Tampere University

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RISKY TRAFFIC BEHAVIOR AMONG MONGOLIAN HERDERS

A qualitative pilot study

Faculty of Social Sciences

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ABSTRACT

Risky traffic behavior among Mongolian herders: A qualitative pilot study

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The purpose of this study is to study the traffic related health and road accident risks among herders who use motorbikes in Mongolia. Also, it is to study the trend and tendency of road and traffic accidents among herders and to identify preventative actions that could possibly decrease the rate of traffic accidents.

The study will be advantageous for experts in public and global health field to understand "How does ongoing transportation transition among herder population impact their road and traffic accident risks and other health risks related to motorbikes?", "What types of hidden and unknown road and traffic accident risks exist among herders who use two-wheel motorbikes?", "Why are today's herders more keen to use motorbikes than horses?".

This is a qualitative study based on the semi-structured interviews with ten herders who use motorbikes for their everyday lives and formerly used horses for the same purposes. Qualitative content analysis has been used to process the study findings.

Safe vehicles and safe people, safe speeds and safe roads (4S) are the basic four elements of the Safe System framework for road safety. The main interventions to prevent road and traffic accidents should be based on 4S. The study aimed to identify the herders' road and traffic risks through the 4S approach.

It is evident that the transportation transition from the horses to the motorbikes has increased herders' road and traffic accident risks greatly. Herders are failing to maintain the four key elements of road safety and having high risks by possessing less knowledge and poor implementation of the traffic rules, including deficient maintenance, drunk driving, driving with excessive passengers, driving on

icy and snowy, slippery terrain, driving during winter, child driving and no helmet usage in the countryside. Also, herders have the mindset that traffic rules must be obeyed only in the town to avoid the penalties of the traffic police.

The Government of Mongolia ought to take culturally sensitive and holistic actions to reduce the road and traffic risks on the basis of the typical needs and risks among herders. This requires involvement from multiple sectors such as transport, police, health, education, as well as agriculture.

Keywords: health, road and traffic accident risk, road accident, traffic accident, risk factors, herders.

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LIST OF ABBREVIATIONS

SSRO-Statistics and Surveillance Research Office
NTORC-National Trauma and Orthopedic Research Center
GDP-Gross Domestic Product
FAO-Food and Agriculture Organization of the United Nations
UNFPA-United Nations Population Fund
NGO- Non-Government Organization
LMIC- Low- and Middle-income Country
WHO- World Health Organization
BAC-Blood alcohol concentration
UN-United Nations
GoM- The Government of Mongolia
IRO-The International Road Organization
RTAD-Road Traffic Accidents, Deaths
MCO-Mongolian Customs Office
TPAM-Traffic Police Authority of Mongolia
MNT-Mongolian tugrug
USSR- Union of Soviet Socialist Republic
4S- Four safe elements

Table of Contents

“When I'm riding my motorcycle, I'm glad to be alive.
When I stop riding my motorcycle, I'm glad to be alive”

- Neil Peart

CHAPTER 1: INTRODUCTION

The purpose of this study is to investigate the road and traffic accident risks and the other health risk factors related to the transportation transition among herders who use motorbikes in Mongolia. Also, it is to study the trend and tendency of road and traffic accidents among herders and to identify preventative actions that could possibly decrease the rate of traffic accidents. The safe system framework-4S for road safety has been used as a guideline throughout the study.

The study will be advantageous for experts in public and global health field to understand the following questions: "Are today's herders more keen to use motorbikes more than horses?", If so, "why?", "How has the transportation transition among the herder population impacted their road traffic accident risks, and other health risks related to motorbike riding?"

This chapter will demonstrate the rationale for choosing this topic. It will also provide the reader an overview of all chapters by briefly outlining the content of each one.

1.1 Traffic as a major global killer

Traffic accidents are a major cause of death world-wide, and particularly in low- and middle-income countries (LMIC). WHO documents this in detail (WHO, 2018a):

> "The number of road traffic deaths rises steadily, 1.35 million in 2016. However, the rate of death relative to the size of the world's population has remained constant. When considered in the context of the increasing global population and rapid motorization that has taken place over the same period, this suggests that existing road safety efforts may have mitigated the situation from getting worse. However, it also indicates that progress to realize Sustainable Development Goal (SDG) target 3.6 – which calls for a 50% reduction in the number of road traffic deaths by 2020 – remains far from sufficient. The Global Status Report on Road Safety illustrated that low and middle income countries (LIMC) have higher road traffic fatality rates. The LIMCs have a fatality rate of 19.5-21.5 per 100.000 population. High income countries have an average of 10.3 per 100.000 population. More than 90% of the deaths caused by road and traffic accidents occur in LIMC. But, only 48% of the motorized vehicles in the world are registered in the LIMCs. Almost 50% of those who die, due to road

> and traffic accidents are the vulnerable road users, including pedestrians, cyclists or motorcyclists."

Resolutions and UN Secretary-General's reports say "road traffic injuries are currently estimated to be the ninth leading cause of death across all age groups globally and are predicted to become the seventh leading cause of death by 2030" (WHO, 2018b).

Road and traffic accidents are one of the most challenging problems of public health nowadays, and everyone should make contributions to prevent it, and support the society to be safe on the roads. Public awareness, effective enforcement and implementation of traffic rules, and more scientific and advanced technologies, and academic studies and research are required more and more to tackle this problem. Emerging economies in the developing countries are requiring the increased use of various types of motorized vehicles for daily use, business and infrastructure development, and construction. Occupational health and road safety are not being considered the most important issues in these countries; thus, road traffic accidents kill a greater number of people every year in LMICs.

As the number of road traffic accidents increases, health and economic consequences of these accidents are rising in a parallel way. There are many negative health and economic consequences of road traffic accidents, which affect the injured people and their families and communities. Health consequences are not limited to the physical pain and disability; it affects people's mental health negatively, including family members and relatives. Anxiety, depression, stress, and suicidal thoughts are common among family members after the life changing horrific accidents to their loved ones. Many accidents have taken the lives of the men, mostly husbands and dads, who are the only breadwinners of the family. Sadly, consequently, children are orphaned and have to face the hardships of life without their dads and parents. Some victims could stay alive and survive from the deadly accidents, which seems they are lucky, but they have to live with incapacitating disabilities for the rest of their lives. This survival sometimes can be a huge economic and mental burden for the entire family. Casualty victims often cannot work anymore or not for months and years, and might require a caregiver from the family members and massive cost for the treatment. The caregiver is likely to be the most capable member of the family for income generation and livelihood. Caregivers from the family have to quit their jobs or reduce their working hours to take care of the casualty victim, and eventually they all fell into in a cycle of debt. Gopalakrishnan (2012) sums up the problem:

> "Motorization has enhanced the lives of many individuals and societies, but the benefits have come with a price. Although the number of lives lost in road accidents in high-income countries indicate a downward trend in recent decades, for most of the world's population, the burden of road-traffic injury—in terms of societal and economic costs—is rising substantially. Injury and deaths due to road traffic accidents are a major public health problem in developing countries."

The decade from 2011-2020 had been declared as "The Decade of Secure Traffic Safety Actions" by the United Nations. The Mongolian Government supported the declaration and decided to resolve some of the urgent problems of traffic safety in the country (WHO, 2018b).

According to the latest WHO data (2017), road and traffic accidents deaths in Mongolia reached 616, or 3.29% of total deaths, in 2017. There were 110 fatalities caused by two-wheeled motorbike accidents in 2013: 42.2% happened during herding animals; 71.2% occurred on unpaved roads; and 46.9% caused fatal skull injuries.

This study is intended to create awareness among the health professionals and decision makers in Mongolia about possible policies to prevent road accidents among herders who use motorbikes and also to inculcate a sense of responsibility toward spreading the message of road safety. This cultural study of the people's behavior and perceptions is the best way to inform about the real situation.

1.2 Societal change and modernization

Mongolia is still in a period of rapid modification. It is becoming increasingly urbanized as more of its citizens migrate to Ulaanbaatar, which is Mongolia's capital, seeking better opportunities for education, jobs and modern conveniences over the traditional nomadic herding life. That is creating pressures in the city, but it's also making things complicated in the countryside as the size of the families' plunges and less people are remaining to do the herding work. Younger people tend to move to the urban centers, therefore the average age of herders is growing older. Modernity does not attract only those Mongolian herders who have moved to the cities and villages, but also those who have chosen to continue with their nomadic lifestyle. One prominent example is the emerging preference of motorbikes over horses. Transportation transition has been going on rapidly in the Mongolian plains among the herding population.

Data from the Mongolian Customs Office indicate 36.9 thousand motorbikes have been imported to Mongolia in 2013 alone. But, it is difficult to find out the exact data on the number of two-wheeled motorbikes in Mongolia, as it is an informal means of transportation in the countryside, and many herders do not register their motorbikes.

Today's the herding population has greater access to the modern technologies, and they are able to live on the combination of traditions and ongoing modernism. They have changed their horses to motorbikes and candles to solar lights. Also, in the past, they have had to travel to call an ambulance; instead of this they are now able make mobile phone calls and save times. Motorbikes make their lives easier, but at the same time, their risks of road and traffic accidents are increasing year by year.

Social change refers to the transformation of culture, behavior and social institutions over time. To understand social change, modernization is an important concept. Modernization has been a key interest of sociology since its origins in the 19th century. Several dimensions and effects of modernization seem apparent (Nolan and Lenski, 2009).

In the initial phase, society gets bigger and more heterogeneous than before. Bigger and modernistic communities start having less strong bonds between members than smaller communities. Members prefer to lead their own individual lives, without any tight connection and dependence with the whole society and other community members.

This theory is more feasible for urban societies, where people are able to live without any or with weaker social bonds. Urbanization has made the people lead a more independent life, without any strong dependence on the other members of the community. It is a bit different for the rural herding population, where traditional and strong social bonds are still alive. The rural herding population is smaller than the urban population, and this means they still have stronger social bonds and dependency on each other. Remote and sparsely located herding populations in Mongolia have their own unique way of living together and supporting each other. However, many of them reside tens of miles away from each other, and hardly have opportunities to meet often, although they can call them "our neighbors." The term together refers here not only to a physical togetherness; it is a term for being physically, mentally, and virtually together and supportive of each other. Herders live under harsh and extreme climate conditions, and have to face and overcome the natural forces, which can be difficult. Thus, there is an unwritten agreement between community members to support one

another when they are in need. They settle together and spend two or three months sharing labors and overcoming harsh seasons, then move in separate ways. Modernization makes their communication easier than before, by using fast transportation, such as motorbike and car, connecting through the Internet, and communicating via mobile phones.

Second, in the trend toward modernization, people gradually start changing their traditional thinking, which used to be very strong and truly believable. The bigger communities are likely to keep their traditions and cultures more than smaller communities. Bigger community can have various types of people; old to young, educated to illiterate, religious to open-minded. Practicing and keeping their tradition strongly exist within the bigger societies, because of the diverse membership and influences on each other. Older generation can teach and pass the traditional practices to the younger ones, if there is someone who is interested. There is a higher chance in the bigger community to have someone or a group of people who want to continue a given tradition. Once communities become smaller and have fewer members, the chance of continuation of tradition decreases. There is a less judgment in their preferences, and less live examples of how to do traditional things. Then, smaller communities become more open to accept the new things in their lives and adopt new and advanced technologies and devices. They start to see this change as healthy and an inevitable process in life. This phenomenon is happening among the Mongolian herding population, as they are keen to adopt any new technologies that are feasible for their lives and labor. Transportation transition, from the horses to motorbikes, is one of the many examples of how they are being open for any advanced and modern technologies.

