestrained in a moving vehicle while a similar group thought not. There was a greater appreciation of the legal status by older respondents and there were fewer KSA respondents that appreciated this than others in the GCC. This was not affected by gender, education, licensing, living region, or whether they have or had children.

When asked those who have or had children if they always had your child in a CRS, again, half said yes and the others, no. Older respondents, 50 years or more, and those with higher education were more likely to have said yes to the question. Those who have children now were more likely than those who had previously, which might also reflect on past availability of these devices.

Of some concern, 44% of all respondents thought that an adult seat belt was a sufficient restraint for a child aged under 10 years. This was especially the case for licensed drivers (males). The follow-up comments here mainly focussed on the perceived safety benefits of seat belts without any thought for the potential dangers to a child from not being appropriately restrained.

The respondents were also shown photographs of the three most common types of Child Restraint Systems, namely a baby capsule, a forward facing child seat, and a booster seat, and asked to nominate age-ranges for each device. The findings showed a reasonable spread of responses from good to poor for the baby capsules, but very poor and inadequate responses for child restraint seats and booster seats.

The finding in regard to CRS generally highlight the lack of knowledge among those interviewed on what constitutes a suitable child restraint and the need for these. Most declared that the cost of these devices was a deterrent to parents, although men and those with children were less likely.

Without a doubt, improved knowledge is urgently required on when and what to use child restraint systems and when to upgrade to ensure greater protection of children in vehicles in the GCC.

On-Road Observations
Two methods were employed in the on-road study, namely an Obrusive and Unobtrusive procedure. The obtrusive approach involved observers working in pairs that approached vehicles stopped at traffic lights and while the first observer talked briefly with the driver about an unrelated issue, the second recorded restraint usage by both front and rear-seat occupants.

The second unobtrusive method involved observers, acting as pedestrians crossing the road, noted the restraint wearing behaviour of just the front seat occupants. This was used partly as a validation of the first method results as well as providing additional adult data.

Adult Seat belt Wearing Rates
Seat belt wearing rates observed here in mainly urban areas of Dammam were 43% to 47% for drivers and 26% to 30% for adult front passengers. This was reasonably consistent across the two methods.

Previous reports on seat belt wearing in Saudi Arabia found poorer wearing rates, suggesting that there has been a recent increase in seat belt wearing in the region. Police reported that they have been paying more attention to seat belt wearing in the region in 2014. Further, a supplementary study of seat belt wearing at a number of police check stops around the Dammam Municipality, found wearing rates of more than 90%
with equivalent increases in front passenger rates. Clearly, this shows the influence that police enforcement can have.

Rear seat, wearing rates, though, were much lower with only 3% to 9% of occupants properly restrained depending on their seating position. This may be because seat belt legislation in KSA is only for front seat restraints, and the false assumption by motorists that they are safer in the rear. In any event, rear seat passengers are at greater risk of ejection and more serious injuries from contacts inside the vehicle in a crash, and an added danger to front seat occupants from contacts with rear seat passengers thrown into the front compartment.

International reports show that seat belt wearing rates in developed countries are all well above the rates reported here in Saudi Arabia. Eight countries including Australia, Canada, France, Germany, Malta, Norway, Sweden and the UK, all reported front seat wearing rates of 90% or above and many others close to this level. All these countries have seat belt legislation either in the front only or for all occupants and this legislation is typically well supported with police enforcement programs. Earlier reports have found a 10 fold increase in the likelihood of being killed in a road crash if you’re not wearing a seat belt in a car with associated substantial cost savings from increased seatbelt use.

**Observed Rates among Children**

By far, the most disappointing result found in this study was the restraint usage rates for children in the cars observed, especially those aged 5 years or under. In the first rear row, wearing rates were no better than 27% for young children and less at 12% for those aged over 5 years. Of even greater concern, there were 171 (25%) of children aged 5 years or less that were seated in the front seat, only 8% of them were restrained.

Furthermore, 11 of the front seat occupants were observed to be in the driver seat without restraints, presumably seated on the driver’s lap. While there were a few passengers seated in the second rear row, the numbers were too small and unreliable.

These findings are of grave concern as unrestrained children, are highly at risk without restraint. Unrestrained fatality rates among children have been reported to be 4 to 7 higher than those restrained. In many instances, they were seen to be seated on their mothers lap. Indeed, as noted earlier, many parents in KSA felt that the young children were well protected in their parents’ arms.

**Recommendations**

A number of recommendations to improve seat belt wearing by adults and children are listed in this report from these findings.

A number of recommendations aimed at improving seat belt wearing to reduce the numbers of adult and children killed or seriously injured on roads in the municipality are listed in this report from these findings. These are briefly listed below (more details provided in the report.

**Increased Police Enforcement**

It is pointless to have legislation requiring motorists to wear seat belts if it is not enforced. In addition, enforcement needs to be supported with adequate legislation in the front and rear, and widespread marketing and education. Seat belt wearing needs to be enforced in both front and rear seats and among men and women.

**Increased use of child restraints**

The low usage rates of purpose-built child restraints in Dammam for children under 5 and up to 10 years is very alarming. Child Restraint Systems (CRS) are in everyday use in all developed countries and give children maximum protection in the event of a crash. Wearing an adult seat belt for a child under 10 years must be discouraged to prevent unintended injuries to the child from the belt itself.
More intensive marketing campaigns are required to alert motorists to their availability and safety benefits. Child seat manufacturers who profit from their widespread use can be used to work together in these campaigns and rental schemes too can lower the financial burden and encourage their use.

**The Role of education**

The community survey results showed that there are many issues associated with seat belt wearing that are not fully understood within the community. It is imperative that many of the false myths that exist about road safety initiatives are addressed. These need to be long-term programmes to have maximal impact.

**Other Initiatives**

A number of other initiatives are also identified. These include:

- Ensuring all cars have 3-point seat belts fitted in all seats;
- Removal of older vehicles that don’t have latest technology where possible; and
- Commercial company policies to ensure their employees wear their seat belts.

**Further Research**

A number of issues in respect of seat belt wearing that warrant further research have been identified for further consideration.
1. INTRODUCTION

The Saudi Aramco Chair of Traffic Safety was formed in 2013 to undertake research aimed at reducing road crashes and injuries in the Eastern Province of the Kingdom of Saudi Arabia (KSA). In 2013, a 3-day workshop was undertaken involving a range of local and overseas organisations and specialists to help identify suitable research projects for the Chair of Traffic Safety to undertake. Of the four major projects identified at the workshop, one important project was to provide a comprehensive account of seatbelt wearing in the region of Dammam and the reasons why drivers and passengers (adults and Children) did or did not wear their seatbelt when driving.

1.1 Project Objectives

Two project objectives were identified at the workshops:

(i) What the residents of Dammam, the capital of the Eastern Province, and the fifth largest city in Saudi Arabia, understand about the importance of wearing seat belts in cars; and
(ii) What the level of seat belt wearing is actually occurring on roads in the region.

Adults and Children were especially of interest and issues of interest within these two sub-groups were addressed separately during the project.

1.2 Project Outline

Two separate studies were designed to address these objectives.

The first was a community survey aimed at obtaining motorists stated practices and attitudes towards seatbelt wearing, both for themselves as well as other passengers within the vehicle.

The second was an on-road observation study of actual practices during varying times across the Dammam Metropolitan region. To the degree possible, adults and children behaviour was assessed separately in this study.

1.3 Hypothesis

This study was based on the premise that an increase in seatbelt wearing will significantly reduce personal injury in traffic crashes and that local data will help identify intervention strategies necessary to improve seatbelt wearing in the region.

1.4 Community Survey Research Questions

A number of research questions were formed at the commencement of the study to help guide the research. For the survey for adult motorists in the community survey, these included the following:

1. Do all KSA motorists claim to always wear their seatbelts and is this a widespread view across the whole Dammam motoring population?
2. What are some of the reasons claimed by those surveyed for not always wearing seatbelts?
3. Is the non-wearing of adult seatbelts age-and gender-specific, or dependent on license, or education status?
4. Is not wearing seatbelts dependent on where they live, or their marital status?
5. Do KSA motorists appreciate the safety benefits from wearing seatbelts?
6. Do motorists understand the legal requirements for wearing seatbelts in the KSA
7. Is it important to wear seatbelts in rear seats in KSA?
For Children, the research questions included:

10. Is it necessary for young children to be restrained in a suitable Child Restraint System (CRS)?
11. Is it an offense for children to be unrestrained in a passenger vehicle?
12. Have you always had your children in a CRS?
13. Is an adult seatbelt a sufficient restraint for children under 10 years?
14. What ages are appropriate for young children in Child Restraint Systems? (Baby Capsule, Child Car Seat, Booster seat/cushion)
15. Has the cost of a CRS been a deterrent for you using these devices?

1.5 Observation Study Research Questions

The research questions identified for the on-road observation study included:

1. What was the actual on-road seatbelt wearing rate and what may influence these findings;
2. Do wearing rates differ between drivers and passengers;
3. Do wearing rates differ between front and rear seats;
4. Do they differ depending on the type of vehicle they are in; and
5. Did the “approach” method influence the adult seatbelt wearing rates?

For children, the research questions were:

6. What are the actual on-road restraint usage rates for young children; and
7. What proportion of children is adequately protected in a purpose-built CRS restraint?
2. LITERATURE REVIEW

2.1 Road Crashes

The Eastern Province of Saudi Arabia (Ash Sharqiyah) is the fifth largest province of the 13 that make up the Kingdom of Saudi Arabia. According to WHO (2013a), national road crash rates in the Kingdom of Saudi Arabia (KSA) currently exceed 23 deaths per 100,000 population, substantially greater than other highly motorised countries (Sweden for example, has less than 4 per 100,000 population currently). Police statistics obtained by TSTN (2009) claimed that annual road crashes in the Eastern Province (EP) were actually higher at 32 per 100,000 population, which when compared with the national figure, suggested that people living in the Province are at greater risk of being killed on the Province roads than those elsewhere in the Kingdom.

TSTN (2009) also calculated that the annual cost of road accidents in the Eastern Province of Saudi Arabia, using a Human Capital method. They estimated the annual cost of road trauma in the region was 5.56 billion (Saudi Riyals) in 2008, including pain, grief and suffering, and human costs. With a population of around 3.8 million inhabitants at that time (Asharaf, 2013) this translates to a cost of injury from road crashes per head of population was more than 1,500 Saudi Riyals. These figures are likely to be much higher today, given the 5 years since these were calculated.

There were various recommendations offered by these researchers to address the higher crash rates in KSA, including Improvements in crash management, accident data systems, safety engineering, driver training and testing, improved vehicle safety, traffic enforcement, better safety publicity, safety education emergency recovery and treatment, and a stronger focus on evaluation and research. The issue of improved seat belt use was particularly highlighted.

Weiss et al (2006) further noted that the Harvard School of Public Health have estimated that road traffic injuries account for over 220,000 in developed regions and 777,000 in developing regions. They also noted that traffic injuries are the third most important global cause of death and disability and without strategic efforts to reduce crashes, they will likely to rise to third position by 2020.

2.2 Seatbelt Usage in KSA and Elsewhere

There are few reliable figures available on adult seatbelt use, nor the use of Child Restraint Systems (CRS) in passenger vehicles in the KSA. Most other countries, however, do have recorded statistics.

In one KSA report by Bendak (2007), he noted that 28% of drivers and 15% of FSPs wore seat belts overall and that higher wearing rates were found in high-income suburbs and with police presence.

In the UK, Narine et al (2009) reported seatbelt wearing rates for London (Table 2.1). They found minor changes in seatbelt wearing rates in London over the previous year but fairly stable generally. Taxis are not compelled to wear seatbelts in the UK (Gov.UK 2014) and these rates were especially low. They also reported that the seatbelt wearing rates were several percent lower in London than other urban areas in the UK.

Seat belt laws were first introduced in Australia between 1970 and 1972. Oxley et al (2009) reported that seatbelt wearing rates in the front seat have been consistently around 95% to 98% across all occupants with lower usage among certain occupant groups (backseat passengers, some child and in in rural areas).
Usage rates are around 70%, though, for those involved in fatal urban crashes, indicating the advantages at reducing fatalities and serious injuries from these devices.

Canada, too, introduced mandatory seat belt laws in the early 1970s and are enforced regularly. Consequently, they reported that 93% of Canadians use their seat belts regularly and that each percentage increase in the national seat belt wearing rate has helped to reduce the number of motor vehicle fatalities. The 7% of Canadians not wearing seat belts account for almost 40% of fatalities in vehicle collisions, again showing the benefits of seat belts in reducing fatal and serious injuries.

In the USA, seatbelt wearing has been a controversial issue for many years. Initially, it was considered unacceptable to enforce motorists to wear a seat belt as it impacted on a citizen’s civil rights. During the 1990s, however, there was a change in attitude by the US Government and legislated for the various states (who have the responsibility for seat belt enforcement) to enforce seat belt wearing in their regions. As a consequence, seat belt wearing rates across the USA in 2000 ranged from around 40% in North Dakota to as high as 89% in California (Cohen and Einav, 2001).

Some states had primary enforcement laws (could stop a vehicle and charge the driver if he/she was not wearing a seat belt) while others had secondary enforcement laws (could only charge a driver for not wearing his/her seatbelt after being stopped for another offense). Fortunately, most other countries are not bothered by these restrictive seat belt enforcement practices.

The figures for seat belt wearing in Europe are also quite scattered across the 27 member states and other European regions. World Health Organisation publish statistics on seat belt wearing for a range of international countries through their observatory data repository (WHO, 2013b). These figures, published by each European country for 2011 show a range varying from around 40-50% for drivers in countries such as Turkey, Montenegro, and Romania, up to >90% for countries such as Germany, Netherlands, Sweden, and the UK. Bosnia & Herzegovina were noticeably low at 20% for drivers and front passengers and only 5% for those in the rear.

Weiss et al (2006) reported on an international survey of seatbelt use exemptions of 30 countries from personal contacts, internet list servers and conference registration delegates. They reported that most had national laws on seatbelt wearing of which two thirds included both front and rear seats. They identified several exclusions involving older and antique vehicles, military and emergency vehicles, and taxis.

### 2.3 Middle-Eastern Research

In an early study of seat belt wearing, Bendak (2007) conducted an on-site observation of seat belt wearing in 8,000 vehicles in and around Riyadh. He reported that overall, 28% of drivers and 15% of FSPs wore their seat belts and that higher wearing rates were found in high-income suburbs. He further found higher rates at major intersections, where police were present.

In a follow-up questionnaire, Bendak (2007) further reported that respondents views on seat belt wearing were inconsistent with their on-road observations and that they considered that both enforcement and education were necessary to increase seat belt wearing rates in Saudi Arabia.

Koushki and Bustan (2006) conducted a person-interview questionnaire survey on issues related to smoking, seat belt use and road accidents among young drivers in Kuwait. They reported that young females were more likely to wear seat belts and were safer than young males. Smokers were less likely to wear seat belts, had higher crash rates when smoking and driving, and those less likely to wear their seat belt were also less likely to violate other traffic laws, too. They noted that expats were more likely to wear their seatbelts that Kuwait drivers. They recommended that more and stronger enforcement effort was needed, monitoring license rates among young drivers, promote the dangers of smoking while driving among youth, and greater education on the dangers of not wearing seat belts among young males.
2.4 Benefits of Seatbelt Wearing

An increase in the rate of seatbelt wearing has been shown to lead to substantial reductions in death and serious injuries in traffic crashes. Mackay (1985) using real-world data concluded that if seat belt usage increased from zero to 100% there would be a reduction of between 47% and 60% in vehicle occupant deaths, and a similar reduction in the percentage of hospital admission cases. Hedlund (1985), further reported that occupants who use their seat belts were up to 50% less likely to sustain serious or fatal injuries in the event of an accident. Evans (1991) using a paired-comparison method, claimed that seat belts would reduce the risk of injury in crash by 40%. Although the injury reduction benefits of seat belts are generally well accepted, NHTSA (2009) recently reported that an increase in seatbelt wearing in 38 States and the District of Columbia (DC) in 2007 resulted in 1,652 (11%) fewer deaths, and 39,486 fewer injuries in one year alone. They noted that the associated cost savings from the increase in seatbelt wearing amounted to US$5.2 billion that year.

Seat belts are generally regarded as a crashworthiness measure (that is, they don’t prevent the crash but rather mitigate the resulting injury). Campbell (1992) noted that by containing the occupant in his/her seat, the belts will minimise the likelihood of hitting the steering wheel or windscreen for a driver and a front seat passenger in all but the most severe crash. More importantly, they prevent the occupants from being ejected from the vehicle in a crash offering large benefits in death by between 200% and 400% (Hedlund, 1985). Zaal (1994) further noted that the belt also helps to spread the severe forces that impact on an occupant in a crash over the strongest parts of the body.

2.5 Child Restraints

Children safety is paramount in passenger vehicles as we adults have a special duty of care to ensure they are well protected. Children are not just small adults – their physiology is quite different and they are continually developing, both physically and mentally. They need special restraint system to be adequately protected in a crash. For children up to 10 years, it is not satisfactory to restrain them in an adult seat belt. Indeed, an adult seat belt can harm young children as their body shape is not suited to these adult devices. A range of special restraint systems has been developed for them and these are well designed and utilised in most countries.

Kid Safe (2014) note that correctly fitted child restraints and booster seats are important in protecting children from serious injury and death in the event of a crash. To ensure that the maximum level of protection is provided for your children, it is important that the restraint they are travelling in is:

- the right size for the child
- correctly fitted to the vehicle
- properly adjusted and fastened for the child

European Child Restraint Systems (CRS) cover three types of designs, dependent upon the size (age) of the child as shown in the photographs below.
Child restraint laws vary slightly from country to country. In some countries (Sweden and the USA for example) they promote rearward facing child seats in the front seat, while in other countries such as Australia, they insist that all three child restraints are located in the rear seat and are fitted with a top tether strap. Germany encourages an additional leg on the child restraint instead of a top tether.

2.4.1 Benefits of Child Restraints

The evidence of the safety benefits of child restraints is quite conclusive. Doyle and Levitt (2006) found that child safety seats provided a statistically significant 25% reduction in least serious injuries. They further noted that for older children, lap-and-shoulder seat belts performed as well as child safety seats in preventing serious injury for older children, while no restraint were associated with much larger injury rates.

Durbin et al (2003) found that inappropriately restrained children were at twice the risk of injury than those who were appropriately restrained children. He also concluded that appropriately restrained children in child seats in the rear were at the lowest risk, for all age groups, while unrestrained children in the front were the highest risk group. Winston et al (2000) reported that compared with children in CRS, children in seat belts were more likely to suffer significant injuries and in particular, children in seat belts had a higher risk of sustaining a significant head injury compared with children in CRS. She concluded that premature graduation of young children from CRS to seat belts puts them at increased risk of injury in a vehicle crash.

2.4.2 CRS Availability

Not all families can afford to buy a suitable Child Restraint, or don’t see the sense of buying a bassinet in particular, to use for only 6 months. Hiring has become popular in Australia and New Zealand where you can hire for a reasonable amount from the hospital itself or one of many agencies who provide this service. As with second-hand purchases, they are advised to check a hired restraint before use and to look especially for obvious signs of wear on the straps or damage to the plastic shell. Providing child restraints in taxis and rental cars is also an option when required.

In the UK, hire schemes seem less common, although the North Lanarkshire Council, Road Safety Section in the UK does offer a baby seat loan scheme through their region’s hospitals for new-born infants. The restraint is loaned for up to 9 months and the cost is exceptionally low. ROSPA also advised that they five road safety units that offer “Try before you buy” schemes. This comes with a goods return offer if not satisfied within a short time period.
2.5 Seat Belt Legislation

Seat belt legislation exists in many countries today. The World Health Organisation (WHO, 2013c) lists national legislation on seat belt wearing by country in 2011. Of the 179 countries listed on their website, 162 (91%) have a national law on seat-belt use among car occupants of which in 109 (18 missing cases) countries, the law applies to all occupants in all seating positions. According to this list, Saudi Arabia is listed as having both national legislation, as well as it applies to all seating positions (i.e., the seat belt law is applicable to occupants).

Earlier, Bendak (2007) reported that seat belt legislation for drivers and front seat passengers was only made compulsory in Saudi Arabia in December 2000. In a subsequent study of on-road seat belt behaviour, he reported that moreover, police officers usually only warned or issue tickets to drivers for not wearing their seat belt, not front seat passengers.

WHO claim, therefore, is at odds with Bendak’s report. It may be that between 2000 and 2011, the seat belt law in Saudi Arabia was expanded to cover all occupants. Alternatively, the WHO claim that KSA seat belt legislation may be incorrect. Data were collected from a number of different sectors and stakeholders in each country from results from a standardized survey that was submitted to the World Health Organization after consensus meetings, facilitated by national data coordinators. The status of the current seat belt requirements in Saudi Arabia needs to be clarified to be sure that motorists fully understand their legal requirement.

2.6 Effectiveness of Police Enforcement

It is one thing to create laws on how motorists should behave on the roads but another in terms of how they accept and adhere to these laws. The role of enforcement of these laws most commonly falls on the police and the legal system in most, if not all, countries.

The effectiveness of police enforcement entails theories of deterrence. As Zaal (1994) pointed out in his excellent review of the Traffic Law Enforcement, the main mechanism in achieving behavioural adherence and change on the road is in deterring the motorists from committing violations of traffic and other social laws. The underlying principle of deterrence is social control, as it relates to traffic law enforcement. Homel and Wilson (1988) noted that the behaviour of human beings on the road can be modified by making them fearful of the consequences of committing illegal acts. The effectiveness of enforcement, therefore, comes down to their perceived threat of being apprehended when committing an unlawful act.

Police presence is one means of deterring motorists from committing an offense. This presence can be physical (a policeman in visual sight of the motorist) or more common these days, visual surveillance technologies such as through CCTV or speed and red light cameras. The effectiveness of police enforcement has however, been called into question on several occasions.

ETSC (1999) noted that in Europe, given other pressing problems, police currently were devoting insufficient resources to traffic policing than previously. Moreover, their use of police traffic operations, they claimed, was not optimal. They argued that effective traffic policing had the potential to make substantial savings in road safety, of the order of a 50% improvement.

From a review of traffic enforcement operations in Europe, they concluded that there is a need for strategic employment of police officers on the road. They claimed that enforcement is not a stand-alone activity and needs to be well supported by an efficient legal system. Furthermore, they argued that while it may be appropriate for serious offences to be treated as criminal cases, the many more minor breaches need to be brought under civic or administrative law in order to increase the efficacy of the law enforcement system.

In the USA, Serafin and Sherman (2009) noted that improvement in enforcement activities was needed in California as the traffic safety problem increased. They outlined a number of areas of enforcement that
needed improvement, such developing and monitoring traffic safety action plans, enhancing and streamlining police reporting of collisions, and more effective deployment of limited traffic unit staff. They especially noted the need for policing and engineering (technology) to work more closely together to optimise the effectiveness of police enforcement.

Diamantopoulou et al (2000) developed a model for measuring the effectiveness of traffic police operations in the state of Victoria using police data for 1997 and 1998. When applied to the most recent year, they found that police operations were generally under average. They noted that the index works best, however, when measured against crashes if the index is above average.

Zajc, L. (1996) claimed that for greater efficiency, traffic policing in democratic societies need more support and understanding from the politicians and the public. He further argued the police should find a balance between police enforcement and prevention actions, and develop a national traffic safety programme.

2.5.1 Enforcement Summary

It is clear that enforcement of traffic laws is a key mechanism for ensuring that motorists’ don’t violate traffic laws on the road. The wearing of seat belts, as discussed above, relies heavily on police enforcement. Without enforcement, laws are commonly overlooked and ignored. While laws are introduced for a range of applications, safety is one of high priority and the potential benefits in terms of fewer deaths and serious injuries require high policing activity over constant periods of time. More and more these days, technology is used to supplement police presence as budgets tend to become more restrictive.

In future, it is likely that vehicles will be fitted with extra technologies such as drink-drive monitors and intelligent speed adaptors. Seat belt technologies are already available in many automobiles that warn the driver when he or another passenger is not wearing their seat belt. However, warning devices have their limits of deterrence and require more effective or stringent technologies such as not allowing the vehicle to move or restricting their performance to enhance seat belt wearing.

2.6 Conclusion

The literature has highlighted a number of issues of relevance to the seat belt project and the Eastern Provence of KSA in addressing the project objectives. There is potential to make large inroads in reducing deaths and serious injuries in the region if seat belt wearing can be enhanced. There is a strong relationship between the level of seat belt wearing and the rate of serious injuries from road crashes. The cost savings are enormous. Our duty of care towards children makes it imperative that they are properly restrained in a suitable child or booster seat when travelling in vehicles. Police enforcement is a key factor in improved seat belt wearing. As there is little evidence available on seat belt wearing rates and reasons behind them, this project is of vital important to enhance safety in KSA.
3. METHODS

3.1 Introduction

Two separate studies are planned to address the project objectives. The first is a community survey of people’s attitudes and reasons behind their current wearing behaviour of seat belts. This will provide insights as to current wearing levels by user groups in the Dammam region and why people chose to wear or not wear seatbelts. The survey will address both adult and children wearing rates. The second study will involve on-road observations of motorists wearing rates in all seating positions and for children, the level and types of restraints they are using. Representative sampling techniques will be employed in conducting these studies and these are outlined in more detail below.