The process of alteration in the means of transportation of motorbikes over horses has been intensified since the start of the new millennium. The horses and horsemanship skills had been a part of the national identity for many centuries. But, due to ongoing modernization, herders are at the edge of losing their long fame and identity of being horsemen and possessing great horsemanship skills. The older herding generation is sad over this transition, but the younger generation is not supportive of their seniors' old-fashioned way of thinking. The urban population in Mongolia generally wants the herders to keep their nomadic traditions and have their own national value and pride, but the fate of tradition utterly depends on the herders. This study will demonstrate the effects of modernization among the herding population, including fading horsemanship skills, which are related to the transportation transition.

Third, modernization provides growing interest in the autonomy and individual freedom of people. People in larger societies have the freedom to deal with their own matters and business themselves, without any judgment from other members of the society. Once they start to sustain the independent lives and being self-sufficient without any major societal support, then people tend to lose their old ways of thinking and traditional lifestyles. In short, people have no worries about pressure and criticism from the society, and go for the most advanced aspects.

Modernization is a process of the sociocultural transformation. Maheshwari (2016) describes it as "a thoroughgoing process of change involving values, norms, institutions and structures. It implies an inherent change in the mode of life in a particular direction for attaining modernity. Hence, man's attitude, idea, outlook and approach are oriented towards change in that direction. The term modernization is used not only to describe the changes in the material culture of a nation, but also in its belief system, values and way of life on the whole." He continues: modernization "is a process which brings desired types of changes in the social structure, value orientation, motivations and norms. It is a process of transformation of a society from its backward framework to a forward looking, progressing and prospering structural build up."

Social science literally defines the modernization through four formulations. These; normative, structural, and psychological, also technological formulations are naturally existing at different levels of modernization among Mongolian herders. Psychosocial formulations, including mentality, thinking, beliefs, opinions, cultural and traditional values, attitudes and actions are changed at some level. Technological formulation, such as technological approach, has been changed greatly, including transportation, communication. Herders are showing a positive response towards modernization by undermining the traditional order at many points while making adaptation to the changing situation. Many of them want to be able to keep the coexistence of traditionalism and modernity without threatening the old tradition.

1.3 Climate in Mongolia

Mongolian climate is one of the harshest and the most extreme climates in the world. The Mongolian capital of Ulaanbaatar is considered the coldest capital city in the world. Temperature fluctuation in different seasons is enormous; summer temperature can reach +35°C, and winter can be as cold as -40°C. Generally, the southern part of the country is milder than the northern part. The northern part of the country is located on the south edge of Siberia, therefore, much colder than other regions of

the country. There is less annual precipitation in Mongolia than the global average, which geographically differs 50-400mm per year. The southern part of the country is dry and more arid than other regions of the country, due to less annual precipitation.
Pasture and grass growth heavily depend on the amount of rain and snow, but more frequent droughts occur in Mongolia, due to the intensifying global warming and climate change. High mobility of the herding population is driven by the availability of grass to feed livestock and animals, and ultimately depends on annual rainfall. More rain means more grass and food for animals. The herders are likely to have more mobility when there is less rain and grass. In contrast, they have more replacements for better pastures and milder temperature, when heavy snow covers the pasture and the weather is extremely cold during the winter season.

The Mongolian climate is challenging and unpredictable for animal husbandry. But, Mongolian animals and herders are well adapted to the climate of the country. Most of the time, they overcome the natural hazards and disasters together. Nonetheless, there are times to be beaten by natural forces and be defeated.

“Road conditions in Mongolia differs in different seasons: muddy in summer, icy and slippery in winter, dry and dusty in autumn and spring, which increases road and traffic accident risks among the population. In Mongolia, transportation of both people and commodities depends on road transportation to a large extent. Therefore, poor road conditions incur adverse impacts on economic development” (Ex-Post Evaluation of Japanese Grant Aid Project, 2012).

1.4 Heroism, braveness, masculinity in culture

Mongolian men respect and admire their ancestor’s, especially Chingis Khaan’s heroic and brave history, and seek to emulate these qualities in themselves even nowadays. Nomadic lifestyle is tough and challenging, but it generously gives the national values, pride and identity to the Mongolians (Worden, 1989). The heroic and brave nature of men and their desire to be looked at as masculine greatly increase their risk behaviors and risk taking habits when riding motorbikes, including speeding, no helmet usage and reckless driving, especially among the herding population. Men are the greatest risk takers in the world; there is no exception to this for Mongolian men. In Mongolia, the death rate for men is higher than women, at all ages, which can indicate not only biological factors, but also environmental and behavioral factors including drunk driving, speeding and reckless

driving. The desire to demonstrate their masculinity and bravery is one of the causes of road and traffic accidents among modern Mongolian men. The Mongolian horsemanship skills are the Mongolian national identity and pride for centuries, and these skills require men to be more masculine. Transportation transition among herders from horses to motorbikes has changed their means of transportation, but has not changed much of their habits and careless behaviors on their horses. The means of transportation have been changed; in contrast, the rider has not changed much.

Many of these behaviors, including risky driving, and drinking and driving are interlinked with a socially constructed toxic masculinities among Mongolian men.

"It is the one of the negative consequence of the nomadic lifestyle and herdsmen culture, which men are considered family power and strength. The families who had more boys and sons were deemed stronger than other families that had fewer sons. Mongolians, especially herders, have the opinion that men have to provide the income for their families. The anxiety of looking weak-willed and cowardly has profound impacts on men's attitudes toward embracing health-seeking and risk reduction behavior and preventing high-risk behaviors detrimental to their health and safety" (Kitahara and Ayush, 2013).

1.5 The safe system approach to road safety-4S **(Strategy, National Road Safety, 2011)**

"Safe systems is an approach to road safety management, based on the principle that our life and health should not be compromised by our need to travel. No level of death or serious injury is acceptable in the road transport network" (Brake, 2019).

Safe systems are designed with the human being at its center, taking human imperfection and vulnerability into account. The goal of safe systems is to ensure that the mistakes that everybody once and while makes do not lead to a crash; or, "if a crash does occur, it is sufficiently controlled to not cause a death or a life-changing injury" (Strategy, National Road Safety, 2011).

"Two of the early countries to adopt a safe systems approach on roads were Sweden and the Netherlands. Australia has also been a leader in this field, adopting a long-term strategy for road safety starting in 2011" (Strategy, National Road Safety, 2011).

The comprehensive involvement of multiple partners is described as follows Brake (2019):

> "Responsibility for the system is shared by everyone. Policy makers, planners, engineers, vehicle manufacturers, fleet managers, enforcement officers, road safety educators, health agencies and the media are accountable for the system's safety; while every road user, whether they drive, cycle or walk, is responsible for complying with the system's rules. A safe systems approach also aligns road safety management with broader ethical, social, economic and environmental goals. By creating partnerships where government or transport agencies work closely with other groups, safe systems tackles other problems associated with road traffic, such as congestion, noise, air pollution and lack of physical exercise."

Safe road and traffic systems are made up of four main components, referred to as "the 4s":

- Safer roads
- Safer speeds
- Safer vehicles
- Safer road use/ people

(Strategy, National Road Safety, 2011)

Diagram 1. Safe system, 4S.

(https://www.mainroads.wa.gov.au/OurRoads/RoadSafety/Pages/SafeSystems.aspx)

2018: Accessed May 24, 2019

CHAPTER 2: LITERATURE REVIEW

While the aspects of traffic accidents have been well established in the literature on public and global health in many countries, little research has acknowledged these factors in a Mongolian context. Thus, little literature and studies have been found for road and traffic accident risks in Mongolia. The safe people element has been searched first to identify health status and risky behaviors among Mongolian men. Kitahara and Ayush (2013) summarize the status of Mongolian health risks:

> "The number of incidental deaths, including suicide (387 men versus 63 women) and alcohol-related incidences (352 men versus 58 women), were far more frequent among men compared to women in 2016. Deaths attributed to alcohol, tobacco, traffic accidents, and even suicide are all preventable and point to men living unhealthy lifestyles. Similar to the post-Soviet countries, especially in Eastern Europe, alcoholism remains a serious problem in Mongolia, predominantly among men. The prevalence of binge drinking in Mongolia was 39.7 percent in men and 15.1 percent in women, making it 2.5 times more common in men compared to women."

"The massive 9 years of gap in life-expectancy between men and women in Mongolia is one of the highest life-expectancy gaps in the world. The world average life expectancy gap is only 4 years" (Kitahara and Ayush, 2013).

Table 1. Highest life-expectancy gaps in 2010-2017.

Highest life expectancy gap (in years) 2010-2017			
Country	Male	Female	Gap
Mongolia	65	74	9
Syrian Arab Republic	65	77	12
Belarus	68	78	10
Russian Federation	66	77	11
Lithuania	69	80	11
Ukraine	67	77	10
Latvia	70	79	9
Kazakhstan	65	75	10

Vietnam	72	81	9
Estonia	73	82	9
Seychelles	70	79	9
El Salvador	69	78	9
Turkmenistan	65	71	6
Venezuela	71	79	8
Moldova	67	76	9
More developed regions	76	82	6
Less developed regions	68	72	4
Least developed regions	63	66	3
World	70	74	4

Source: UNPFA, UN Population Fund, State of World Population Report, 2017: Worlds Apart

The Statistics and Surveillance Research office (SSRO) of the National Trauma and Orthopedic Research Center (NTORC) in Mongolia receives data from 60 private and public orthopedic service providers and compiles the received data. SSRO (2018) report indicates:

> "Men have much more injuries and fatalities than women. In 2017, accident-related injuries occurred mostly among men: 62% of injuries occurred in men, and 38% in women. Men are 1.7 times more likely to get injured due to any type of accidents."

The top five accidents causing injuries in 2017 were falling from higher objects, 37.3%; external force from lifeless mechanical objects, 15.9%; road and traffic accident, 15.3%; rape and physical abuse, 14.5%; and external force from living objects, 6%. Thus, road and traffic accidents cause a substantial number of injuries among men. Road and traffic accident related injuries are much higher among men than women.

Table 2. Comparison of the incidence rates in two sexes on road and traffic accident caused injuries (Statistics and Surveillance Research office (SSRO) of National Trauma and Orthopedic Research Center (NTORC) 2017).

Cause of injury	Incidence rate		Incidence rate per 10.000 population	
	Male	Female	Male	Female
Road and traffic accident	11052	6551	72.0	41.3

Of the total registered injuries in 2017, 13.9% were related to alcohol, of which 82% were among men. The rate of alcohol-related injuries was 85 per 10.000 population for men, 18 per 10.000 for women. Men are drinking and having injuries 2.7 times more than women. A staggering 63% of injuries and 80% of fatalities caused by road and traffic accidents were in men. Nearly one-third (31%) of victims who had injuries due to road and traffic accidents were traveling in cars; 18% were on motorbikes. A total of 3257 injuries caused by motorbikes was registered in 2017. Fewer people--2207--had injuries due to the falls from horses and camels in 2017 (SSRO, 2018).