3.2 Community Survey Study Design

Community surveys can provide valuable and accurate detailed information on community attitudes to social issues when conducted in a non-threatening manner and are structured to be representative of the population at large. Common forms of undertaking such surveys involve mail-out questionnaires, telephone interviews, face-to-face interviews and online internet surveys. Of these, face-to-face surveys have been shown to be a most useful, accurate and timely approach, with lower rejection rates than many of the others (Szolnokin and Hoffmann, 2013).

Three regions (Dammam, Dhahran and Khobar) within the Dammam Municipality (i.e., Local Administrative Boundary) were selected for the study area in the Eastern Province. Sample size was determined from the population census in 2010 for these three towns (Central Dept. Statistics and Information, 2014).

The study set out to collect a reasonable sample of around 1000 interviews within the different age groups of the population and contained both male and female respondents. Considering the social culture and norm, the target percentages for females were expected to be less than those of male respondents. To ensure meaningful results, a sample needed to be “representative” of the whole population to ensure that the results are not an artefact of the selected samples. The sample needed to be of sufficient size to give robust (statistical) results, it was to include KSA and non-KSA people, and to contain a sample of different age groups. Table 3.1 shows the Eastern Province population, the target sample and the final collected sample.

Table 3.1: Kingdom of Saudi Arabia and Eastern Population 2010 (1431 H)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Eastern Province Population %</th>
<th>Target Sample Population %</th>
<th>Collected Sample Population %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
</tr>
<tr>
<td>Children (&lt; 20 yrs)</td>
<td>51%</td>
<td>49%</td>
<td>40%</td>
</tr>
<tr>
<td>Young adults (20-29 yrs)</td>
<td>58%</td>
<td>42%</td>
<td>21%</td>
</tr>
<tr>
<td>Middle-aged (30-49 yrs)</td>
<td>63%</td>
<td>37%</td>
<td>31%</td>
</tr>
<tr>
<td>Older adults (50 yrs or)</td>
<td>58%</td>
<td>42%</td>
<td>8%</td>
</tr>
<tr>
<td>Total (%)</td>
<td>57%</td>
<td>43%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Central Department of Statistics & Information (CDSI, 2014)
3.2.1 Study Region

It was decided to conduct the interviews in shopping plazas at varying times and days of the week. To achieve the target population samples, five different local shopping malls were selected from the three administered regions. These included:

1. Mall of Dhahran, Dhahran
2. Al Rashid Mall, Khobar
3. Lulu Hypermarket, Khobar
4. Al Othaim Mall, Dammam
5. Marina Mall, Dammam

The distribution of these Malls around the Dammam Municipality is shown in the Figure opposite.

3.2.2 Questionnaire Design

The survey questionnaire was designed with a pre-determined list of questions to address the study objectives and research questions (Appendix 2 shows the questionnaire used in this study). It had three main sections—

A. Personal characteristics
B. Seat belt wearing among adults
   a. wearing frequency
   b. reasons for non-wearing
C. Child restraints for young children
   a. usage
   b. any restraints
   c. costs

The emphasis on close-ended (fixed choice) questions, to keep the data collection methodology simple. However, there were few open ended follow-up questions or comments to gain additional information on the respondent’s opinions or attitudes toward restraint wearing by adults and their children. The questionnaire was further translated for administration to Arabic respondents.

3.2.2 Procedure

The method chosen for this survey was a ‘face-to-face’ interview with questionnaire to maximise the data collected with minimum rejections. This was based on previous experience (Stevenson et al, 2007). Eight Interviewees were recruited to conduct the survey. They were trained in administering the questionnaire and a pilot study was conducted to test the procedure.

Each interviewer approached a suitable candidate respondent, bearing in mind their distribution agreed to for the sample. If the candidate agreed to be interviewed, they were explained the purpose of the survey and that it would only take 5-10 minutes to conduct. They were encouraged to be open and honest in their responses and assured that their privacy and confidentiality would be protected. In addition, the interviewer stressed that these data would only be used within the study team. At the conclusion of the interview, the respondent was thanked for their participation and the interviewer moved onto find another suitable candidate.
The Interview times and days were planned to cover both weekdays and weekdays according to the following schedule below. Each weekday the interview usually started after 5pm, considering the general travel behavior for the customers in Saudi Arabia. During weekend, and especially on Saturdays, an earlier starting time was applied.

- **Interview times**
  - Tuesday evening – 5pm to 10pm
  - Thursday evening – 5pm to 10pm
  - Friday evening – 5pm to 10pm
  - Saturday afternoon – 2pm to 6pm or 6pm to 10pm

During planning the main interview schedule major holiday periods such as Hajj and Eid in October 2013 were excluded.

### 3.2.2.1 Pilot Study & Feedback

A pilot study was conducted during a weekday to test the procedure. The pilot set out to test the clarity and the respondents understanding and to identify any anomalies in the process. The trained interviewers followed the procedure outlined above and approached candidate respondents (both female and male). Interviewers were grouped in teams of two interviewers to begin with but quickly discovered that they could operate independently within the mall. A total six interview teams operated for 3 to 4 hours within one Interview shift closely watched by the supervising staff member and were corrected when required. It was stressed not to put the participant under any pressure and not to influence their response in any way.

### 3.2.2.2 Main study

After the pilot was completed, the main interview session commenced. An interview session lasted for 3 to 4 hours) after which the interviewer check with theirs supervisor and handed over the completed questionnaires. During each interview shift, the supervisor for that interview shift has based a fixed location within the interview venue to ease communication and logistic support. All interview sessions took place with the prior permissions from the Management Authority of the shopping mall.

### 3.3 On-road Observation Study Design

Two methods were employed in the on-road study; the “**Obtrusive**” and the “**Unobtrusive**” approaches. The first (obtrusive method) was modelled on an earlier study by Smith and Drummond (1988). Observers worked in pairs, approached vehicles stopped at traffic lights and while the first observer talked briefly with the driver about an unrelated issue, the second recorded restraint usage by both front and rear-seat occupants. This has the advantage of close visibility, although can result in a degree of non-cooperation.

The second unobtrusive approach involved a less-obvious observation technique where the observers, acting as pedestrians crossing the road, noted the restraint wearing behaviour of just the front seat occupants. This was used partly as a validation of the first method results as well as providing additional adult data. The procedure used in both these studies is described further below.

Kazdin (2013) discussed the merit of both approaches. The obtrusive approach, also referred to as the experimental method, involves direct elicitation of data from the research subjects (the car occupants who were approached and observed). The unobtrusive approach involves observation where the subject (the car occupants) are unaware they are being studied. Both methods have their advantages and disadvantages. The obtrusive method is more ethical or honest in that the people under study know they are being observed. However, this can be a disadvantaged in observation studies like this one in that those observed may change their behaviour as a consequence (in this case, put their seat belts on before being approached). The unobtrusive method overcomes this disadvantage as it studies behaviour in real life, even if it may seem to be less ethical. The unobtrusive method is commonly used when observing behaviour.
3.3.1 Obitrusive Survey

Following the Smith and Drummond (1988) method, the study team conducted on-road observations of actual in-car seat-belt wearing practices within the Dammam, Dhahran and Khobar municipalities. A number of red-light signal intersections were selected within those three regions with sufficient cycle times to conduct an interview with the driver safely. Eight intersection locations from the three administrative towns were selected namely:

1. Al Shatea Mall, Dammam
2. Aajad International School, Dammam
3. Rakha Driving School, Dammam
4. IKEA, Dhahran
5. Toyota Lexus, Dhahran
6. Silver Tower, Khobar
7. Le Meridian Hotel, Khobar
8. Gulf Centre, Khobar

3.3.1.1 Response Form Design

A response form was designed for the interview team with simple vehicle interior seat layout for rapid response. It had three types of passengers’ seat-belt observation sections for front and rear seat adults and children aged up to 5 years and above. The response form is shown in Appendix 3 and 4.

The emphasis was on accurate observation within one minutes of the red light signal cycle time for each road arm at the selected intersections. Obviously, the main aim was to safely collect information on restraint wearing for both adults and children in all seating positions.

3.3.1.2 Observation Procedure

Teams of two observers were recruited and given a training at several road intersections that had been selected as safe locations (i.e., had central reserves and relatively long cycle times (sufficiently more than 120 seconds). Each team working in pairs approached vehicles stopped at traffic lights and approach selected vehicles. The first observer talked briefly with the driver about an unrelated safety issue while the second observer recorded the restraint status of every occupant in the vehicle. This had the advantage of close visibility, although it did result in a degree of non-cooperation. During the observation, if a vehicle driver/passenger did not agree and that vehicle were excluded from the study.

Interview approach was positive, friendly, professional and not overbearing. Passenger vehicles (cars and SUVs) and light commercial utilities were randomly selected and when the driver agreed to talk, information were recorded the car seat-belt observation status.

Two days, at two different road intersections as pilot survey, were planned to check the observation format and length of time taken to complete and for the survey team members to approach the vehicle safely.
during the red-light and stopped the observation before the green light initiated. Each road arm (direction) was covered by a pair of two observers.

During pilot study, all the observation team members had started wearing yellow fluorescent jacket (safety jacket) showing the ‘University of Dammam’ Logo. However, to separate them from the authorities, the study team subsequently completed their observations in street clothes. It was felt that the yellow fluorescent jacket, made it look more like a police check-point which would unduly influence the study objectives.

3.3.1.3 Observation Plan

The observation times and days were planned covering both weekdays and weekends according to the following schedule. Each weekday the interview usually taken place between 1pm and 9pm; considering the general travel behavior of school trip, work trip, home trip and leisure trip in the evening. Of course, during weekend, especially, on Friday and Saturday only evening times were considered.

The main observation had schedule between December 2013 and March 2014 (excluding January 2014 – school and university holiday period). Covering more months and different seasons (winter and spring) had given a variation as well. The initial aim was to complete all 4000 observations, however, after data screening and filtering using excel, a total 3775 completed observations were considered for further data analysis.

3.3.2 Unobtrusive Survey

As explained earlier this unobtrusive approach involved a less-obvious observation technique where the observers, acting as pedestrians crossing the road, noted the restraint wearing behaviour of just the front seat occupants. This was used partly as a validation of the first method results as well as providing additional adult data.

A validation study was undertaken to see whether the obtrusive approach may have influenced the earlier results. It was noticed that a few drivers were seen to put their seat belts on when they saw the observation team approach. Given the importance of front seat wearing rates, the validation study focussed only on the seat belt status of the driver and front passenger only.

3.3.2.1 Study location

This study was undertaken in similar regions to the obtrusive survey for consistency. The locations of the intersections involved are shown below and in the map opposite:

1. Five locations in Dammam
   a. Prince M Ibn Fahd & King Saud Street
   b. Al Waha Mall & Prince M Ibn Saud
   c. Stadium, Prince M Bin Fahd Rd & King Fahd Rd
   d. Hospital & Al Khamsa’a St
   e. Univ. Housing Compound 3
2. Two locations in Dhahran
a. McDonalds Girls School, Dana  
b. IKEA  
3. Four locations in Khobar  
a. Saad Hospital  
b. Silver Tower  
c. Le Meridian Hotel  
d. Yamouk Sumou Tower  

3.3.2.2 Data collection procedure  
Unlike the obtrusive approach, the intention here was to observe seat belt wearing behaviour without being observed by the vehicle occupants. This was done by having a team of 2 or 3 observers crossing intersections as pedestrians with only a momentary glance at the stopped pre-selected vehicle they crossed the path of as they negotiated the crossing. In addition, they did not record their observations until they had reached the other side of the road and could do so anonymously.  
Students in Saudi clothing were used as observers and trained to look as casually and innocently as possible while they crossed the road. While they did work in a circular path around the four-leg intersections, observing each leg as they went, the traffic was constantly changing. Hence there was little opportunity for those stopped at the intersection to get a “heads-up” of their activities.  

3.3.2.3 Response Form  
A simple observation form was developed that contained boxes for recording (i) if the driver/front passenger was restrained or not, what travel lane they observed, and the vehicle type (car, SUV or light commercial utility. As this was a validation of the earlier obtrusive results, only the driver and front passenger needed to be studied as the other occupant data would not have been contaminated by the methodology. Remember, it is only the front seat occupants who are required to use their seat belts by law in Saudi Arabia.  

3.3.2.4 Data Collection  
The observation validation data collection had schedule in April 2014. The aim was to complete all 1500 observations, however, after data screening and filtering using excel, a total 1501 completed observations were considered for further data analysis. For all data input, the excel spreadsheet was used.  