Traffic accidents in Mongolia are significant because of the extreme weather, poor road conditions, less developed infrastructure, and risky behaviors of drivers and pedestrians. One study examined the causes that lead to traffic accidents in Ulaanbaatar from 1997 to 2011 (Bayasgalan and Osorkhuu, 2013). However, studies and research relating traffic accident risk among herders who use two-wheeled motorbikes have not been done in Mongolia.

The relationship between risk-taking and driving motorcycles cause of accidents among Chinese motorcyclists in Hong Kong was studied by (Ng and Cheng , 2012). A total 774 motorcyclists were recruited. Of these, 292 had encountered motorbike accidents in the previous three years. Their risk-taking acts on the motorbike and the perception of motorbike accident causes had been assessed through a questionnaire. The study revealed three main types of accident causes: driving related, environment related, and belief related. This study illustrates that causes of road and traffic accidents are multidimensional; these are not only caused by one single cause. This study was helpful to the researcher to plan to detect the multidimensional causes and risks of the road and traffic accidents among the herding population.

The researcher needed to understand more about belief-related causes, which had the most significant odds ratio in the study in Hong Kong, and what leads riders to believe that it is beyond their ability to affect accident causation and prevention. This study assessed the belief-related, superstitions-related causes of road and traffic accidents. It was a unique study, and some elements are applicable to the study among the Mongolian herding population. Mongolian herders have some common beliefs and superstitions, as they live under the natural factors, which can be harsh at some times. Also, they are much more attached to the nature and hold stronger beliefs and superstitions than the urban population. For instance, Tuesday is not a good day to travel, and everyone has their own bad direction, thus they should not travel there directly, the first they must travel in their blessed direction at least a few dozen meters, then change the direction to the destination. Literally, it is an intention related with superstition to cheat evils out by confusing them. Some herders strongly believe that the evils do wait in their bad direction and are able to harm them. Cheng and Ng study is helpful to detect belief and mentality related causes for Mongolian herders; however, the study was totally based on the urban settings, which only showed the perceptions in the metropolitan cities in South East Asia, especially in Hong Kong.

A study conducted in a rural community in Oyo State, Nigeria determined the incidence of accidents and patterns of non-fatal injury among commercial motorcyclists (Owoaje and Osemeikhain , 2005) The rural location of this study was an interesting aspect for the researcher to review. This study recruited 299 commercial motorcyclists in Nigeria, who work as motorbike taxis for the community. Selected motorcyclists filled the questionnaire prepared by the researchers. Their accidents experiences, due to motorbike accident, including types of injuries they had, also additionally their motorbike riding experiences, risky behaviors, including drinking and driving were assessed. This study was similar to the study of the herding population in Mongolia, as it included many similar components, such as motorcycle accident caused injuries, types of injuries, risky behavior of the motorcyclists, including drinking and driving. This study revealed that 62.5% of the participants had a single accident, 37.5% had multiple accident history, and clearly showed that motorbike accidents is common among riders all over the world. But, as this study is conducted in a rural setting in Nigeria, the results cannot be totally applicable to Mongolia. Rural settings in the two countries are totally different, also only rural villages' motorcyclists were involved in this study, not nomadic herders.

The researcher found no study relating to the motorcyclist herders' road and traffic accident risks. There was no study found about the road and traffic accident risks among motorcyclist herders in the

same nomadic nations in Central Asia, such as Kazakhstan and Kyrgyzstan. There is a big gap in the literature that needs to be filled regarding road and traffic risks and other risk factors for unsafe driving of the herding population, especially nomads in Mongolia. Motorbikes are not used only for commuting in Mongolia. Therefore, the future studies should take a holistic approach, not only focusing on commuting and transportation, but also other aspects, including livelihood, education, income, and access. The study aims to detect existing risks and causes of road and traffic accidents among herding population.

The National Road Safety Strategy 2011–2020 (based on 4S elements) (Australian Transport Council, 2019) set its ambitious vision:

> "The National Road Safety Strategy 2011–2020 aims to elevate Australia's road safety ambitions through this decade and beyond. It is firmly based on Safe System principles and is framed by the guiding vision that no person should be killed or seriously injured on Australia's roads. As a step towards this long-term vision, the strategy presents a 10-year plan to reduce the annual numbers of both deaths and serious injuries on Australian roads by at least 30 per cent. The casualty reduction targets for 2020 are ambitious, but achievable. However, the level of trauma reduction that can actually be achieved by 2020 will depend on the costs and policy changes that the community is prepared to accept in return for a safer road transport system.
>
> The strategy sets out a range of high-level interventions to drive national road safety performance to the end of 2020. These focus on the main areas where there is evidence that sustained, coordinated effort can lead to large gains. There is also a focus on measures which may not see results for some time but which will lead to long-term improvement.
>
> The National Road Safety Strategy represents the commitment of federal, state and territory governments to an agreed set of national road safety goals, objectives and action priorities. It is supported by a comprehensive performance monitoring and reporting regime. However, the strategy is not an implementation plan. The detailed planning required to give effect to the strategy, including funding, legislative and administrative arrangements, requires ongoing work by

all governments and their respective transport agencies. Further, the mix of measures adopted in individual jurisdictions, and the details of specific actions, may vary to reflect local conditions and priorities".

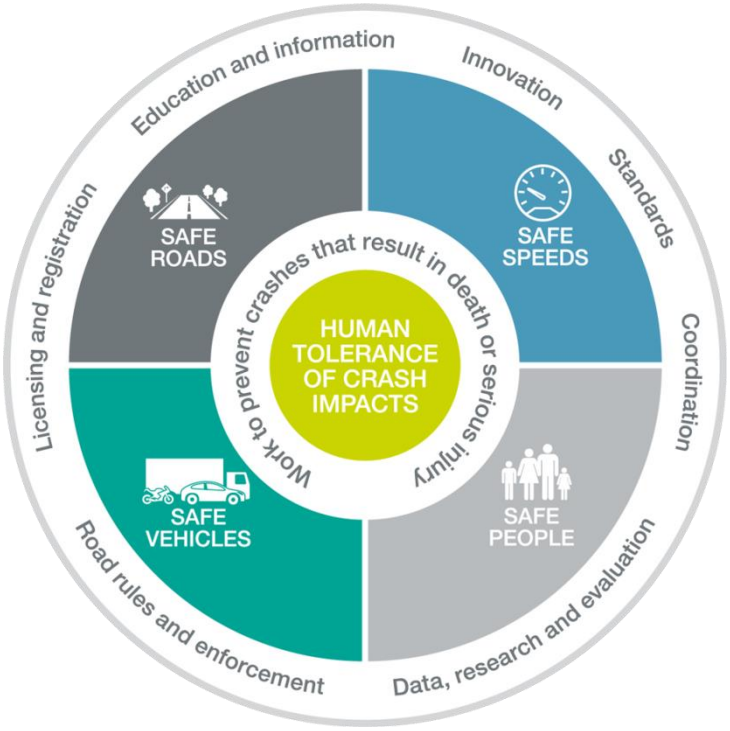


Diagram 2. Safe system diagram adapted from Safer Roads, Safer Queensland: Queensland's Road Safety Strategy

Source: https://www.tmr.qld.gov.au/Safety/Road-safety/Strategy-and-action-plans.aspx

Accessed May 24, 2019

The development of the road safety system in Australia explained some of the details required to create safe roads for motorcycles, as well as cars" (Main roads Western Australia, 2018).

> "Studies have shown the safety of motorcyclists are compromised to a large extent by the design and operation of the road system, especially as motorcyclists differ in their use of the road compared with drivers of other motor vehicles. As an example, maneuvering a motorcycle in curves requires a motorcyclist taking a different line than drivers, and the motorcycle is

steered and balanced as a result of a complex interaction of forces rarely incorporated into the road design.

Factors identified in contributing to the majority of motorcycle crash injuries include:

- Inconspicuousness of motorcyclists at intersections and roundabouts, and
- Single-vehicle run off road crashes into roadside furniture, trees and obstacles.

Mitigation of these trends requires emphasizing the need to improve intersection design and for roadside treatments on road lengths where there is a high proportion of run-off-road crashes."

Summary

As noted, despite the extensive literature on road traffic safety, no studies have examined the road traffic behavior of the nomadic herding population of Mongolia. The high incidence of traffic-related deaths, combined with the transition from use of horses to motorbikes, make the study presented here a valuable contribution to understanding the characteristics and factors explaining motorbike safety practices among Mongolian herdsmen.

CHAPTER 3: RESEARCH METHODS

This chapter will present the aims of this research and the methodological approach adopted. It will introduce the sample that was selected and will set out the method used for data collection, along with the process of data analysis. Finally, it will discuss topical ethical issues and limitations associated with this study.

3.1 Research questions and Hypotheses

The assumption underlying this study is that nomadic herders in Mongolia are changing from using horses for work and personal life to using motorbikes. The research objective of the study is to understand and analyze the Mongolian nomadic knowledge and attitudes about traffic culture and its health risk dimensions. The study applies Safe System principles, based on 4S elements: safe people, safe vehicle, safe road and safe speed.

The study intends to discover an individual's personal experience of road and traffic accident and to identify other traffic related health risks among herders who use two-wheeled motorbikes.

The primary research questions are:

1. Do Mongolian herders prefer to use motorbikes for their work and personal life rather than horses? If Yes, Why? If No, Why?

2. Do Mongolian herders who use motorbikes for work or personal life engage in safe traffic practices, as expressed in the 4S model?

The related hypotheses that predict the expected direction of the study findings are:

Hypothesis #1: Contemporary Mongolian herders prefer to use motorbikes for work and personal life rather than horses.

Hypothesis #2: Contemporary Mongolian herders who use motorbikes for work and personal life do not engage in safe traffic behaviors.

3.2 Methods and Study Design

This qualitative research is interactive and iterative, analysis has been conducted after each interview, and this means we have information that allows us to know when to stop. The in-depth interviews were informal and open-ended, and carried out in a conversational style. The interviews were flexible and iterative, that is, data collection and research questions were adjusted according to what was learned during the interview. There were unanticipated responses from participants by the researcher, which were not in the hypotheses. Therefore, questions that were not planned at the initial stage were asked to obtain a deeper understanding of the issue. Some responses were rich and explanatory in nature.

This is a qualitative study based on interviews with herders who use motorbikes for their everyday lives, who traditionally used horses for the same purposes. The study applies qualitative methods as they can reveal new information, uncover dimensions such as culture, values, opinion, behaviors, and social context of herders, and provide insight into complex relations. This information will be critical to understand what type of road and traffic accident risks they are experiencing, why these exist, and what are the driving factors are. The interviews were conducted during January 2019 at Bulgan and Dundgobi provinces.

3.3 Sampling strategy

Purposive sampling has been used for sampling for this study. Purposive sampling is one of the most common sampling strategies, whereby participants are selected according to predetermined criteria relevant to a particular research question. The sample size was influenced by the resources and time available, as well as the study's objectives. Also, the remoteness of Mongolian herders and weather and road conditions during winter were considered to determine the size of the sample.

3.4 Sample Characteristics and Recruitment

The target population was male herders who have two-wheeled motorized motorbikes and utilize their motorbike in their everyday lives.

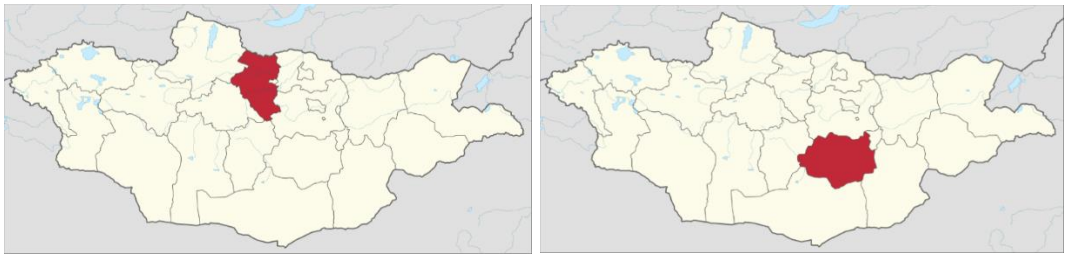
Two age groups were interviewed:

1. 18-34 year old males
2. 35-54 year old males

Age groups have been formed on the basis of data from the Traffic Police Office of Mongolia. According to reports from the Traffic Police Office of Mongolia, 69% of road and traffic accident victims are from these two age and gender groups (respectively 33.5% for 18-34, 35.3% for 35-54) (Traffic Police Office of Mongolia, 2018). These data clearly show that these two groups are more susceptible to road and traffic accidents and having higher risks than women, children or men of older ages.

The two provinces have been selected for interviews, because of their diversities on climate, geography and animal husbandry practices. Selecting two different provinces in two different regions in the country was supportive to get a result that can be applied to overall Mongolia.

Bulgan province is located in the northern part of Mongolia. Bulgan province borders with Russian Federation in the north. The northern region of the province is mountainous covered by pine and birch forests, and the southern part of the province is steppe and grass land. The open water resource is plentiful in Bulgan, as the biggest rivers of Mongolia, for instance Orkhon, Eg, Selenge run through the provincial territory.



Picture 1 & 2. Map of Mongolia, Bulgan (a Northern region) and Dundgobi (a Central region)
Source: Wikipedia. Accessed May 24, 2019, at www.wikipedia.com/Mongolia

Dundgobi province is located in the central region of the country, but very close to the world-famous Gobi Desert. It is located 260 kilometers south of the capital Ulaanbaatar. Geographically, it is arid and semiarid land with smaller sandy steppes hills. Water resources are scarce in the province, as it has no running major rivers and fresh water lakes in its territory. Water wells are the main resource of water for people and animals in Dundgobi.

As Mongolia's herder population tends to live in remote places isolated from each other, it was appropriate to seek a convenience sample of participants for this study. Two specific provinces were targeted, where the researcher could obtain the information for two different geographic regions, which may be generalizable to overall Mongolia.

Participants were selected through local contacts who are informal community leaders with influence in their communities. Selection criteria and the overall research plan were briefly introduced to the contacts, and then they made a selection and contacted the participants. Participants were eligible if they were male, herder, own and use a motorbike, aged between 18-54 years old, and settled in places easily reachable by the researchers in the winter time. Selected participants were contacted via phone and in person for their availability for an interview. The first task was achieving informed consent. The community leaders explained the research to the people in a way they could understand. There was no formal permission required from community leaders before the interviews began.

The participants had been informed orally about the purpose of the research and what is expected of a research participant, including the amount of time likely to be required for participation. Also, the other facets were introduced, including that participation is voluntary, that one can withdraw at any time with no negative repercussions, and that confidentiality will be protected. Participants were informed about the arrangement for the interviews, and 100 % of selected participants agreed to the interviews.

3.5 Interview Questions

Data collection was conducted through 10 semi-structured interviews using open-ended and unstructured questions. Safe System principles (based on 4S elements) have been used to develop the questionnaire. Questions related to the behavior, habit, accident, knowledge and traffic rule implementation were used to reveal the risks associated with people and their culture and attitudes. Vehicle condition was revealed by the questions related to motorbike maintenance. Furthermore, questions related to the season and weather and purpose of usage were used to identify risks associated with road condition. The questions addressed directly the awareness of the safety and risks of motorbike use and related traffic issues. The questions used to guide the interviews are included as Appendix 4.

3.6 Data Collection

The researcher and interpreter travelled to the provinces and visited the selected households. Before the interview the purpose of study and the interview process was introduced to the participants, as described above. Each interview took around 45 minutes. In addition, 1-2 hours of travel time were required to reach each participant from the provincial capitals. The interviews were conducted in each participant's home, and each interview has been voice recorded. Permission for voice recording was obtained from the participants.

With open-ended questions, participants were free to respond in their own words, and these responses tended to be more complex than simply "yes" or "no." In addition, the relationship between the researcher and the participant was informal. Some participants had the opportunity to respond more elaborately and in greater detail. In turn, the researcher had the opportunity to respond immediately to what participants said by tailoring subsequent questions to the information the participant provided. Some were naturally closed and responded with a few words.

The researcher listened carefully to what participants said, engaged with them according to their individual personalities and styles, and used "probes" to encourage them to elaborate on their answers. It was important to note, however, that there is a range of flexibility among methods used in qualitative research, still maintaining the high scientific standard. Rather, the degree of flexibility indicates broad understanding of the problem that is being pursued. Recordings have been transcribed later, as a textual data. A one hour interview required approximately 6 hours of transcription. Field notes in conjunction with the interviews were also completed.

3.7 Data analysis

Qualitative content analysis focuses on the content of text and can be applied to a variety of data (Hsieh and Shannon, 2005). According to Lyberget et al. (2004) the qualitative content analysis makes a distinction between manifest, i.e., a descriptive level, and latent analysis, which means various depths of interpretation. In this study a descriptive analysis was used in order to detect, present, and eventually elaborate upon the road and traffic risks and other health risks of the herding population.

In the qualitative content analysis, the transcripts were first read several times to become familiar with the text. Once the data were transcribed, it was read, then coded, categorized, themed, then analyzed, interpreted and verified. The process of transcribing the interviews helped the researcher to understand the subject from repeatedly listening to and reading the transcribed interviews. Coding transcribed data produces codes, which are keywords that are used to categorize or organize text. This is the core essence of qualitative research (Sarantakos, 1998). The data were analyzed, categorized and organized into themes and further sub-themes through the coding process.

The interview topics were categorized into two main themes, five sub-themes reflected below. Quotes from respondents are cited and elaborated to substantiate the insight highlighted. The two main and five sub-themes identified are shown in Table 2.

Table 2. Themes and Sub-Themes Identified Through Interviews

Theme #1: Herders' transportation is in transition:

Health risks of transporting: contrasting horse and motorbike,

Differences in maintenance, worries about thieves

From fading horsemanship to licensing and registration of motorbike

Theme #2: Risk behavior of Mongolian herders, including:

Safety for police:

- Obeying traffic rules
- Helmet use

Risk for individuals and family members

- Drinking and driving
- Accidents as an evidence that things happen
- The risk of family: driving together, excessive passengers than permitted and child driving.

The next stage involved interpreting the data by identifying any reoccurring themes seeking and highlighting any similarities and differences in the data. The final stage, data verification, involves a process of checking again the transcripts and codes. (Sarantakos, 1998)

3.8 Ethical issues

The following ethical issues have been considered during the study:

Do No Harm: The researcher had a reasonable expectation of those participating in this study would not be harmed in any situation.

Privacy and Anonymity: Any individual participating in this study has a reasonable expectation that privacy would be guaranteed. Consequently, no identifying information about the individual will be revealed in writing or other communication.

Confidentiality: Any individual participating in this research study has a reasonable expectation that information provided to the researcher will be treated in a confidential manner, and any information gained will not be given to anyone else.

Informed Consent: Individuals participating in this study have a reasonable expectation that they will be informed of the type of the study and they may then choose whether or not to participate. None will not be coerced into participation.

Rapport and Friendship: By meeting in the participant's home, the researchers made sure that they provided an environment that was trustworthy. At the same time, the researcher needed to be sensitive to the power that we held over participants.

Intrusiveness: Individuals participating in this study have an expectation that the conduct of the researcher will not be excessively invasive. There was no intrusiveness during the interview, at the time and place were arranged well in advance.

Inappropriate Behavior: Individuals participating in this study have a reasonable expectation that the researcher would not engage in conduct of a personal or sexual nature.

Data Interpretation: A researcher is expected to analyze data in a way that avoids misstatements, misunderstandings, misinterpretations or false analysis (Marylin, 2013).

3.9 Limitations

The limitations of the study included the small sample size, as the researcher enrolled 10 participants, due to time pressure, winter climate condition during travel and interview period, and challenging remote access for the herding population.

The study of the totally new area challenged the researcher to do a comprehensive literature review and comparisons with other related studies. Few studies were found that would allow the researcher to compare the results of the present study to the results of relevant previous studies.

The representativeness of the results might be challenged for being maximized, as only two provinces out of 21 provinces in Mongolia were selected for the study. The researcher believes the study findings and results are applicable to the entire country. However, the study included only two different regional provinces. Livelihood, labor, income, general practices, habits and behaviors are fairly similar among herding populations throughout the country, therefore, the study results can be generalized.

It is also hoped that the limitations of researcher bias were kept to a minimum in terms of its effect on respondents' answers.

CHAPTER 4: FINDINGS

This chapter will address the two primary research questions stated in 3.1 and present the Findings, which arose out of the interview process and subsequent thematic analysis. The interview topics were categorized into two main themes, which align with the primary research questions, and five sub-themes. Quotes from respondents are cited and elaborated to substantiate the insight highlighted. The applicability of the 4S framework will be addressed in the Discussion.

4.1 Herders' Transportation Is in Transition

Research Question #1: Do Mongolian herders prefer to use motorbikes for their work and personal life rather than horses? If Yes, Why? If No, Why?

Responses to this question were related to the transition to herders' transportation from horses to motorbikes. The three sub-themes that emerged are presented separately.

4.1.1 Health risks of transporting: contrasting horse and motorbike

4.1.2 Differences in maintenance, worries about thieves

4.1.3 Fading horsemanship

4.1.1 Health risks of transporting: contrasting horse and motorbike

Most of the participants agreed that the motorbike is more convenient and faster than horses. The horses require much more work to be done than motorbikes. Motorbikes require fuel and maintenance, but they are is still easier than horses to use.

KI3- Motorbike is fast and easy to look after, and requires less work. It is a convenient transportation for herders.

KI9- I use motorbikes all year round 100%, for every purpose. I have no horses. But, even people who have horses use motorbikes often. I think, it does not matter if people have horses or not, they are keen to use motorbikes more than horses.

Most of the participants said that motorbikes are not reliable in winter, however, all of them use it in winter.

KI1-Motorbikes are fast, but the rider has to face the wind and cold, thus it is not good for health, especially in the lower limbs. Motorbikes have difficulties to start, when the weather is very cold, especially in the winter.

One participant from Gobi province responded that he uses motorbikes all year round. Geographical location also has an influence on the usage of motorbikes. Gobi region has a milder winter climate, therefore herders in the region are likely to ride motorbikes all year round.

KI7- The horse riding is becoming less popular. People are not using horses that much anymore. Even in winter, motorbikes are used popularly in Gobi.

One participant mentioned positive health effects of horse riding. Also, many of the participants said motorbikes are not convenient during winter, because it is too cold to ride in winter.

KI1-The horse is also good for human health, because horse riding is warmer than a motorbike riding in winter. A horse requires certain movements from the rider, which is helpful to keep warm, also horse movements and breath create a warm feeling.