3.4 Analysis  
The primary analysis undertaken here comprised frequency and crosstab computations using the Statistical Package for the Social Sciences (SPSS). Significance of the findings was computed using the Chi-Squared Distribution (chi-squared distribution is the distribution of a sum of the squares of k independent standard normal random variables) and the commonly used non-parametric statistic. Statistical significance traditionally uses a Probability level threshold of p=0.05. However, when using multiple comparisons, Siegel and Castellan, (1988) argue that when multiple non-parametric tests are reported, it is wise to reduce the probability threshold to a lower value (eg: p=0.01).  

3.5 Ethics and Culture  
During the entire period of sample data collection, it was kept in mind the need to maintain respect for the privacy of the respondent (privacy of the individuals must be respected in any research involving human subjects). In addition, confidentiality of the database must also be maintained and must not contain any personal details.
4. RESULTS – COMMUNITY SURVEY

4.1 Adult Responses

The first project objective listed in Chapter 1 was to examine “what the residents of Dammam, the capital of the Eastern Province, and the fifth largest city in Saudi Arabia, understand about the importance of wearing seat belts in cars”.

4.1.1 Research Questions

A set of research questions were identified to help guide the analysis process. These were listed in Chapter 1.4 and listed again below:

- Do all KSA motorists claim to always wear their seatbelts and is this a widespread view across the whole Dammam motoring population?
- What are some of the reasons claimed by those surveyed for not always wearing seatbelts?
- Is the non-wearing of adult seatbelts age-and gender-specific, or dependent on license, or education status?
- Is not wearing seatbelts dependent on where they live, or their marital status?
- Do KSA motorists appreciate the safety benefits from wearing seatbelts?
- Do motorists understand the legal requirements for wearing seatbelts in the KSA
- Is it important to wear seatbelts in rear seats in KSA?

The results for each of these research questions are addressed in the separate sections below. Only those that were found to be significantly related to each question are plotted in the Tables. The overall demographics of the study have been included for information.

4.1.2 Sample Demographics

The demographics of the sample are listed below. Of the 1,389 people who were interviewed:

- 72% were male;
- 62% had current driving license
- 66% were from KSA
- 83% lived in Dammam region
- 59% were married; and
- 41% were single

All participants were willing volunteers and agreed to participate freely when approached. It was also possible to interview both men and women, although the numbers were greatly biased towards men, given the culture we were operating in.

4.1.3 Seat Belt Stated Wearing Rates

The first aspect of the analysis addressed the issue of whether they wore their seat belt always, some of the time, or hardly ever. As the interviewees were all local young men without posing a threat to the individuals, we expected these findings to be relatively representative.
Only 34% of the respondents claimed to always wear their seat belt when travelling in cars. Furthermore, the proportion of those who always wear their seatbelt was lower among KSA respondents. In addition, older respondents, men (only men can be licensed in Saudi to drive) and those with higher levels of education, all scored high. There were no significant differences in the responses for the region they lived in. Surprisingly, those without any education (very few), also had higher levels than those with secondary or high school education. This may be a function of their low numbers. All these analyses were highly significant\(^1\).

### 4.1.3.1 Reasons for not always wearing seatbelts

Among those who claimed to only wear their seat belt hardly ever, the main reasons they expressed for this included their attitude, only at police check points, long distance travel and a few mentioned it was not common in Arab culture. Among those who always wore their seat belts, safety was the predominant reason (78%) and habit was also occasionally mentioned.

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\(^1\) Significance Levels - *(p=0.10), **(p=0.001), ***(p<0.001) – All values listed in the Table in the Appendix
4.1.4 Licensing and Marital Status

Those who were licensed to drive (males) were more likely to admit to always wearing their seatbelt than those who were not licensed (predominantly females). Police are known to target drivers more than passengers for not wearing a seat belt. In addition, married respondents (males and females were also more likely to admit to always wearing a seatbelt than single respondents.

4.1.5 Knowledge of Legal Requirements

There was a high proportion (87%) of all respondents, young and old, married and single, who knew that legally, they needed to have their seat belt on when travelling in the KSA. This tended to be more males and those licensed which as noted above are probably covariates. Unfortunately, however, seat belt legislation in KSA only targets front seat occupants, and that this only seemed to be common knowledge among a proportion of the respondents.
4.1.6 Appreciation of the Safety Benefits

As noted in the literature review, it is generally known and accepted in many countries that seat belts save lives and serious injuries. It was important here therefore to assess Saudi motorists’ attitudes.

The significant finding here was that 66% of Saudi motorists surveyed here knew that seat belts definitely saved lives and that this was fewer for Saudi nationals, singles, and younger motorists. These findings were not significant by education level, licensing or the region they lived in. Interestingly, those who reported always wearing a seat belt were only about one-half of these respondents. Clearly, they were motivated by other reasons (eg; being fined by the police for instance).

4.1.6.1 Comments on safety benefits of seatbelts

Positive comments for this question included safety benefits through body kinematics, fewer ejections and reduced chance of a fatality, while negative ones included that they don’t have any safety benefits, sometimes yes and no, they are dangerous, and seat belts can cause injuries. Not surprisingly, many of these negative comments can from those who didn’t use their seatbelts. Clearly, there is a lot of false information among the community of the benefits of seat belts in saving lives and serious injuries which needs to be addressed to help increase the rate of seat belt wearing in Saudi Arabia.

4.1.7 Important to wear seatbelts in rear seats

The respondents were asked if they felt it was important to wear a seatbelt in the rear seat. The significant findings are shown in Figures 4.15 to 4.17 below.
It is often less common for people to appreciate (or admit) that it is also beneficial for those seated in the rear seats to also be belted. Indeed, more than one-third of the respondents acknowledged this in this survey too. Differences were observed among those who were older, licensed to drive a motor car and were married. There was no significant differences observed here by the respondent’s nationality, their education level, or where they lived. Interestingly, half of those who were single responded that it was either important or non-important, effectively, a chance response or a guess to this question.

4.1.7.1 Reasons for not wearing seatbelts in rear seats

There was a broad mixture of responses to the follow-up question here. Some felt injuries in crashes were more likely to occur in the front seat, not a legal requirement in Saudi Arabia, women and children tend to sit in the rear and it’s not a cultural requirement, they are uncomfortable, and inappropriate for large-sized people. They also suggested that it was very much a cultural issue, especially for women. More positively, though, there were many people who did recognise the benefits of being restrained in the rear seat and that rear seat occupants needed to be protected just as much as those in the front. Of special interest, a number of the respondents who worked for particular companies noted that it was a company requirement for them to wear seat belts wherever they sat in the vehicle and that they generally complied with this policy. The need for education to inform people of the benefits of wearing seatbelts in the rear was also raised by some respondents.
4.2 Responses for Child Restraint

As with the adults, another set of research questions were identified to help guide the analysis process. These were listed in Chapter 1.4 and listed again below:

- Is it necessary for young children to be restrained in a suitable Child Restraint System (CRS)?
- Is it an offense for children to be unrestrained in a passenger vehicle?
- Have you always had your children in a CRS?
- Is an adult seatbelt a sufficient restraint for children under 10 years?
- What ages are appropriate for young children in Child Restraint Systems? (Baby Capsule, Child Car Seat, Booster seat/cushion)
- Has the cost of a CRS been a deterrent for you using these devices?

The responses to these questions by the respondents are listed below.

4.2.1 Children Restrained in a Suitable CRS

To answer the question of the need for children to be suitably restrained, participants were asked if they thought it necessary for young children to be restrained in a suitable child restraint seat (CRS).

![Figure 4.18: Education by necessity for CRS Restraints***](image1)

Fig 4.18: Education by necessity for CRS Restraints***

![Figure 4.19: Licensing status by necessity for CRS Restraints**](image2)

Fig 4.19: Licensing status by necessity for CRS Restraints**

Overall, 88% of the respondents agreed that young children needed to be restrained in vehicles. While most of the comparisons among the different respondents were not significant, there was a steady increase in its necessity with increasing education levels. In addition, those who were licensed were more likely to agree of the need for restraint over unlicensed respondents but this was not a particularly strong effect.

4.2.1.1 Reasons for not having children suitably restrained

The two most popular responses to the follow-up question here for those who agreed of the need for restraint was for safety and comfort and to stop the children from moving within the vehicle while in motion. For those who thought they did not need restraint, they felt the children were well protected spiritually, that the adult seat belt was not suited to children and that they can be adequately protected by their parents.
4.2.2 Children Unrestrained an Offense

The participants were also asked if they understood whether it was an offense for children not to be properly restrained in a car. Interestingly, only about one-half of the respondents thought that is was not an offense, which it is in Saudi Arabia according to the World Health Organisation (WHO, 2013a).

The only significant finding here among respondents was that there was a greater appreciation of the law by older respondents and indeed, a false understanding by younger respondents. While there were fewer KSA respondents that appreciated this than others, the effect was not particularly strong. This responses were not affected by gender, education level, licensing, living region or whether had or have had children.

4.2.3 Always had your Children in a CRS

Those who have or had children were asked if they always have, or have had, their young children in a suitable child restraint device. Overall, 48% of them claimed to have always had their children restrained in a suitable CRS. Interestingly, the same proportion claimed that they have not necessarily always used CRS.
There were a number of respondents who significantly differed in their responses to this question. Older respondents (50 years or more) and those with higher education levels in particular were much more likely to have said yes to the question. Those who have children now were more likely as well, which might also reflect on past availability of these devices. Finally, the respondents who were licensed were more likely to claim that children should always be restrained in a CRS (it may be that unlicensed drivers were passengers and believed that they were capable of restraining their child if needed (in spite of the evidence that this is not possible above about 8km/h).

4.2.3.1 Reasons for not always having Children in a CRS

Those claiming not to have always had their children in a suitable restraint believed that they were not suitable for the child’s size (presumably, they meant a seat belt), that they never used these devices, or that it’s a habit or attitude not to use child restraints. Those who claim they do always restrain their children predominantly stated for safety reasons. This question appeared to be poorly understood in the survey as it appears that there is a large population who have little knowledge of the use and possibly availability of child restraint devices. This is an area that needs a greater flow of information to enhance child safety in the region.

4.2.4 Adult Seatbelt Sufficient for Children

Respondents were asked if they thought that an adult seatbelt is a sufficient restraint for children aged under 10 years. While 56% of the respondents agreed that an adult seat belt was not a sufficient restraint for those aged under 10 years, 44% thought it was. Licensed drivers (males) were more likely to agree that an adult belt is sufficient than those unlicensed. There were no other significant differences among the respondents’ age groups, gender, nationality, where they lived, their education level or family background. This shows a lack of knowledge generally about the dangers of restraining a young child in an adult seat belt that is not designed to restrain a child’s body and likely to cause injury in a crash.

4.2.4.1 Appropriate for children in adult seatbelt

Again, there were mixed messages in these responses. For those who thought an adult seat belt was sufficient, some responded that it was sufficient while others though training programs were required on how to use seat belts or publicity campaigns. For those who did not believe it to be sufficient, the major
response was that they were not suitable and that there were no violations for not wearing or using child restraints.

4.2.5 CRS Suitability by Child Ages

In examining the respondents’ appreciation of when child responses should be used, they were asked to nominate start and end dates for the use of the three types of Child Restraint Systems (capsules, Child Restraint Seats (CRS) and booster seats). These were then converted into three response categories based around regulations, where:

- Good - they were correct with current EU recommendations;
- Moderate - they got the start date correct but not when they should go to the next seat type; and
- Poor when they reported start and end dates incorrectly.

The results in Figure 4.27 show a reasonable spread of responses from good to poor for baby capsules but very inaccurate responses for child restraint seats and booster seats. More than half the respondents’ ratings were poor for these two seat types and good responses were no better than 4 percent. Clearly, knowledge on when to use child restraint systems and to upgrade needs to be improved in the region.

4.2.6 Cost of a CRS a Deterrent

The final analysis in this section set out to address the question of whether the cost of a child restraint system was a deterrent to their use in the region. Overall, 73% of the respondents claimed that cost was not a deterrent Men were more likely to respond that cost is a deterrent than women were and those who have or had children were significantly more likely to see cost as a deterrent than were those with no children.
5. RESULTS – ON-ROAD SEAT BELT WEARING

The second hypothesis under test was to address “What the level of seat belt wearing is actually occurring on roads in the region”. As before, a series of research questions were formed to help drive this analysis. As noted in Chapter 3 on Methodology, two separate approaches were used in assessing on-road seat belt wearing rates – the obtrusive and the unobtrusive approaches. Where relevant, the results from these two approaches will be reported together. Note, the observations requiring child wearing rates here was only obtained using the obtrusive procedure.

5.1 Adult Observations

5.1.1 Research Questions

A set of research questions were also identified to help guide the obtrusive analysis process. These were listed in Chapter 1.4 and listed again below:

1. What was the actual on-road seatbelt wearing rate and what may influence these findings;
2. Do wearing rates differ between drivers and passengers;
3. Do wearing rates differ between front and rear seats;
4. Do they differ depending on the type of vehicle they are in; and
5. Did the “approach” method influence the adult seatbelt wearing rates?