Most of the participants said that motorbikes are riskier than horses. Herders are still not as totally comfortable with motorbikes as they have been with horses.

KI10- Motorbikes are riskier than horses, because this is a machinery, which has no senses horses do have.

Motorbikes are very popular in the countryside, especially among the herding population. The motorbike is used for every purpose, and being multi-functional, it is used for commuting and herding, transporting things, such as firewood and drinking water. Herders assume that the motorbike is more convenient and faster than horses, as it requires a lot less work than a horse. In contrast, horses require special care, such as hay and fodder, water, and other daily routine tasks including, catching from the herd, roping for pasture, saddling for riding, and keeping safe. Many herders avoid the time consuming tasks related to horses, and have started preferring the motorbikes over the

horses. Motorbikes are used almost all year round, especially when winter is mild. The herders think that horse riding is good for health, and motorbike is riskier than horses.

4.1.2 Differences in maintenance, worries about thieves

Only one out of the ten participants said that he has a motorbike in bad condition.

KI5-My motorbike condition is like a mess. One single fall causes a damage to light. It requires a lot of work to replace it. I have to go to the city and buy spare parts and finally replace it. I cannot do it often, then I ride a motorbike without any lights.

Not all of them have motorbikes in bad shape, as they said. Some of them can keep their motorbikes in good condition, and having all parts complete.

KI3- I need to keep my motorbike complete. Otherwise, I cannot go to the city to sell our dairy products, because of the traffic police. Selling dairy products is our main livelihood.

One participant said motorbike cables of lights and hand brakes are easily frozen and broken in extreme cold. Herders live far from cities and towns, where they cannot buy and replace spare parts.

KI6-Motorbike is riskier during winter, even rider can lose his life, if motorbike breaks down in the place, where no homes nearby. The rider has a high risk for hypothermia.

One participant said that the motorbike is sharing workloads of horses. But some other participants said there is a big side effect of this. One of the participants lost all of his horses to thieves, and now only uses a motorbike. Some of his horses were pro-actively sold by himself before theft took them. Increased utilization of the motorbikes reduced workload of horses, then horses gain more weight, which attracts more horse thieves. Weighty horses can be sold at good prices by thieves. He mentioned that he has not many worries anymore about horse thieves, because he has no horses now. Some participants sold some of their horses and purchased motorbikes.

KI5- I use only motorbikes solely for last 6 years. Since I started using motorbikes more often, my horses started gaining more weight on them. Weighty horses attract more thieves, because they can sell fat horses for a good price. Then, I lost many of my horses for thieves. I wanted to move the first

before the thieves could steal my other horses, so I sold them myself. It was actions from two sides, which are from my and thieves' sides. At last I had no horse left with me.

Keeping the horses safe from thieves requires a lot of attention from everyone. All of the participants have had experiences of loss of their horses to thieves.

KI3-Horses are risky to be stolen, when we stay nearby city in our summer place. We move to our summer place nearby city and sell our dairy products for city residents. We have to keep the horse with long roping during a night on the pasture to graze him. Now, many thieves have not much horsemanship skill for loose herds in the pasture, therefore they are more likely to target roped horses nearby family homes. Roped horses are riskier to be stolen by thieves.

Motorbikes are also at risk to be stolen. One participant said that his motorbike was stolen during the night.

KI4- Thieves stole my motorbike once, luckily thief could not start the engine and left it nearby ravine. Motorbike theft is increasing, however motorbike is not easily stolen as same as horses. No fuel is required for horses, but a lot of worries and attention required for horses.

The motorbikes require regular maintenance, spare parts and fuel. Living in the countryside in the middle of nowhere is challenging for herders to maintain their motorbikes in good condition. They have to travel to the town for a replacement, but they cannot do it often. Some herders utilize motorbikes in bad condition, without any brakes and lights. The financial capacity of the family is interlinked with maintenance of motorbikes. Wealthier families are able to replace the damaged parts fast and easily, but less well-off families are not able to do it, due to shortage of money and less access to the towns. Mongolian men have an opinion that strong and masculine men must keep their rides in good shape. This is driven by traditional sayings that "others will mock you and laugh at you, if you keep your ride badly"; "you are not a capable man, look at your horse". This sentiment was traditionally related to horses, first among army men during the invasion to the other countries, lately among herding men. Nowadays, this thinking has been shifted to the motorbikes, as their main ride is the motorbike. For this reason, only one participant might admit that he had a motorbike in a bad condition.

Participants had experiences of loss of their horses from thieves in the past. Horse theft is a popular and a worrisome issue among the herding population, especially among those who reside nearby villages and cities. Therefore, herders prefer motorbikes over the horses, and try to eliminate their worries about horse thieves.

4.1.3 Fading horsemanship

Herders have some type of remorse for losing their horsemanship skills and long thrived traditions by decreased horse utilization. All of the participants showed signs of sadness about this.

KI1-Now, someone who is riding horses looks nicer and respected by people. But, now motorbikes and cars are always used. Horses are not much needed anymore. The horsemanship was a big thing in Mongolia. Now sadly, this tradition is being lost.

Most of the respondents agreed and said Mongolian horse culture is shrinking year by year, and it is a huge loss for Mongolian tradition and horsemanship culture. The majority of children and teenagers are not engaged with horses like they used to be.

KI1-Mongolian herders have had a pride of riding our horses and herding animals with good horses. Sadly, nowadays children are not able to learn how to ride horses. We used to learn riding horses from a very young age, it is over now. Children are becoming more familiar with motorbikes from a very early age and start riding motorbikes. Horses are used for meat, milk and some for horse races, not that much for transportation anymore.

One participant responded he uses horses more often than others. He is a well-known trainer for horse racing and has many horses. Having many horses and training horses for races requires usage of horses on a regular basis. Also, he tries to keep horsemanship skills and culture more than others.

KI2- I mostly use horses for herding all year around. I also train racing horses, and milk our mares during summer time. I only use motorbikes for urgent matters, for example call the ambulance, go to the hospital.

Only one participant was not sad about this transition.

KI9- I do not see any different preferences from people on horse and motorbike riders. Anyway, many herders are using motorbikes.

Horsemanship skill is fading away year by year, as the transportation transition is taking place among herders. It is greatly influenced by the increased motorbike usage among the herding population. Usage of the motorbikes is getting popular; motorbikes are replacing horses rapidly. As observed, there are other reasons apart from the motorbikes for decreased utilization of horses. Popular advanced technologies, including solar panel, television set in the ger, mobile phone, and Internet are as well decreasing their time to improve their horsemanship skills. Gaining a horsemanship skill is a long and time-consuming process, today not many herders allocate the time for this. Only a five minutes' mobile phone call can save a whole day's journey on horseback to make a contact with others. Less engagement with horses causes less horsemanship skills. Also, in the recent years, traditional horse racing has been restricted by the government due to child jokey safety and child labor and children's right concerns. Mongolian children usually aged 6-15 ride race horses and take part of the long distance race in the open pasture. They started possessing the horsemanship skills from the very young age. This tradition is being lost rapidly, due to the many causes. Generally, the herders are sad about fading horsemanship skills and lost tradition.

4.2 Risk Behavior of Mongolian Herders

Research Question #2: Do Mongolian herders who use motorbikes for work or personal life engage in safe traffic practices, as expressed in the 4S model?

This question incorporates the facets of the 4S model. Consistent with thematic analysis, two sub-themes, each having sub-components, emerged from the interviews. The data will be presented here according to the sub-themes, then related to the 4S framework in the Discussion section. The two sub-themes are:

4.2.1 Safety in response to police and government regulations:

- Licensing
- Registration
- Helmet use

4.2.2 Risk for individuals and family members

- Drinking and driving
- Accidents as evidence
- Driving together, excessive passengers than permitted
- Child driving

4.2.1 Safety in response police and government regulations

Licensing

Nine out of ten participants have a driver's license for a motorbike. But, the story of obtaining a driver's license differs greatly. Most of the respondents had a proper driver's training and obtained the license. Many herders have cars nowadays, as well as motorbikes. They have had driving courses to get a driver's license for cars. Motorbike driver's license, which is called type A license, is combined with car driver's license type B. Herders take cars more seriously than motorbikes and are keen to get B type license. A license is a complementary part of their needs.

KI1- I have a driver's license. Type A license is required for motorbike. I had a 45 days of driving course. Motorbike driver's license is combined with the car driver's license. It was easy for me to get a motorbike driver's license through the car driving course.

Two out of nine participants who have driver's license had no training and bought the licenses. A participant responded that he purchased a motorbike driver's license from the traffic police, without any training. The traffic police forced them to purchase it.

KI4- I have a driver's license. I paid 120.000 MNT to the traffic police. My motorbike was suspended in the traffic police's disciplinary fencing, due to no registration. Buying a license from the traffic police was obligatory for everyone who their motorbikes were suspended that day. Therefore, I had to pay money and got a license. There were no training and instruction. I thought that the traffic police needed an urgent money.

One participant said that he voluntarily purchased a driver's license from local authorities, without any training.

KI9- I have a license for motorbike. I did not have a driving course, just simply purchased a license with the price of 80.000 MNT from local authorities.

Only one respondent had no driver's license. He did not explain why he has no license.
The herders tend to have drivers' licenses for motorbikes. Some had proper training, some did not have and purchased the license without any driving training. The traffic police inspect and check their licenses often, therefore herders have to have the drivers' license. At the same time, the traffic police can force herders to purchase the license without any training.

Registration

Motorbike registration among participants has a different profile than licensing. Six of them registered their motorbikes, and four of them had not registered. The registration of a motorbike is mainly driven by the pressures from the traffic police.

KI3- My motorbike has a registry. We live near to the city and travel a lot there. I need to have a registration for my motorbike, otherwise the traffic police in the city will penalize me, whenever they inspect me.

There are different stories given regarding the reason for having no registration.
Cheaper motorbikes on the market do not have customs documents with them. Customs documents are required by local authorities for the registration of new motorbikes.

KI1- I have no registration for my current motorbike. My previous motorbike had a customs document, when I purchased, therefore I could register it. But I bought a new motorbike without customs document, then I could not register it.

Motorbike life span is not very long. The average life span of a Chinese made motorbike is two years. But it depends on the workload of the motorbike, and the owner's care. Some last longer than two years, but some last less than one year. It differs, because of the various frequencies of utilization, distance travelled, and care and maintenance by the owner. The elimination has to be done for old motorbikes not in use anymore. Without the elimination document for the previously owned motorbike, a herder cannot register the newly purchased motorbike. The elimination is done in the capital and provincial centers, so sometimes herders are not able to travel there to do this.

KI4- My current motorbike has no registration. Chinese made motorbike has a short life span, approximately 2 years. The elimination by authorities has to be done for old motorbikes which are not used anymore. Elimination is time consuming and bureaucratic procedure, as it is only done in Ulaanbaatar, capital city or in provincial center. I could not go there and get an elimination document. New motorbike cannot be registered without an elimination document for previous one. Also, without elimination I am still paying taxes for my old one every year, not for my new one.

One participant shared a bit different story for having no registration.