5.1.2 Adult Seat Belt Wearing Rates

The figures for adult seat belt wearing rates and numbers from the obtrusive observations are shown in Figures 5.1 and 5.2.

Fig 5.1: Number of obtrusive observations – adults  
Fig 5.2: Adult wearing rates - obtrusive observations

These figures show the seat belt wearing rates in the front and rear seats for adult occupants. There were significant differences in the wearing rates between drivers (47%) and front passengers (26%). In addition, the figures in the front seat are considerably higher than those in the first rear row, suggesting that rear seat occupants do not see the benefit of seat belts and thus are not concerned about wearing seat belts when not seated in the front. While it would appear that adults in the second row rear were more likely to wear their seat belts that those immediately in front of them, these numbers are too low to be reliable.
5.1.3 Unobtrusive Observations

As noted earlier, as a check to see if the obtrusive results were influenced by the method used, a validation study was subsequently undertaken using an unobtrusive approach. This is outlined in detail in the methodology section. Unlike the obtrusive study, this one focussed entirely on adults seated in the front seat as these were the figures of interest here.

Figure 5.3 shows the results obtained from this study. Seat belt wearing figures were obtained using the unobtrusive observation approach for front seat occupants, (43% for drivers and 31% for front passengers). Comparing the two sets of figures for the obtrusive and unobtrusive methods, they were not statistically significant ($\chi^2=1.25$, df=1, p=0.26) confirming that there was no real difference in seat belt wearing rates for front seat occupants across the two observation methods. Thus, it can be concluded that seatbelt wearing rates in the Dammam region of KSA are somewhere between 43% and 47% for drivers and 26% and 31% for adult front seat passengers.

Furthermore, there were also no significant differences in seat belt wearing rates by type of vehicle as shown in Figure B ($\chi^2=0.7$, df=2, p=0.71) and travel lane as shown in Figure C ($\chi^2=1.37$, df=3, p=0.71). Clearly, neither of these two road characteristics had any effect on seat belt wearing rates among adult vehicle occupants.

5.1.4 Summary

In respect of the four research questions posed for the observation study of adult seat belt wearing in passenger vehicles, seat belt wearing rates in the front seat ranged from 43% to 47% for drivers and 26% and 31% for adult front seat passengers. Rear seat belt wearing was considerably less (3% to 9%, depending on seating position), which may be unduly affected by seat belt legislation in the KSA. There were no significant differences between travel lane and the type of passenger vehicle. The study approach (obtrusive and unobtrusive) had no measurable influence on these results.

5.2 Child Observations

5.2.1 Research Questions

The research questions of relevance for children from Chapter 1.4 are again listed below.

6. What are the actual on-road restraint usage rates for young children; and

7. What are the proportions of children adequately protected in a purpose-built CRS restraint;
5.2.2 Child Restraint Wearing Rates

The figures for child restraint wearing rates and numbers are shown in two diagrams, Figs 5.6 to 5.9.

These results show that for the 679 children ≤5 years old who were obtrusively observed, 171 (25%) of them were in the front seat, and very few were restrained in either an adult belt or a child restraint seat (CRS). In the first row, less than one-quarter were restrained, and in the second row (SUV or Van), very few of those seated were also restrained. The 11 children equal to or under 5 on the driver’s lap is even more distressing, given the safety risk they face themselves or to the driver.

For slightly older 320 children observed, the figures are equally bad. Forty-three (13%) were seated in the front seat and had very low restraint use. Two of these again were presumably on the driver’s lap. First row restraint use among children aged above 5 years was also very poor with only 5% to 12% of them restrained. Second row seat usage was again low with low rates of restraint use. Evidence shows that children seated in the front row must be restrained to be safe, and only if they are in a purpose designed Child Restraint Seat.

5.2.3 Child Restrain Usage

As noted earlier, adult seat belts are not suitable restraints for children, especially those aged under 5 years. For adequate protection in a moving passenger vehicle, a child must be seated in an approved child seat for its age and size. The figure opposite shows the observed restraint use for each of the 679 children in the study. The vast majority were unrestrained and the use of a CRS varied from 6% in the front, 15% in the second row and only 5% in the second rear row. These figures are
alarming and show that on the whole, children in vehicles in KSA are grossly under-protected in passenger vehicles, and face greater risk of serious injury or death in a collision.

5.2.4 Summary
In respect of the research questions posed here, restraint usage among children in passenger vehicles in the region is very poor. At best, it’s around 23% in the immediate rear seat behind the front and even worse in the second row, although these numbers were very small indeed and unreliable. Moreover, it was disturbing to see the numbers of children who travel unrestrained in the front seat and even worse, those who seem to travel on the driver’s lap. Very few of the children “restrained” were actually in a purpose-built Child Restraint Seat (CRS). Many restrained by an adult seatbelt were at high risk of being injured by the belt, not designed for use by children. These results suggest the need for urgent attention to improve the health status of those we have immediate duty of care for and the next generation of adults in KSA.
6. GENERAL DISCUSSION

This project started out with two project objectives. First, it aimed to determine what the level of seat belt wearing is on roads in the Dammam region; and secondly, to identify what the residents of Dammam understand about the importance of wearing seat belts in cars. The study was particularly interested in both adult and child occupants.

6.1 On-Road Seat Belt Wearing

Seat belt wearing rates observed here in mainly urban areas of Dammam were 43% to 47% for drivers and 26% to 30% for front passengers. Previous reports on seat belt wearing in Saudi Arabia have reported poorer wearing rates. Bendak (2007) for instance found driver rates of 28% and 15% for front passengers with high variability across the three regions studied; TSTN (2010) reported 18% driver and 13% front passenger in urban areas and higher rates (31% and 25% respectively) in rural zones; while Naeem (2014) reported rates between 2008 and 2009 of 33% drivers and only 4% for front passengers.

Interestingly, the rates observed in this study were consistently higher than any of the previous reports. The reasons for this seem to be a general increased awareness of the need for wearing their seat belts (police started enforcing seat belt wearing earlier this year) and the message appears to be having some (minor) impact. In an unpublished study by Hogue et al (2014), wearing rates observed at a number of police check stops around the Dammam Municipality found driver wearing rates of more than 90% (with equivalent increases in front passenger rates too). Clearly, this is an indication of the influence that police enforcement can have in this area.

In the rear seat, wearing rates were much less. Only 3% to 9% were seen to be properly restrained depending on seating position. None of the other studies found for Saudi Arabia reported wearing rates in the rear seats. This is probably explained by the fact that seat belt legislation in KSA refers to only front seat restraints, and the false assumption by motorists that they are more safe in the rear, thus do not need to wear their seat belts (refer Section 4.1.7). This interpretation leads to rear seat passengers at greater risk of ejection and more serious injuries from contacts inside the vehicle, and an added danger to front seat occupants from contacts with rear seat passengers thrown into the front compartment.

International reports show that seat belt wearing rates in developed countries are all well above the rates reported here in Saudi Arabia. As shown in Table 2.1, eight countries (Australia, Canada, France, Germany, Malta, Norway, Sweden and the UK) all reported wearing rates at least in the front seat of 90% or above. Many others were close to achieving this level. Of the 25 countries listed during the mid-2000 period, only one (Greece) reported usage rates of less than 60%. As noted in WHO (2013c) all these countries have seat belt legislation either in the front or for all occupants and this legislation is typically well supported with police enforcement programs.

A number of previous reports (Mackay, 1985; Hedlund, 1985; Evans, 1991; NHTSA 2009) reported significant benefits to car occupants in a crash from seat belt use. These benefits are substantial; as Mackay (1985) noted that “if seat belt usage increased from zero to 100% there would be a reduction of between 47% and 60% in vehicle occupant deaths with similar reductions in the percentage of hospital admission cases”. More recently, ORS (2014) the Office of Road Safety in Western Australia (ORS, 2014) noted that you are 10 times more likely to be killed in a road crash if you’re not wearing a seat belt in a car. NHTSA (2009) also claimed that the associated cost savings from an increase in seatbelt wearing amounted to US$5.2 billion in one year in the States.

NHTSA (2009) recently reported that an increase in seatbelt wearing in 38 States and the District of Columbia (DC) in 2007 resulted in 1,652 (11%) fewer deaths, and 39,486 fewer injuries in that year alone. They noted that the associated cost savings from the increase in seatbelt wearing amounted to US$5.2
billion that year. These benefits arise from a reduced likelihood of hitting the steering wheel or windscreen for a driver and a front seat passenger and prevent occupants from being ejected from the vehicle in a crash.

6.1.3 Observed Rates among Children

By far, the most disappointing result found in this study was the restraint usage rates for children in the cars observed, especially those aged 5 years or under. In the first rear row, wearing rates were no better than 27% for young children and less at 12% for those aged over 5 years. Of even greater concern, there were 171 (25%) of children aged 5 years or less seated in the front seat, only 8% of them were restrained. Furthermore, 11 of the front seat occupants were observed to be in the driver seat without restraints, presumably seated on the driver’s lap. While there were a few passengers seated in the second rear row, the numbers were too small and unreliable.

These findings are of grave concern as unrestrained children, in particular, are highly at risk without restraint. As noted by Decina et al (2007), the percentage of unrestrained children among child crash fatalities is 4 to 7 higher than the percentages of unrestrained children reported in observational studies. In many instances, they were seen to be seated on their mothers lap. Indeed, as noted in section 4.2.1, many parents in KSA felt that the young children were well protected as they can be adequately restrained by their parents’ arms.

Many reports have discussed the benefits of children being properly restrained in vehicles (Seatcheck 2006; ORS, 2014; CDC, 2014). The Center for Disease Control (CDC, 2014) in particular noted that car seat use reduces the risk for death to infants (aged <1 year) by 71%; and to toddlers (aged 1–4 years) by 54% in passenger vehicles. They further reported that booster seats reduce the risk of serious injury for children aged 4–8 years by 45% when compared with seat belt use alone. For older children and adults, seat belt use reduces the risk for death and serious injury by approximately 50%.

6.1.3.1 Adult Restraints Use by Children

In addition to the above, it was observed during the on-road observations that a number of young children were restrained with an adult seat belt. While arguably, an adult seat belt may be marginally better than no belt at all, adult seat belts, however, do not provide adequate protection for children as they fail to track across the most optimum regions of a child’s body and hence likely to do irreparable damage to the child in a crash (Henderson, 1997).

Tingvall (1985) reported that the smaller portion of a child’s abdomen is covered by the pelvis and rib cage, thus a child’s ribs are more likely to bend rather than break, transferring the energy from the crash to the heart and lungs. FIA (2014) further remarked that as a consequence, three-point lap and diagonal seat-belts may lead to abdominal injuries among children, and will not be optimally effective at preventing ejection and injury among them. For these reasons and others, children find them very uncomfortable and are more likely to take them off.

There is absolutely no doubt that increasing the use of suitably-designed child restraints for child passengers will lead to substantial benefits in reduced death and serious injuries to children in a crash. Not only that, all parents have a “duty of care” for their children (the Free Dictionary notes that duty of care is the requirement that a person act toward others, especially children, with watchfulness, attention, caution and prudence that a reasonable person in the circumstances would expect). Legally, if a person’s actions do not meet this standard of care, then the acts can be considered negligent, and any damages resulting may be claimed in a lawsuit for negligence. It has been argued that allowing children to travel in vehicles unrestrained or not adequately restrained with the appropriate child restraint device is a violation of their duty of care and hence adults may not be acting responsibly.
6.2 Community Survey on Seat Belt Wearing

The results of the community survey held towards the end of 2013 highlighted a number of interesting trends among the almost 1400 male and female respondents, two-thirds of which were from KSA and more than 80% lived locally in Dammam region.

6.2.1 Main findings for Adults

First, when asked if they always wore their seatbelt, approximately one-third said they, another one-third said sometimes and 30 percent, hardly ever. Given the findings from the observation study, it would appear that they were quite honest in their responses. This is in contrast to an earlier study in Saudi Arabia by Bendak (2007) who reported much lower observed wearing rates than those from self-reported wearing rates. The reasons for the differences between these studies are not clear.

When asked why, those who always claimed to wear their belts overwhelming claimed that safety was their main reason (eg: to protect me in a crash, concern for my safety, to follow the rules, habit, etc.). A notable group however, did say that they wore their seat belt to avoid being penalised.

The most common reasons expressed by those who hardly ever wore their seat was related mainly to attitude – don’t want to, I’m lazy, don’t need it, uncomfortable, not the Arab culture, I forget, etc). Interestingly, too, many of these declared “non-users” did admit to wearing their belts at police checkpoints – clearly, enforcement was a high motivator for them to put their seat belt on.

Using a survey conducted in Greece, Chliaoutakis et al (2000) revealed that positive factors related with the seatbelt use among young drivers included 'imitation', 'self-protection', and 'legality' while 'discomfort' was negatively associated with the seatbelt use. Furthermore, they particularly noted that mileage was negatively correlated with seatbelt use, while in this study, many respondents claimed it was a positive reason for wearing a seat belt, even if they did not normally use them.

6.2.1.1 Aspects of Non-Wearing Belts by Adults

Those who were licensed to drive (males) were more likely to admit to always wearing their seatbelt than those who were not licensed (predominantly females). Bendak (2007) noted that the police were more likely to target drivers than passengers for not wearing a seat belt in his earlier study. This may also still be the case, judging from this finding here. In addition, married respondents (males and females) were also more likely to admit to always wearing a seatbelt than single respondents. NHTSA (2003) reported that young drivers were very much more at risk than older ones, especially because they are less likely to wear their seat belts. Brennan (2011) argued that married adults were more likely to wear their seat belt as they have the right attitude and appropriate behaviour.

6.2.1.2 Appreciation of Safety Benefits

In terms of whether KSA respondents appreciated the safety benefits of seat belts, 66% of motorists surveyed here knew that seat belts definitely saved lives and that this was fewer for Saudi nationals, singles, and younger motorists. These findings were not significant by education level, licensing or the region they lived in. Interestingly, those who reported always wearing a seat belt was only about one-half of these respondents, suggesting that they were also motivated by other reasons such as being fined by the police for instance.

When asked why seat belts improved safety, positive comments included improved body kinematics and fewer ejections in a crash and less chance of a fatality, while negative comments included don’t have any safety benefits at all, sometimes yes and no, they are dangerous and seat belts can cause injuries. Not surprisingly, many of these negative comments can from those who didn’t use their seatbelts.

The internet is full of reasons why seat belts are dangerous. These include such nonsense as leading to more reckless driving, a violation of a person’s freedom, an oppressive money generator, and in many
accidents it is safer to not be wearing a seatbelt. However, there is now a wealth of undisputable scientific evidence (see the early literature review) that seat belts do save lives and serious injuries and these false notions need to be firmly addressed.

6.2.1.3 Legal Requirements

A high proportion (87%) of all respondents, young and old, married and single, and those born and living in the KSA who understood that legally, they need to wear their seat belt on when travelling in the region. This tended to be more males and those licensed which are related. Unfortunately, however, seat belt legislation in KSA appears to only targets front seat occupants (Bendak, 2007) and this appeared to be common knowledge among a proportion of the respondents.

6.2.1.4 Importance in the rear seat

From the survey results, it was often less common for respondents to appreciate the safety need for those seated in the rear seats to also be belted. Indeed, more than one-third of the respondents acknowledged this in this survey. Differences were observed among those who were older, licensed to drive a motor car and were married. There was no significant differences observed here by the respondent’s nationality, their education level, or where they lived. Interestingly, half of those who were single responded that it was either important or non-important, effectively, a chance response or a guess to this question.

There was a broad mixture of responses as to why this was so. Some felt injuries in crashes were more likely to occur in the front seat, it’s not a legal requirement in Saudi Arabia, women and children tend to sit in the rear, it’s not a cultural requirement, and inappropriate for large-sized people. More positively, though, some who did recognise the benefits of being restrained in the rear seat claimed that rear seat occupants also needed to be protected just as much as those in the front. Of special interest, a number of the respondents who worked for particular companies in KSA noted that it was a company requirement for them to wear seat belts wherever they sat in the vehicle and that they generally complied with this policy.

The need for legislation to also include rear seat belt wearing for safety purposes has been noted by others. VicRoads (2014) claimed that wearing a correctly adjusted seatbelt is one of the simplest ways of reducing the risk of serious injury or death in a crash and that this is true whether you are sitting in the front seat or the back seat. They note that it is the reason that by law everyone must wear a seatbelt in Australia. Seat belt wearing in all seating positions is listed as a requirement in the majority of international countries listed by WHO (2013b).

6.2.2 Community Survey – Children

6.2.2.1 CRS Necessary

The first question put to the respondents regarding child passengers related to the necessary for young children to be restrained in a suitable Child Restraint System (CRS). There was strong agreement that children aged up to 5 years should be restrained in a suitable Child Restraint Seat (88%). While this view was consistent across most of the groups interviewed, the necessity for CRS increased with increasing education levels and among those who were licensed.

Reasons for this were for safety and comfort and to stop the children from moving within the vehicle, while those who thought it unnecessary were they felt the children were well protected spiritually, that the adult seat belt was not suited to children and that they can be adequately protected by their parents. In fact, as noted earlier, adults are unable to restrain their child above relatively low crash speeds (<10km/h), given the extremely high forces generated in even relatively minor crashes. Babies on parents’ laps are in danger of being ripped out of their arms by the force of a collision. And if parents decide to place the seat belt around themselves and the child, then the parent’s weight could actually crush the child to death. Child safety fundamentally requires that the child is securely buckled in a suitable car seat for every trip, no matter how short.
6.2.2.2 Unrestrained Child an Offense?

When asked if it is an offense for children to be unrestrained in a passenger vehicle, roughly half those interviewed thought it was and the other half thought not. The Global Status Report on Road Safety (WHO, 2013a) in a publication dealing with road safety in the Eastern Mediterranean region noted that Saudi Arabia was one of only three countries in the region that have a national law requiring the use of child car restraints. Thus, this finding suggests that the respondents were purely guessing here.

There was a greater appreciation of the legal status by older respondents and there were fewer KSA respondents that appreciated this than others in the GCC. This responses were not affected by gender, education level, licensing, living region or whether had or have had children.

Clearly, there is an urgent need to spread the word widely about the legal status of wearing Child Restraint systems and for the police to start enforcing this law if the high numbers of children killed or seriously injured in car crashes in the region is to be addressed. As noted by FIA Foundation (FIA, 2014), there can be up to an 80% reduction in serious injury and death to children by having them properly restrained.

6.2.2.3 Child Restraint Use

When asked those who have or had children if they always had your child in a CRS, overall, half responded yes and the others no. Older respondents (50 years or more) and those with higher education levels in particular were much more likely to have said yes to the question. Those who have children now were more likely as well, which might also reflect on past availability of these devices. Licensed respondents were more likely to claim that children should always be restrained in a CRS (it may be that unlicensed drivers were passengers and believed that they were capable of restraining their child if needed in spite of the evidence.

All respondents were also asked if they thought an adult seat belt was a sufficient restraint for a child aged under 10 years of which 44% thought it was. This was especially the case for licensed drivers (males). The follow-up responses here mainly focussed on the safety benefits of seat belts without any thought for the potential dangers to a child from being inappropriately restrained.

Concerns centre on the crash protection offered by these systems and on the possibility of increased risk and severity of belt-induced injuries. Lavelle (2007) claimed that children in adult seatbelts are on average about 2.7 times more likely to suffer an injury in a car crash than adults wearing the same seatbelt. The reason for this was because children are shorter than adults, have relatively larger heads, and smaller hip bones. So the sash portion of an adult seatbelt tends to lie across a child's face or neck and the lap portion rides up across the abdomen rather than the waist as in an adult. In a crash, the belt can cause head, neck and abdominal injuries.

6.2.2.4 CRS Suitability

The respondents were also questioned on what ages they thought were appropriate for young children in Child Restraint System. Photos were shown of the three most common types of Child Restraint Systems, namely a baby capsule, a forward facing child seat, and a booster seat. These are shown in Section 2.5 in the literature review earlier.

The findings showed a reasonable spread of responses from good to poor for the baby capsules but very poor and inadequate responses for child restraint seats and booster seats. These finding further highlights the lack of knowledge generally on what constitutes a suitable child restraint in the region Without a doubt, improved knowledge is urgently required on when and what to use child restraint systems and when to upgrade to ensure greater protection of children in vehicles in the GCC.

This raised the issue of whether the cost of these devices was a deterrent to parents. The survey found that three-quarters of the respondents claimed that cost was not a deterrent although men and those with children were more likely to respond that cost it is. There are mechanisms for addressing this. Hiring schemes are available in Australia, for instance, especially for the first baby capsule as it is usually only used
for 6 to 12 months. Some local governments offer hire schemes for forward-facing child restraints and boosters too. Renters are required to check for damage and wear-and-tear before these devices can be re-used.
7. CONCLUSIONS AND RECOMMENDATIONS

The study of seatbelt behaviour and understanding has been very successful in terms of meeting its research objectives and expectations. The level of seat belt wearing in the Dammam Municipality was between 43% and 47% for drivers and 26% to 30% for front adult passengers. Wearing rates for adults and children were very poor in the rear seats. Adult responses in the community survey were roughly in line with these figures suggesting that their responses were quite honest but also naive of the risks and benefits. Of some concern was the fact that even though there were signs of a recent increase in wearing rates in Saudi Arabia, the rates observed were still well below what is considered to be best practice internationally. While KSA vehicle occupants are legally bound to wear their seat belts in all seating positions, this is relatively unknown and unenforced. There are substantial benefits in fewer deaths and serious injuries if seat belt wearing rates can be increased to international levels.

Of special concern were the poor wearing rates among children, especially under 5 years. Child rates were poor (less than 10% generally) in both front and rear seats, and those restrained were equally likely to be using an adult seat belt or in a suitable child restraint. Adults’ knowledge of the need for having a young child in a suitably design Child Restraint System (CRS) was reasonably high, yet not reflected in the observed wearing rates on the road. The dangerous practice of having unrestrained children in the front seat, in the drivers lap, and/or held by the child’s mother must be eliminated to maximise their safety and maintain the adults’ duty of care to their children. Age, gender and education all seemed to be associated with higher safety appreciation, and in some instances, KSA residents held less safety attitudes than other GCC or international respondents.

7.1 Recommendations

A number of recommendations aimed at improving seat belt wearing to reduce the numbers of KSA residents killed or seriously injured on roads in the Municipality are listed below for consideration.

7.1.1 Enforcement

It is pointless to have legislation requiring vehicle occupants to be properly restrained if it is not regularly enforced. As noted earlier, seat belt wearing rates in the Municipality were considerably higher at compulsory police stops in the region and have been increasing recently in and around Dammam since more attention has been given to restraint wearing by the police. However, it is evident that this increase has been mainly observed among drivers. More effort is clearly required to ensure front and rear passengers are also properly restrained in their vehicles.

To give maximum benefits, seat belt enforcement needs to be heavily supplemented with high levels of advertising and marketing to illustrate that these efforts are clearly safety orientated and not just to raise revenue. The most successful international campaigns in Australia, Canada, Europe, and more recently in the USA, have all adopted multi-faceted campaigns to achieve the high and consistent wearing rates they have. These can be used as models for developing similar campaigns in KSA, bearing in mind cultural differences that may exist across these regions.

Seat belt legislation may also need to be reviewed and improved to provide the police with the full weight of the legal system in KSA. Penalties and fines need to reflect the seriousness of these offenses so that motorists can see the risks they are taking by driving unrestrained in their vehicles. These can be differentiated by risk factor and other occupant characteristics (eg: adult and child) to reinforce seat belt wearing by vulnerable passengers.
7.1.2 Child Restraints

The low usage rates of purpose-built child restraints in Dammam for children under 5 and up to 10 years is very alarming. Child Restraint Systems (CRS) are in everyday use in all developed countries to give children maximum protection in the event of a crash. Moreover, they properly constrain these children, minimise the chance of them injuring themselves in a collision, and also provide fewer distractions to the driver in normal driving. Wearing an adult seat belt for a child under 10 years must be discouraged to prevent unintended injuries to the child from the belt itself. CRS ensure that the child is in a position where the seat belt protects without causing unwanted injuries.

The study showed that the cost of these devices was not a deterrent and anecdotally, it seemed that there were several outlets in and around Dammam that offered the latest designed CRS units. More intensive marketing is required to alert motorists to their availability and other campaigns required informing motorists of their need and safety benefits to increase their usage. Child seat manufacturers who profit from their widespread use can be used to work together in these campaigns. Rental schemes too can be introduced to lower the financial burden and encourage their use. For new born babies going home for the first time, many hospitals around the world will not allow them to leave unless the parents have a suitable baby capsule fitted to their vehicle. Where this is not available, the parents are given the choice to either buy or borrow a suitable device provided by the hospital or the baby stays in hospital until such a device is found.