KI5- My motorbike has no registry. Registration lasts one year. It is better not to have it. I am managing without registration. Metal cover for motorbike gear breaks down easily, when it is hit by a stone. It is so fragile. There is a number on the original gear cover, which is important for registration. When we replace the original, but damaged cover, this number has to be changed, because it has to be replaced by new cover. The authorities do not allow changes in the cover number and don't register the (don't extend the registration, I mean) motorbikes, if cover number is changed. Even they suspect the owner for stealing of someone's motorbike. It is stressful, so I don't like to go there for annual registration. Anyway, they don't register my motorbike, due to number change on the gear cover.

One participant said that he had never registered his motorbikes. He sees the motorbike registry as not important in the countryside. People buy motorbikes just like horses and use it without any documentation.

KI6- I have never registered my motorbike. Herders here, mostly don't register their motorbikes. I just started using my motorbike for herding, right after I purchased it, without any registration. We can go the village center and purchase motorbike same as a horse. Some motorbikes came to market without custom paper. Without custom paper, motorbike can't be registered. It is one of the reasons for lack of registration.

A bureaucratic system exists for the registration of the motorbikes of the herders, including customs document, elimination, and number of the original gear. The authorities do not register motorbikes without customs documents. Some herders prefer cheaper prices in the first place than registry and are keen to purchase cheaper motorbikes without any customs documents. Motorbikes without

customs documents are approximately 300.000 MNT cheaper than motorbikes with customs documents. The financial ability of the herder is linked to the motorbike registration. Motorbikes with customs documents are made in state-accredited factories in China and are a bit more expensive than motorbikes made in private factories.

Helmet Use

Generally, the usage of helmet is not a common practice among herders.

KI2- Yes. I use the helmet, but only when I go to the city.

One participant responded that wearing a helmet is not a masculine practice in the countryside.

KI3- I use helmet in the city to be seen as I follow the traffic rules. I would be mocked by other fellow herders, if I use helmet in the countryside, while herding. People would laugh at me. When I use a helmet and riding motorbikes, people do ask, hey are you going to the city? It is very standard assumption here. People think helmet must be used only, when you go the city and to show for the traffic police. It is a good indicator, which that person is going to the city. He cares about his life too much, he is coward- kind of attitude to be seen from others, when you use a helmet in the countryside. Also, using a helmet is not our common practice.

All of the participants think the helmet is only something to show to the traffic police when they go to the town. They said that they wear helmets when they travel to the town. Nobody mentioned about its benefits for their safety during the interview. But, the benefits of wearing a helmet for not getting fined by the traffic police were mentioned. They use helmets when they travel to the town, and do not use it in their neighborhood or pasture.

4.2.2 Risk for individuals and family members

Drinking and driving

Seven out of ten participants agreed that they drive a motorbike after they have alcoholic drinks. Only three of them responded that they do not drink and drive. They all agreed that they do not drink

when they visit town, or they can be caught by traffic police and have to pay a large fine. All responded that this does not apply in the countryside.

KI3- Yes, I drink and drive in my neighborhood within approximately 5 km. Because there is no traffic police around here. I do not drink and drive in the city. I can be fined for 1 million MNT by traffic police for drunk driving, if I get caught. Then, I will not be able to go to the city to sell dairy products. It is going to be bad for our livelihood.

The main driving forces not to drink and drive in the town are a considerable fine by the traffic police and loss of income related to restricted transportation of animal products to the local markets. Their own safety was mentioned a little by some participants, not by all.

Accidents as evidence

Half of the participants responded that they had accidents on motorbikes. Some had multiple accidents and serious injuries. Injury stories told by participants who had accidents had different causes and circumstances, including windy and cold weather and sandy and icy, slippery road condition, work with horses, and old tires. The most injuries that participants experienced were to the skull, face and upper limbs, including arms and collarbones.

KI1- I had a skull injury. I was hit by wind during the very windy spring and fell down. I was hospitalized for my injury.

KI2- I injured my arm and collarbone once. I was chasing horses and fell down. I was going so fast and turned over suddenly and injured myself.

KI5- I had a fall, due to a flat tire. I had no serious injury, only tore off my facial skin.

KI7- Yes. I have a minor injury in 2013 during the winter a few years back. I was slipped over on the icy road. The motorbike was badly damaged. I had a soft tissue injury in my cheek and arm. I went to the hospital and had a checkup. Luckily, I was not injured that badly.

KI10- Yes. I injured my collarbone in two places 2 years ago. I slipped over on the sandy road and fell from my motorbike.

Half of the participants responded that they did not have any accidents themselves, but they know and experienced many motorbike accidents for relatives, friends, and neighbors. One participant responded that a key to being safe on the motorbike is to be careful and drive sensibly. One responded he had been riding motorbikes for last 20 years, but he had no serious injury. From this question, participants only shared their experiences with serious injuries, therefore, minor injuries and accidents were not likely mentioned to the researcher. Also, participants may have intended to only show and share their best skills for riding motorbikes to the researcher. Mongolian men have a common attitude not to share any bad experiences with others. This type of thinking could have been present during the interview.

KI3- I have no injuries yet. Be careful and be sensible. Then it is going to be ok. Chinese made and imported motorbikes are in bad quality. I have seen a serious motorbike accident in the city, luckily owner was not badly injured.

The herders know and feel that motorbikes are riskier than horses, and the majority of them had had an accident and had serious or minor injuries.

Driving together, excessive passengers than permitted

Eight participants out of ten responded they carry more than two people on their motorbikes. Only one extra passenger is allowed, apart from the driver for motorbikes, according to traffic rule, but herders are not likely following this rule. As same as other aspects mentioned above, a motorbike carrying more than two people happens mostly in the countryside, and in nearby neighborhoods. They all know and responded that carrying more than two people is a breach of the traffic rule, therefore, they can be fined by the traffic police. They think that they will be fined, if they travel with excessive passengers in the city. But, again, they have no certain awareness of their own risks and safety. It is all about to show the traffic police and avoid the fine.

KI5-I have three children. Five of us travel on my motorbike together.

Participants who said they do not carry more than two people are the oldest participants, whose children are already grown up and live on their own. Younger herders have greater needs to allow

more passengers, mostly children, than the permitted amount. Nonetheless, it is still a subjective issue, as many older herders look after their grandchildren and live with them. They also have the same needs as the younger herders, as they have to carry their grandchildren with them.

Child driving

Many of participants replied that their wives and children ride their motorbikes within neighborhood travels and for herding. All family members likely share a motorbike and ride it turn. The approved age of driving is 18 in Mongolia, but certainly it is not being followed in the countryside by the herders.

KI5- All my family members can ride a motorbike, even my 9 year old son rides my motorbike. His legs are however short, but reachable to the brakes and gear, which means he can ride it. But someone has to help him, when he comes to the ger, because his legs are too short to support himself on the motorbike and stand alone. My wife also rides my motorbike. Motorbike is a transportation for everyone.

The teaching of horsemanship skills to children has shifted to motorbikes. Young herder boys are engaged with motorbikes from a very young age.

Summary

The purpose of this chapter was to highlight the findings, which emerged from the interviews that were carried out. From the findings, it is apparent that transportation transition from horses to motorbikes has increased herders' road and traffic accident risks greatly. As the narratives have detailed, herders are having higher risks by possessing less knowledge and implementation of traffic rules; deficient maintenance of motorbikes; drinking and driving; driving with excessive passengers; driving on icy and snowy, slippery terrain; driving during winter; allowing child driving; and no helmet usage in the countryside. Also, herders think that traffic rules must be obeyed only in the town, such as that the helmet must be used only when they go to the town. The main motive to follow the traffic rules is avoidance of the fines from the traffic police. Their own safety was not deemed of much importance. Motorbike riding resembles that of a horse ride in the countryside, through

pastures and herder's neighborhoods, without any traffic rules followed. Herders who travel to town and provincial centers more often are more likely to have a bit better familiarity and awareness than others and cited more rules, including, safe crossing of four road junctions and complete repair of motorbikes, especially brakes and lights. But these were still very general and modest responses. Even herders who have a driver's license and drive a car could not mention more rules than others. In summary, almost all of the participants think traffic rules must be followed only in the towns and villages, where traffic police work and check drivers. One's own safety in the countryside is not a big concern for them.

CHAPTER 5: DISCUSSION

This section first examines the Findings in relationship to the primary research questions and the hypotheses predicting the direction of the Findings. The Findings section presented the results according to the themes that arose from thematic analysis. This section applies to the National Road Safety framework and re-states the findings according to the 4S categories of Safe Vehicles, Safe Roads, Safe Speed, and Safe People. Use of the 4S framework provides a systematic way of exploring evidence-based interventions to improve traffic safety and reduce health risks. Chapter 6, which follows, combines the findings with the 4S model to offer recommendations for policy and practice.

5.1 Research Questions and Hypotheses

Research Question #1: Do contemporary Mongolian nomadic herders prefer to use motorbikes or horses for work and personal life? Why?

The hypothesis associated with this research question was:
Contemporary Mongolian nomadic herders prefer to use motorbikes more than horses for work and personal life.

The Findings support the hypothesis. All 10 herders definitely prefer to use motorbikes than horses. The participants described the pros and cons of horses and motorbikes. They expressed sadness that horses and horsemanship, which had long been part of the Mongolian tradition, were no longer as important. Overall, the herders found more advantages than disadvantages to motorbikes. Thus, the trend for the herding population to use motorbikes rather than horses is likely to continue.

Research Question #2: Do Mongolian herders who use motorbikes for work or personal life engage in safe traffic practices, as expressed in the 4S model?

The hypothesis associated with this question was:

Hypothesis #2: Contemporary Mongolian herders who use motorbikes for work and personal life do not engage in safe traffic behaviors.

The Findings partially support this hypothesis as well. The application of the 4S model is explored in detail below. Overall, the respondents showed awareness of some safe traffic behaviors, but the majority did not practice safe traffic behaviors except under the threat of police fines. Police inspection and fines occurred primarily in towns. Safe traffic behaviors were reported less in the country than when going into town, both for fear of being fined by the police and because of the perception that adhering to traffic rules is not necessary in the countryside. Herders who went into town less frequently were more likely to engage in risky behaviors than those who visited town often. Financial status had a bearing on knowledge about and practice of safe traffic behaviors.

5.2 Application of 4S Road Safety Framework

The National Road Safety Framework, also known as 4S, was developed in Australia to guide traffic safety programs. The 4S framework is a useful tool for analyzing traffic safety issues among Mongolian herdsmen, as it offers a structure by which to consider policy and practice interventions. The four goals are for Safe Vehicles, Safe Roads, Safe Speeds and Safe People. Structures and processes that are used to accomplish these outcomes are also delineated. For the analysis, the Findings from the interviews, which were first presented according to themes, are reorganized to examine each of the 4S goals. The structure and process features of the model are used as guides for policies and programs that could be applied to the Mongolian herding population to improve traffic safety and reduce health risks from the increased use of motorbikes. Recommendations are presented in Chapter 6.

Note that the 4S elements do not always appear distinctly in the findings, as the risks are interlinked with many other factors. For instance, the answers to questions about the use of motorbikes during the winter condition applies to safe road and safe vehicle facets, as well as to safe people elements.

Safe Vehicle.

Of the four elements of 4S, the analysis starts with this element, as it arose in all of the 10 interviews. As explained in detail in the Findings, herders using motorbikes are likely not to report that their motorbikes are in poor condition (only 1 of 10), but this might be the respondents' perception or

cultural tendency to share only positive information. From a herder's perspective, motorbike in good condition does not mean that the motorbike has everything in perfect order and is totally reliable. It is a subjective matter, as they likely think and say that it is in good condition, when only the overall condition of the motorbike is good. Minor problems are not considered that important.