7.1.3 The Role of Education

It is clear from the community survey that there are many issues associated with seat belt wearing that are not fully understood within the community. It is imperative that the many false myths that exist about road safety initiatives such as seat belt wearing are addressed in an on-going campaign at all levels. First, education at schools in road safety practices is needed to help introduce changed attitudes in the next generation of adults. For the current generation, marketing and advertising initiatives are needed in the published and electronic media that run continually. Short-term campaigns only offer short-term gains so it’s imperative that these initiatives are long-term. Organisations that specialise in safety issues (eg: Safe Kids, and Decade of Action) need to be encouraged to help with these initiatives. The World Health Organisation (WHO) and the Organisation for Economic Co-operation and Development (OECD) are also international groups with a primary role in safety improvement who can be called upon when required. There are also many existing education programmes worldwide that are available to assist. The Center for Disease Control (CDC, 2011) has published a series of policy briefs highlighting key public health issues and important, science-based policy actions that can be taken to address them.

7.1.4 Other Initiatives

Seat belts are essentially an engineering approach to reduce the risk of injury in the event of a collision. They are a “crashworthiness” initiative, that is, they don’t prevent the crash but rather prevent the injury in a crash. Older cars don’t always have seat belts fitted and these need to be taken off the road or forced to retro-fit suitable belts. Initiatives to remove older less crashworthy vehicles from the road have been introduced in many countries (eg; the “Trabant” campaign in the former East Germany). This also has many additional safety benefits in terms of the latest safety technology. In particular, seat belt technology has improved dramatically in recent years from the use of load-limiting belts and pyro-technic retractors.

Some commercial companies are also taking a lead in promoting road safety by introducing policies for those who use their vehicles. While this often addresses many unsafe practices such as acceptable speeds, driving behaviour, safest vehicles, etc., it commonly calls on all those using company vehicles to be fit to drive and fully restrained. Often, these vehicles are monitored to ensure that the drivers and passengers adhere to their safety policies. It is understood that Saudi Aramco is one such company in the KSA that has
such a policy. The US Federal Motor Carrier Safety Administration (FMCSA 2006) published a commercial motor vehicle safety belt partnership, aimed at increasing safety belt use in Companies.

7.2 Further Research

A number of issues in respect of seat belt wearing warrant further research that is identified below for completeness.

- **Seat belt wearing and CRS use in other areas** – this study was restricted to an assessment of seat belt use in the Dammam Metropolitan region (predominantly urban) in the Eastern Province of KSA. It would be useful to conduct similar studies in other regions, and especially in rural areas.

- **Seat belt wearing in commercial vehicles** – for reasons of practicality, this study focussed on passenger vehicles (cars and SUVs) and light commercial utilities. While these represent the majority of passenger transportation in the region, it would be worthy to expand the vehicle population to include more commercial vehicles (light and heavy trucks).

- **The use of seat belts and CRS in taxis and buses** – another source of passenger vehicles are taxis and busses. In some international countries, bus and taxi drivers and passengers are excluded users of seat belts. This is difficult to justify, given the excess mileages they travel each year and the volume of passengers that use them. This could represent a significant at-risk population of KSA residents who are not adequately protected on KSA roads.

- **The fitment and security of CRS in passenger vehicles** – There are a number of reports that have noted the issue of mal-fitment of CRS in passenger cars. These can vary from minor problems such as belt attachments not being firm enough or twisted, to more major issues such as not having the attachments properly aligned or even having some belts unattached such as top tethers. This points to the need for more inspection programs and training on how to attach a CRS securely.

- **Evaluation** – finally, it is imperative that any new initiative to improve seat belt usage in the KSA be evaluated periodically to monitor the effectiveness of the initiative or campaign and revisit or identify areas where further improvement may be necessary to optimise their outcomes.
REFERENCES


### APPENDIX 1 – STATISTICAL SIGNIFICANCE VALUES

#### A: Community Survey Analysis

<table>
<thead>
<tr>
<th>ADULT RESPONSES</th>
<th>( \chi^2 ) Value</th>
<th>CHILD RESPONSES</th>
<th>( \chi^2 ) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age x seat belt wearing</td>
<td>( \chi^2=114.5, \text{df}=6, p=0.000 )</td>
<td>Age x CRS necessary</td>
<td>( \chi^2=5.3, \text{df}=3, p=0.15 )</td>
</tr>
<tr>
<td>Gender x seat belt wearing</td>
<td>( \chi^2=123.1, \text{df}=2, p=0.000 )</td>
<td>Gender x CRS necessary</td>
<td>( \chi^2=3.4, \text{df}=1, p=0.183 )</td>
</tr>
<tr>
<td>Nationality x seat belt wearing</td>
<td>( \chi^2=165.5, \text{df}=4, p=0.000 )</td>
<td>Nationality x CRS necessary</td>
<td>( \chi^2=8.8, \text{df}=2, p=0.182 )</td>
</tr>
<tr>
<td>Education x seat belt wearing</td>
<td>( \chi^2=81.5, \text{df}=8, p=0.000 )</td>
<td>Education x CRS necessary</td>
<td>( \chi^2=29.8, \text{df}=4, p&lt;0.001 )</td>
</tr>
<tr>
<td>License x seat belt wearing</td>
<td>( \chi^2=82.7, \text{df}=2, p=0.000 )</td>
<td>License x CRS necessary</td>
<td>( \chi^2=6.5, \text{df}=1, p=0.01 )</td>
</tr>
<tr>
<td>Region x seat belt wearing</td>
<td>( \chi^2=1.17, \text{df}=2, p=0.56 )</td>
<td>Region x CRS necessary</td>
<td>( \chi^2=0.002, \text{df}=1, p=0.96 )</td>
</tr>
<tr>
<td>Marital status x seat belt wearing</td>
<td>( \chi^2=74.1, \text{df}=4, p=0.000 )</td>
<td>Family x CRS necessary</td>
<td>( \chi^2=5.8, \text{df}=2, p=0.055 )</td>
</tr>
<tr>
<td>Age x legality</td>
<td>( \chi^2=18.5, \text{df}=3, p=0.000 )</td>
<td>Age x offense</td>
<td>( \chi^2=14.7, \text{df}=3, p=0.002 )</td>
</tr>
<tr>
<td>Gender x legality</td>
<td>( \chi^2=105.8, \text{df}=1, p=0.000 )</td>
<td>Gender x offense</td>
<td>( \chi^2=2.4, \text{df}=1, p=0.12 )</td>
</tr>
<tr>
<td>Nationality x legality</td>
<td>( \chi^2=2.17, \text{df}=2, p=0.34 )</td>
<td>Nationality x offense</td>
<td>( \chi^2=8.36, \text{df}=2, p=0.015 )</td>
</tr>
<tr>
<td>Education x legality</td>
<td>( \chi^2=1.0, \text{df}=4, p=0.91 )</td>
<td>Education x offense</td>
<td>( \chi^2=2.86, \text{df}=4, p=0.58 )</td>
</tr>
<tr>
<td>License x legality</td>
<td>( \chi^2=99.7, \text{df}=1, p=0.000 )</td>
<td>License x offense</td>
<td>( \chi^2=2.7, \text{df}=1, p=0.10 )</td>
</tr>
<tr>
<td>Region x legality</td>
<td>( \chi^2=3.2, \text{df}=1, p=0.075 )</td>
<td>Region x offense</td>
<td>( \chi^2=0.02, \text{df}=1, p=0.89 )</td>
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<tr>
<td>Marital status x legality</td>
<td>( \chi^2=18.5, \text{df}=2, p=0.000 )</td>
<td>Family x offense</td>
<td>( \chi^2=4.6, \text{df}=2, p=0.10 )</td>
</tr>
<tr>
<td>Age x safety benefit</td>
<td>( \chi^2=33.0, \text{df}=6, p=0.000 )</td>
<td>Age x always CRS</td>
<td>( \chi^2=43.5, \text{df}=3, p=0.000 )</td>
</tr>
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<td>Gender x safety benefit</td>
<td>( \chi^2=11.0, \text{df}=2, p=0.004 )</td>
<td>Gender x always CRS</td>
<td>( \chi^2=0.3, \text{df}=1, p=0.87 )</td>
</tr>
<tr>
<td>Nationality x safety benefit</td>
<td>( \chi^2=29.3, \text{df}=4, p=0.000 )</td>
<td>Nationality x always CRS</td>
<td>( \chi^2=6.0, \text{df}=2, p=0.05 )</td>
</tr>
<tr>
<td>Education x safety benefit</td>
<td>( \chi^2=17.4, \text{df}=8, p=0.026 )</td>
<td>Education x always CRS</td>
<td>( \chi^2=29.8, \text{df}=4, p=0.000 )</td>
</tr>
<tr>
<td>License x safety benefit</td>
<td>( \chi^2=8.4, \text{df}=2, p=0.15 )</td>
<td>License x always CRS</td>
<td>( \chi^2=7.1, \text{df}=1, p=0.007 )</td>
</tr>
<tr>
<td>Region x safety benefit</td>
<td>( \chi^2=5.8, \text{df}=2, p=0.056 )</td>
<td>Region x always CRS</td>
<td>( \chi^2=1.6, \text{df}=1, p=0.27 )</td>
</tr>
<tr>
<td>Marital status x safety benefit</td>
<td>( \chi^2=47.8, \text{df}=4, p=0.000 )</td>
<td>Family x always CRS</td>
<td>( \chi^2=13.1, \text{df}=1, p=0.000 )</td>
</tr>
<tr>
<td>Age x rear seat wearing</td>
<td>( \chi^2=53.3, \text{df}=3, p=0.000 )</td>
<td>Age x adult belt sufficient</td>
<td>( \chi^2=5.78, \text{df}=3, p=0.12 )</td>
</tr>
<tr>
<td>Gender x rear seat wearing</td>
<td>( \chi^2=0.03, \text{df}=1, p=0.96 )</td>
<td>Gender x adult belt sufficient</td>
<td>( \chi^2=0.68, \text{df}=1, p=0.79 )</td>
</tr>
<tr>
<td>Nationality x rear seat wearing</td>
<td>( \chi^2=1.8, \text{df}=2, p=0.41 )</td>
<td>Nationality x adult belt sufficient</td>
<td>( \chi^2=4.33, \text{df}=2, p=0.12 )</td>
</tr>
<tr>
<td>Education x rear seat wearing</td>
<td>( \chi^2=4.5, \text{df}=4, p=0.34 )</td>
<td>Education x adult belt sufficient</td>
<td>( \chi^2=6.9, \text{df}=4, p=0.14 )</td>
</tr>
<tr>
<td>License x rear seat wearing</td>
<td>( \chi^2=6.8, \text{df}=1, p=0.009 )</td>
<td>License x adult belt sufficient</td>
<td>( \chi^2=7.1, \text{df}=1, p=0.008 )</td>
</tr>
<tr>
<td>Region x rear seat wearing</td>
<td>( \chi^2=1.2, \text{df}=1, p=0.26 )</td>
<td>Region x adult belt sufficient</td>
<td>( \chi^2=1.6, \text{df}=1, p=0.21 )</td>
</tr>
<tr>
<td>Marital status x rear seat wearing</td>
<td>( \chi^2=45.4, \text{df}=2, p=0.000 )</td>
<td>Family x adult belt sufficient</td>
<td>( \chi^2=5.8, \text{df}=2, p=0.055 )</td>
</tr>
<tr>
<td>Age x cost</td>
<td>( \chi^2=7.5, \text{df}=3, p=0.057 )</td>
<td>Gender x cost</td>
<td>( \chi^2=8.67, \text{df}=1, p=0.003 )</td>
</tr>
<tr>
<td>Nationality x cost</td>
<td>( \chi^2=1.9, \text{df}=2, p=0.38 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Education x cost</td>
<td>License x cost</td>
<td>Region x cost</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------</td>
<td>----------------</td>
<td>--------------</td>
</tr>
<tr>
<td></td>
<td>( \chi^2=7.1, \text{df}=4, \text{p}=0.13 )</td>
<td>( \chi^2=0.3, \text{df}=1, \text{p}=0.56 )</td>
<td>( \chi^2=0.03, \text{df}=1, \text{p}=0.85 )</td>
</tr>
</tbody>
</table>

**B: Observation Analysis**

<table>
<thead>
<tr>
<th>ADULT RESPONSES</th>
<th><strong>( X^2 ) Value</strong></th>
<th>CHILD RESPONSES</th>
<th><strong>( X^2 ) Value</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Front-seat x seat belt wearing</td>
<td>( \chi^2=28.7, \text{df}=1, \text{p}=0.00 )</td>
<td>Kids ≤5yrs (first rear row)</td>
<td>( \chi^2=5.2, \text{df}=2, \text{p}=0.07 )</td>
</tr>
<tr>
<td>Date x seat belt wearing</td>
<td>( \chi^2=18.6, \text{df}=7, \text{p}=0.01 )</td>
<td>Kids &gt;5yrs (first rear row)</td>
<td>( \chi^2=4.9, \text{df}=2, \text{p}=0.08 )</td>
</tr>
<tr>
<td>Location x seat belt wearing</td>
<td>( \chi^2=17.7, \text{df}=9, \text{p}=0.04 )</td>
<td>Kids ≤5yrs (Restrainment type)</td>
<td>( \chi^2=6.0, \text{df}=4, \text{p}=0.19 )</td>
</tr>
<tr>
<td>Observer x seat belt wearing</td>
<td>( \chi^2=15.6, \text{df}=6, \text{p}=0.02 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lane x seat belt wearing</td>
<td>( \chi^2=1.37, \text{df}=3, \text{p}=0.71 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle x seat belt wearing</td>
<td>( \chi^2=0.65, \text{df}=2, \text{p}=0.72 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seatbelt wearing by study method</td>
<td>( \chi^2=1.25, \text{df}=1, \text{p}=0.26 )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 2 - QUESTIONNAIRE – SEATBELT AND CRS SURVEY

Introductory remarks
We are conducting a survey on what people think about restraint use in vehicles in KSA. This includes adults wearing seatbelts and children using child restraints. This information is useful for understanding how injuries can be reduced in car crashes. Your answers will be kept confidential at the University of Dammam and your answers will not be shown to anyone outside the University. Please answer the questions as truthfully as you can as your response could help in saving lives on our roads.

A. Personal Characteristics

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What is your gender?</td>
<td>Male</td>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>2. Do you have a driving license?</td>
<td>Yes I do</td>
<td>No I don’t</td>
<td></td>
</tr>
<tr>
<td>3. What is your age group?</td>
<td>Under 20 years</td>
<td>20 to 30 years</td>
<td>31 to 50 years</td>
</tr>
<tr>
<td>4. Level of education completed?</td>
<td>None</td>
<td>Middle</td>
<td>High School</td>
</tr>
<tr>
<td></td>
<td>University</td>
<td>Higher Education</td>
<td></td>
</tr>
<tr>
<td>5. What is your Nationality?</td>
<td>Saudi</td>
<td>Gulf countries (GCC)</td>
<td>Elsewhere</td>
</tr>
<tr>
<td>6. Where do you live?</td>
<td>In Dammam or, Khobar or, Dhahran</td>
<td>Elsewhere</td>
<td></td>
</tr>
<tr>
<td>7. Marital status?</td>
<td>I am married</td>
<td>I am single</td>
<td>Other</td>
</tr>
</tbody>
</table>

B. Seat Belt Wearing Among Adults

I now would like to ask you some questions about your thoughts on wearing seatbelts in cars. Please be totally honest about your answers - they will not be shown to anyone outside the study team at the University.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8. How often do you wear a seatbelt when you travel in a car?</td>
<td>All the time</td>
<td>Some of the time</td>
<td>Hardly ever</td>
</tr>
</tbody>
</table>

Please explain why you think this is so:

........................................................................................................................................

........................................................................................................................................

........................................................................................................................................
### C. Child restraints for young children

I now would like to ask you some final questions about your thoughts on child restraints for young children. Again, please be totally honest about your answers - they will not be shown to anyone outside the study team at the University.

<table>
<thead>
<tr>
<th>Question</th>
<th>Response Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Do you currently have any children under the age of 10 years?</td>
<td>Yes I do</td>
</tr>
<tr>
<td>14. Have you ever had any children of your own under the age of 10 years?</td>
<td>Yes I have</td>
</tr>
<tr>
<td>15. Do you think it is necessary for young children to be restrained in a suitable child seat?</td>
<td>Yes I do</td>
</tr>
<tr>
<td>16. Do you know that it is an offense for children not to be properly restrained in a car?</td>
<td>Yes I do</td>
</tr>
</tbody>
</table>
### SHOW THE CHILD RESTRAINT PHOTOS TO THE RECIPIENT

#### Question 17
At what ages do you think these Child Restraints should be used among children?

<table>
<thead>
<tr>
<th>1. Baby capsule:</th>
<th>Start (months-yrs)</th>
<th>End (months-yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Child Seat</td>
<td>Start (yrs)</td>
<td>End (yrs)</td>
</tr>
<tr>
<td>3. Booster Seat</td>
<td>Start (yrs)</td>
<td>End (yrs)</td>
</tr>
</tbody>
</table>

#### Question 18
Do you think it is sufficient to put children under 10 years in an adult seatbelt?

<table>
<thead>
<tr>
<th></th>
<th>Yes I do</th>
<th>No I don’t</th>
</tr>
</thead>
</table>

In **Question 18**, please explain **why you think this is so:**

………………………………………………………………………………………………………………
………………………………………………………………………………………………………………
………………………………………………………………………………………………………………

#### Question 19
Have you always had your young children in a suitable child restraint?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Sometimes</th>
</tr>
</thead>
</table>

In **Question 19**, please explain **why you think this is so:**

………………………………………………………………………………………………………………
………………………………………………………………………………………………………………
………………………………………………………………………………………………………………
Thank you very much for your assistance in conducting this survey. Your answers will be very helpful in appreciating some of the problems associated with seatbelts and child restraints in the KSA.

If you have any questions you would like to discuss about this survey, please contact <Dr Abdul Hamid Al Mojil> at the University of Dammam on <0569389032>.

Thank you very much for your time and effort.

Chair of Saudi Aramco for Traffic Safety
University of Dammam
حاسبة حزام الأمان ومقاعد أمان الأطفال

القسم 1: معلومات شخصية

1. ما هو جنسك؟
   - ذكر
   - أنثى

2. هل لديك رخصة قيادة؟
   - نعم
   - لا

3. ما هي فئة العمر؟
   - أقل من 20 عام
   - 20 إلى 30 عام
   - 31 إلى 50 عام
   - 51 إلى 65 عام
   - فوق 75 عام

4. ما هو مستوى تحصيلك العلمي؟
   - لا شيء
   - ثانوية عامة
   - جامعي
   - دراسات عليا
   - من دول الخليج
   - أخرى

5. ما هي جنسيتك؟
   - سعودي
   - من دول الخليج
   - أخرى

6. مكان إقامتكم؟
   - الدمام
   - الخبر
   - الظهران
   - مكان آخر

7. حالة الإجتماعية?
   - مزوج
   - أعزب
   - أخرى

التقديم بال данныات: استبيان حزام الأمان ومقاعد أمان الأطفال

نقوم حالياً بالاستبان عن رأي الناس باستخدام تجهيزات الأمان في المركبات في المملكة العربية السعودية. ويشمل هذا البالغين الذين يستخدمون أحزام الأمان والأطفال الذين يستخدمون مقاعد الأمان المخصصة لهم. وستقدم هذه المعلومات الفائدة في فهم كيفية تخفيض إصابات الحوادث المرورية، وسيتم حفظ أجوبتكم بشكل سري لدى جامعة الدمام، كما لن يتم عرضها لأي شخص خارج الجامعة. يرجى الإجابة على الأسئلة بشفافية عالية لأنها قد تساعد في إنقاذ حياة الكثير من الناس على الطرقات.

القسم 2: استخدام البالغين لحزام الأمان

أود الآن طرح بعض الأسئلة المتعلقة بحزام الأمان في السيارات. يرجى تقديم الأجوبة بصدق تام، حيث لن يتم عرض الأسئلة لأي شخص من خارج فريق الدراسة في الجامعة.

8. ما هو تكرار استخدامك لحزام الأمان عند التنقل بالسيارة؟
   - كل الوقت
   - بعض الوقت
   - نادر

9. ما هو السبب في عدم استخدامك لحزام الأمان عند التنقل بالسيارة؟
   - شرح سبب رأيك هذا:

..................................................................................................................................................................................
9. هل تعتقد بأن أحزمة الأمان يمكنها الحد من حالات الوفيات والإصابات عند وقوع الحوادث؟

<table>
<thead>
<tr>
<th>بالتأكيد</th>
<th>لا</th>
</tr>
</thead>
</table>

في السؤال التاسع، يرجى شرح سبب رأيك هذا.

<table>
<thead>
<tr>
<th>نعم</th>
<th>لا</th>
</tr>
</thead>
</table>

10. هل تشعر بعدم الراحة أثناء ارتداء حزام الأمان؟

<table>
<thead>
<tr>
<th>نعم</th>
<th>لا</th>
</tr>
</thead>
</table>

11. هل تعتمد أن عدم ارتداء حزام الأمان يعد من المخالفات؟

<table>
<thead>
<tr>
<th>نعم</th>
<th>لا</th>
</tr>
</thead>
</table>

12. هل من الضروري ارتداء حزام الأمان في المقعد الخلفي؟

<table>
<thead>
<tr>
<th>نعم</th>
<th>لا</th>
</tr>
</thead>
</table>

في السؤال الثاني عشر، يرجى شرح سبب رأيك هذا.

<table>
<thead>
<tr>
<th>نعم</th>
<th>لا</th>
</tr>
</thead>
</table>

13. هل لديك حالياً أي طفل دون سن 10 أعوام؟

<table>
<thead>
<tr>
<th>نعم</th>
<th>لا</th>
</tr>
</thead>
</table>

14. هل كان لديك في أسرتك من قبل أي طفل دون 10 أعوام؟

<table>
<thead>
<tr>
<th>نعم</th>
<th>لا</th>
</tr>
</thead>
</table>

15. هل تعتقد بضرورة وضع الأطفال الصغار في مقاعد أمان مناسبة لهم؟

<table>
<thead>
<tr>
<th>نعم</th>
<th>لا</th>
</tr>
</thead>
</table>

في السؤال الخامس عشر، يرجى شرح سبب رأيك هذا.

<table>
<thead>
<tr>
<th>نعم</th>
<th>لا</th>
</tr>
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</table>

16. هل تعلم بأن وجود الأطفال بوضعية غير أمنة

<table>
<thead>
<tr>
<th>نعم</th>
<th>لا</th>
</tr>
</thead>
</table>

القسم 3: ضوابط مقاعد أمان الأطفال الصغار

يرجى الإجابة بصدق تام حيث لن يتم عرض الأجوبة لأي شخص من خارج بيئة دراسة الجامعة.

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<thead>
<tr>
<th>نعم</th>
<th>لا</th>
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</table>

17. هل تعتقد بضرورة وضع الأطفال الصغار في مقاعد أمان مناسبة لهم؟
يرجى عرض صور مقاعد الأطفال على ملتقى الاستبيان

1. سرير الرضيع: البداية (بالسنوات) ...... النهاية (بالسنوات) ......
2. مقاعد الأطفال: البداية (بالسنوات) ...... النهاية (بالسنوات) ......
3. المقعد الداعم: البداية (بالسنوات) ...... النهاية (بالسنوات) ......

17. لأية أعمار برأيك يجب استخدام هذه المقاعد للأطفال؟

18. هل تعدك بأنه من الكافي وضع الأطفال دون سن 10 أعوام في مقعد مع حزام أمان مخصص للاطفال؟

19. هل قمت دائماً بوضع أطفال بشكل أمن ضمن المقاعد المناسبة لهم؟

20. هل شكلت تكاليف توفير مقاعد أمان أطفال عقبة أمامك؟

شكراً جزيلاً لمساعدتك في إجراي هذا الاستبيان، ستساعدنا إجاباتك في تقييم بعض المشاكل المتعلقة بحزام الأمان وكراسي أمان الأطفال في المملكة العربية السعودية.

في حال وجود أي استفسارات تود مناقشتها عن هذا الاستبيان يرجى الاتصال بـ د. عبدالحميد المعجل في جامعة الدمام على الرقم 0569389032.

شكراً

كرسي أرامكو السعودية للسلامة المرورية
جامعة الدمام
APPENDIX 3 – ON-ROAD OBSERVATION FORM

Date..........................................Location..........................................................Recorder.................................

Driver’s response to destination  ☐ Work  ☐ Home  ☐ Shopping  ☐ School  ☐ Other

Please mark all occupants’ restraint status in each car you observe. Do adults and children (when they are present) separately in the boxes below. The codes are listed opposite the diagrams.

Adult Seating position and seatbelt status (mark all adults by seating position)

1 = Male restrained
2 = Male part-restrained
3 = Male unrestrained
5 = female restrained
6 = female part-restrained
7 = female unrestrained
9 = unknown adult status

Child Passenger and restraint status (mark all children under 5yrs by seating position)

1 = Child restrained CRS
2 = Child part-restrained CRS
3 = Child restrained BELT
4 = Child part-restrained BELT
5 = Child unrestrained
9 = unknown Child status

Child Passenger and restraint status (mark all children over 5yrs by seating position)

1 = Child restrained CRS
2 = Child part-restrained CRS
3 = Child restrained BELT
4 = Child part-restrained BELT
5 = Child unrestrained
9 = unknown Child status

Special Comments
## APPENDIX 4 – OBSERVATION VALIDATION FORM

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Which LANE</th>
<th>Driver Wearing CRS or not*</th>
<th>(FRP) Front Right Passenger*</th>
<th>Type of Passenger Cars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Car</td>
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Note: *Validation 1=yes, 2=no