Issues with motorbike safety that were mentioned by respondents included:

- The motorbikes require regular maintenance, spare parts and fuels, all of which present problems for herders. Living in the countryside in the middle of nowhere makes it challenging for herders to maintain their motorbikes in good condition. Parts of motorbike, including lights and brakes are fragile and easily broken. But these cannot be replaced right after the damages, due to the remoteness of herders, busy daily chores for animal herding and insufficient finances. They have to travel to the town for a replacement, but they cannot do it often. Some herders thus utilize motorbikes in bad condition, without any brakes and lights. Fuel is less of a problem than maintenance. Since 2000, many fuel stations have been built-in the villages and towns in the countryside, therefore, herders have relatively easy access to fuel.
- Maintaining a motorbike in good condition is expensive. The financial capacity of the family is interlinked with maintenance of motorbikes. Wealthier families are able to replace the damaged parts fast and easily, but less well-off families are not able to do it, due to shortage of money and less access to the towns.
- There are some seasonal and weather limitations for motorbikes. Herders assume that motorbikes are not reliable in winter, however, all of them use it in winter because of its convenience and speed. A motorbike engine is not easy to start when weather is extremely cold.
- The majority of the motorbikes are cheap and of poor quality. The transportation transition intensified since early 2000, when many businesses started importing brands of motorbikes from Russia, China, lately from India and Japan. Motorbikes on the Mongolian market vary in quality and values. The study illustrates that most herders use motorbikes imported from China, which have less quality and are also less expensive. The main motive for choosing Chinese manufactured motorbike is the cheapest price, as well as access to procure and replace spare parts. Motorbikes imported from countries other than China are expensive, and spare parts are not easy to find. Parts are also high-priced, if they able to find. The insufficient financial capacity of the herders compels them to purchase lower quality motorbikes.

Safe Roads

Creating safe roads requires actions on multiple dimensions, including physical road condition, regulations, and legal enforcement. The safety of the roads used by Mongolian herders is challenged by all these factors.

- Herders do not follow roads; they follow their animals. There are no certain roads in the pasture; some terrain is rough for motorbikes.
- Seasonal weather is a problem, particularly in the northern parts of the country. From March until late October are the months which are feasible for motorbike riding. Herders assume that motorbikes are not reliable in winter, however, all of them use their motorbikes in winter anyway because of the convenience. A motorbike is much riskier to ride on the slippery, icy and snowy roads during winter. Old tires add to the problem.
- Vehicle registration is required but fraught with problems. Many herders lack knowledge about the registration of motorbikes. Only six of the ten participants in the study had registered their motorbikes. As explained in the Findings, the bureaucratic procedure of registration requires a lot of money and time. The financial ability of the herder is interlinked with the motorbike registration. The Customs documents required for initial registration and the elimination documents for replacement motorbikes can be difficult and expensive to maintain. Particularly the herders who are poorer and do not go into the town often do not view motorbike registry as important for using a motorbike in the countryside.
- Police enforce traffic regulations, but in ways that are punitive rather than constructive. One of the external factors of the increased road and traffic accident risk is a corruption of the traffic police. The traffic police checks, driver's for having a valid license. The police can issue a driver's license and sell it to the herders without any training or courses. This practice is driven by their desire for easy money and corrupt attitude. Also, the traffic police only focuses on enforcing penalties for making money, and their support, guidance and advocacy is not enough and efficient for creating safe roads or safe behaviors.

Safe Speeds

This element of the 4S framework is somewhat less relevant to the herder population.

- The Mongolian herders are not adrenaline-seeking motorbike fans.
- Motorbikes are used not long for long distance travels, but for all daily purposes, from fetching drinking water from the water well or river, traveling to villages, searching for

horses and other animals, visiting neighbors and relatives, transporting dairy products to the market, herding animals. Speed is not as important for these tasks as careful driving.

Safe People

The Mongolian herders that were interviewed did not express concern for their own safety when riding a motorbike. The issues that came up with regard to the safety of people included:

- Licensing. Most, but not all, adult male herders have a driver's license and had a proper driver's training course. Possessing a motorbike driver's license is interlinked with the financial capacity of the herders. Those who have better financial capacity have cars, therefore, they have attended the driving courses for obtaining the car driver's license Type B, and automatically get a Type A driver's license for a motorbike. Herders who use only motorbikes are not likely to have proper training for motorbike driving. In addition to the expense, there are not many training courses for motorbike drivers in the countryside. Driver's licenses may be purchased, illegally, from the local traffic police authorities, voluntarily or forcefully without the proper and required training.
- Helmet use. Generally, the use of helmets is not a common practice of herders. Herders think that helmet is only something to show to the traffic police, when they go to the town so that they do not get fined. They do not use it in their neighborhood or pasture. Many of them think wearing a helmet is not a masculine practice in the countryside. They have a cultural mindset that the brave person should not think about the dangers and be protective of himself.
- Drinking and Driving. The drinking and driving is popular among the herding population. All of the respondents agreed that they do not drink when they visit town, or they can be caught by traffic police and have to pay a large fine. All responded that this does not apply in the countryside. Their own safety was mentioned very little.
- Children and women riding motorbikes. Participants reported during the interview that wives and women without any driver's license or knowledge of traffic rules ride motorbikes like men, especially in the countryside. Young boys used to develop their horsemanship skills from a very young age to be a real man. Instead, today they engage with motorbikes from a young age. Parents see this as a normal and safe practice and encourage them to do so. Young children who grow up seeing their parents' breach of traffic rules will likely see this as normal.
- Carrying Excess Passengers. The herders carry more than two people on their motorbikes. Only one extra passenger is allowed, apart from the driver for motorbikes, according to traffic

rule, but herders are not likely following this rule, especially in the countryside. As same as other aspects mentioned above, a motorbike is carrying more than 2 people happens mostly in the countryside. They think that they will be fined, if they travel with excessive passengers in the city. But, again, they have no certain awareness of their own risks and safety. It is all about appearance to the traffic police and avoiding the fine.

- Access to medical care. Remoteness and the environment free of traffic police give the herders the opportunity not to obey the traffic rules all the time, which reflects the free-roaming spirit of the independent Mongolian herders. However, the isolated living conditions can have negative consequences, such as delayed medical help from urban areas. As noted above, many injuries go unreported because the victims are never seen by health professionals due to their attitude of self-sufficiency and their remote locations.

Further Considerations

The study brought out additional factors about road traffic safety that require further research or policy and program actions.

- Limited data and reporting. Motorbikes are causing many accidents among herders, but only the serious injuries are likely registered in the health report. There are many unreported cases left without any registration. Half of the participants responded that they did not have any accidents for themselves, but they know and experienced many motorbike accidents for relatives, friends, and neighbors. As herders experienced, injuries caused by horse riding are milder than injuries caused by motorbikes. Motorbikes can cause serious fractures in the upper and lower limbs and skulls. From the study findings, it is clear that riders have experienced accidents, however they don't report minor accidents. A weather condition clearly makes riding a motorbike riskier than a horse. Many accidents were happening in bad weather condition. Even bad weather condition can restrict their access to have a medical assistant, further resulting in many accidents likely not reported. It is clear that there is an increase in motorbike accidents which cause more serious injuries to the herders. Additional data are needed to understand fully the extent of injuries caused by motorbikes and the nature and causes of those injuries.
- Location and financial status are interlinked with safe vehicles, safe roads, and safe road safety behaviors. Some herders live in the countryside, tend their animals, and primarily trade locally. They do not need to go into town often. They also have relatively low incomes, reflecting the limitations of their economic activity, and a low level of education, as they start herding when they are young and forego formal education. Herders who travel a lot to the

town for their economic exchanges tend to have motorbikes in good condition. The herders who trade in town tend to have a higher income. They are more likely to keep their motorbikes in good shape because of the fear of fines from the police. (Incomplete or damaged parts of a motorbike cause fines of the traffic police.) They are also more likely to have driver's licenses earned by taking a course, to have registered their vehicle, and to know the traffic laws better. Program or policy actions to reduce the risk of traffic accidents from motorbikes should be tailored to the circumstances of the herder population, as the herders are not a homogenous group.

- Cultural issues related to masculinity affect behaviors related to traffic safety. Limited reporting and failure to take precautions for traffic safety may be due to issues of masculinity. For example, a male herder who fell from a horse could think that possessing less horsemanship can impact their masculinity, especially if it was a minor accident, so would not report the accident. Among herders, showing their masculinity for their peers is one of the many factors related to not strictly obeying traffic rules, especially helmet usage. Herders have a hidden opinion that real masculine men should not strictly obey anything, any rules, or anything told to them by someone. It is a side effect of being in isolation and practicing a nomadic and independent, pastoral lifestyle. Men do not wear helmets when riding a motorbike in the countryside, as it is perceived as a weakness. They only wear helmets in the town because of the fear of a fine from the traffic police. Young boys are encouraged to become herders, whereas girls are perceived as weaker and thus sent to school. The result is that men have lower education, which in turn relates to knowledge about traffic safety rules and registrations and to other health risk behaviors. Even responding to the survey is affected by conceptions about masculinity, as respondents were not likely to share bad experiences with the researcher nor to admit that their motorbike might be in poor condition. Any efforts to reduce traffic accident risk among the nomadic herder population in Mongolia must be sensitive to the existing culture.

Summary: What we learned from this?

Mongolian herders are adopting more and more new technologies and devices for their day-to-day life. One of the prominent alterations has been occurring in their means of transportation from horses to motorbikes. The study demonstrated that the transportation transition renders an increase of road and traffic risks among herders who use two-wheeled motorbikes. In today's Mongolia, motorbikes are more popular than horses, and this tendency will continue intensively

in coming years. Road and traffic accident risks among herders are likely to escalate in a parallel lane. Sadly, safe driving practices are not likely to be heard in relation to the increasing risks, without any comprehensive strategy and procedures for herders to follow. Herders do not have enough knowledge about their own and passenger safety when motorbike driving.

Obeyed traffic rules by the herders, such as helmet usage and possessing a motorbike in reliable condition, are mostly driven by avoidance of penalties by the traffic police. Their own and passengers' safety is not taken into account strongly. Most herders have lower education levels, therefore, they tend to have lower learning skills of the traffic rules, although some of them have had a driver's training course. Only a certain number of rules are being obeyed in reality, not all traffic rules. Also, herders use their natural senses for safe driving and getting out of any dangerous situation, the same as when they ride their horses. But, still they must be part of the society and social network. Certainly, herders fail to be responsible for their safety and that of others.

The study demonstrates not only the driver is having high risk; the family members are also at an elevated risk. Child driving and allowing an excessive number of passengers are getting more popular, thus their risks of road and traffic accident are soaring. Children used to help their parents for herding on the noble horseback, nowadays this valuable tradition has been altered as their means of transportation have changed.

Now motorbikes are replacing the horses and do things horses used to do. It is a massive transition and change, but sadly, riders do not change themselves much and are not even able to see this change. Motorbikes are being treated like horses, however these have totally different degree of risks. Herders enjoy the speed and convenience of motorbikes, but they are not truly aware of the price they must pay for this more comfortable lifestyle.

This chapter offered an interpretation of the findings within the 4S framework. The level of the four main safe elements among herders is low, as the researcher's hypothesis predicted, and the herding population has an enormous risk for the road accidents. The themes that arose from a thematic analysis of the open-ended interview questions fit surprisingly well with the four main ideas represented by the 4S framework, thereby reinforcing the appropriateness of the framework for traffic safety issues. Use of the 4S framework facilitates identifying evidence-based practices

and policies to ameliorate the health risks from traffic accidents. Specific Recommendations are presented in Chapter 6.

CHAPTER 6: RECOMMENDATIONS

Safe systems approach of road safety, 4S is applicable for Mongolia and herders, but certain types of Nomadic adjustments will be required to the Mongolian herder context. Adopting a foreign policy and strategy blindly into Mongolian soil does not function efficiently in the pastures. Global basic and universal elements for reducing road and traffic accidents must be in place for sure, but these should include distinct actions developed specifically for herders. Most of the traffic injuries and fatalities can be prevented, if actions are taken correctly and efficiently. The Government of Mongolia ought to take action to address herders' road safety in a holistic manner. This requires involvement from multiple sectors such as transport, police, health, education, agriculture. Whoever is engaged more with herders can be included in the action. Herders themselves should be involved. Theirs is an absolute unique situation and style of life, therefore any actions taken to reduce their road and traffic risks must be considered and developed on the basis of their atypical needs and risks. In the Mongolian context, enforcing laws relating to key risks, and raising public awareness among herders are the potential prevention actions to decrease traffic-related accidents and health risks from motorbike use.

The safe systems (4S) approach is recommendable for a systematic and holistic way of the road and traffic accident prevention. As reported in Chapter 2, a successful the safe system approach is developed through:

Developing road rules and enforcement strategies to encourage compliance and manage non-compliance with the road rules. Herders definitely ignore the laws and regulations, and the police to not enforce the laws. Mongolia should work with its police to ensure that all road safety laws are enforced consistently and through legal means.

Managing access to the road through licensing drivers and riders and registering vehicles. Mongolia should set and enforce firm laws pertaining to driver's licenses to individuals and registration of vehicles. The police departments and department of motor vehicles should be engaged, and their performance monitored.

Using data, research and evaluation to understand crashes and risks. Mongolia should work with police, hospitals, clinics, motorbike repair shops, and communities to improve reporting about accidents so that data can be used to improve road safety.

Providing education and information. Education may be the single most important and cost-effective action that can be taken immediately to decrease risks and improve the safety of the herder population. Women, children, and men of all ages should receive information and be encouraged to participate in education about road traffic safety. Many exemplary programs have demonstrated the benefits of education, and educational programs are available at no cost that could be adapted for the herder population. The federal government, local governments, schools, healthcare organizations, and NGO could all participate in spearheading educational efforts.

Developing standards for safe vehicles, roads, and equipment. Although the economic realities of importing cheap motorbikes from China cannot be ignored, the Mongolian government and local communities should do what they can to promote importing better quality vehicles, requiring that imports have customs documents for registration, and encouraging higher quality motorbike companies to enter the Mongolian market. The study of the quality and safety of imported motorbikes on the market should be conducted.

Good management and coordination. As noted earlier, creating a safe road system requires a multi-faceted approach by many units of government, local communities, educators, healthcare organizations, and herders themselves. Once Mongolia recognizes the high cost of road traffic risks to its people and its economy, a coordinated nationwide campaign, involving private enterprise as well as government, could be launched to achieve safer traffic conditions. This would be a comprehensive, multi-year approach.

Overall, use of motorbikes by the herder population in Mongolia will likely increase. The upward trend of accidents will accompany the upward trend of use. Comprehensive action, based on well-established experiences of other countries, is imperative to protect the Mongolian herders, their families, and the total population of the country.

The risky driving behavior of herders should to be studied further, and evidence-based policies and practices implemented in response to the particular needs of the Mongolian herding population.

CHAPTER 7. CONCLUSION

The study revealed the road and traffic related health and accident risks and risk factors in Mongolia. This type of study focused on the risks among motorbike user herders has not been conducted before in Mongolia. Everyone in Mongolia has a rough hypothesis and understanding that herders on motorbikes are having a high risk of road and traffic accident risks, as many fatalities and injuries caused by motorbike are reported randomly on the news. This study can inform readers to have a snapshot understanding of road and traffic accident risks possessed by the modern herders, as well as suggest strategies to be implemented from the national level down to the local level to improve road safety and reduce traffic risks and accidents among Mongolian herders.

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APPENDIX 1

World Health Organization's (WHO) approach to addressing road safety.

WHO, Statement on Road Safety. Accessed May 21, 2019, at www.who.org/

In making recommendations to countries around the world on addressing road safety, WHO focuses on five risk factors and two additional areas of concern for road traffic injuries and deaths. For long-term improvements, WHO advises a comprehensive approach involving multiple sectors and taking into account vehicles, road users and the road environment. In the short term, some results can be achieved through cost-effective interventions such as comprehensive road safety legislation, law enforcement and awareness-raising campaigns.

Speed. In high-income countries, speed contributes to about 30% of road deaths, while in some low- and middle-income countries speed is the main factor in about half of road deaths. A safe distance for braking is proportional to a vehicle's speed. For example, a car travelling at 50 km/h takes 28 m to stop, whereas a vehicle driven at 90 km/h takes 70 m to stop. Determining a "safe speed" involves consideration of a number of factors, such as the type and function of the road, the kinds of collisions and the traffic mix.

Drink driving. 135 of the world's countries use random breath testing to enforce their drink-driving laws. Drinking and driving, especially with a blood alcohol concentration (BAC) level of over 0.05 g/dl (grams per deciliter), greatly increases the risk of a crash and the possibility that it will result in death or serious injury. Young people are at greater risk of alcohol-related road crashes. The number of crashes involving young people can be reduced by as much as 24% by laws that establish a lower blood alcohol concentration (around 0.02 g/dl) for young or novice drivers. Law enforcement through random breath-testing checkpoints is highly cost–effective and can reduce alcohol-related crashes by approximately 20%.

Helmet. 155 countries have comprehensive motorcycle helmet laws which cover drivers and passengers, on all roads. 98 countries apply a national or international motorcycle helmet standard. Wearing a standard motorcycle helmet correctly, can reduce the risk of death by almost 40% and the risk of severe injury by over 70%. When motorcycle helmet laws are enforced, helmet-wearing rates can increase to over 90%. Requiring helmets to meet recognized safety standards, to be in good

condition and to be properly worn, e.g. did not crack and properly fastened, can significantly reduce head injuries.

Seat belt. 111 countries have comprehensive seat belt laws covering all car occupants
Wearing a seat belt can reduce fatalities among front-seat passengers by up to 50% and among rear-seat car passengers by up to 75%. Public awareness campaigns, mandatory seat belt laws and their enforcement have been highly effective in increasing the rates of seat belt wearing.

Child restraints. Child restraint systems, such as child seats for infants and booster seats for older children, decrease the risk of death in a crash by about 70% for infants and up to 80% for small children. Mandatory child restraint laws and enforcement are effective in increasing the use of child restraints. In order to be effective, child restraint systems must meet standards, be appropriate to the age and size of the child and installed correctly.

APPENDIX 2

Interview Questions

The following was used to guide the interview. Open-ended responses were sought, and the subsequent interview questions adapted according to the participant's response.

Have you been using horses and motorbikes for the same purpose?

IF NOT (question 1)

IF YES (open-ended)

How does it work for this purpose? (Open ended)

1. What is the difference for using horses and motorbike?
2. Is your motorbike registered?
3. Do you have a motorcycle rider's license for using motorbike?
4. Do you know basic traffic rules?
5. Is your motorbike in good condition, including lights and brakes?
6. Do you use helmets always when you ride your motorbike?
7. Do you ride your motorbike when you have a drink?
8. Do you use your motorbike in winter?
9. Do you use it to carry your family members?
10. What do you think about accident risks related to horse with one hand and motorbike on the other?
11. What kind of purpose you use motorbike?
12. Would you like to tell about the most dangerous situation that happened to you or your friends on a motorbike?

APPENDIX 3

National Road Safety (Australia 2011)
Source: (Main roads Western Australia, Safe systems, 2018)
Accessed 24th May, 2019
https://www.mainroads.wa.gov.au/OurRoads/RoadSafety/Pages/SafeSystems.aspx

Safer roads
According to a safe systems approach, roads are designed to reduce the risk of crashes occurring, and the severity of injuries if a crash does occur. Safety features are incorporated into the road design from the outset, for example:

Segregating road users: One of the key dangers on our roads is that different types of road user share the same space. As far as possible, a safe systems approach seeks to segregate different road users, developing and enhancing safer routes for vulnerable users.

Segregating traffic: It is also desirable to segregate traffic that is moving in different directions or at different speeds – for example, by crash barriers separating opposite lanes of traffic. Crash barriers and other physical measures should be "soft" and give in the event of a crash, and verges made safer.

Speed: If segregation of people and traffic is not possible, then appropriate speed limits are put in place to protect the most vulnerable of road users.

Self-explaining roads: Safe system's roads are "self-explaining", i.e. they are designed so that the driver is aware of what is expected of them and behaves appropriately. Each class of road is immediately distinctive, with its own carriage way width, road markings, signings and use of street lighting that are consistent throughout the route. The simplicity and consistency of the road's design reduce driver stress and driver error.
There is also an emphasis on a proactive approach to road safety, with improvements made to improve both the actual and perceived risks of road safety. Crash hot spots are identified, and targeted engineering measures taken to remedy them, e.g. by improving road surfaces, removing roadside obstacles to vision, or installing traffic lights.
Safer speeds
Speed limits in safe systems are based on aiding crash avoidance and a human body's limit for physical trauma. An unprotected pedestrian hit at over 20mph has a significant risk of death or life-changing injury. A car in a side-on collision can protect its occupants up to around 30mph; a car in a head-on collision up to around 40mph.

Safe systems seek to:

Establish appropriate speed limits: These are set according to road features and function and the known physical tolerances of road users, e.g. by rolling out a 20mph speed limit across a city center or residential streets.

Enforce existing limits: Transport authorities work with the police to develop and evaluate speed enforcement. They may also work with community groups such as, a locally driven initiative where community members use the speed detection devices to monitor vehicle speed, with the support of the police.

Educate road users: Authorities can mount speed enforcement and education campaigns. They might also ensure speed limit compliance by working directly with fleet drivers, licensed taxi companies or contractor vehicles.

Safer vehicles
The vehicles are designed, built and regulated to minimize the occurrence and consequences of crashes, with the emphasis on collision survivability. There are two main strands to safer vehicles – technology and road-worthiness:

Technology: 'Active safety' measures that help to prevent crashes include collision-avoidance systems, (semi-)autonomous vehicles, stability control, improved road-vehicle interaction, automatic braking systems, air cushion technology, Alco-locks, and speed limiters on fleet vehicles. Vehicle components that protect occupants if a crash does occur ('passive safety') include three-point seat belts, padded dashboards and airbags.
Road worthiness: Consumers and businesses are encouraged to purchase safer vehicles. Vehicles are then maintained to the highest safety standards.

Safer people
Everyone who uses roads is encouraged to use roads safely and comply with road rules. Emphasis is placed on a philosophy of shared and proportionate responsibility. Safe systems encourage safer road use in various ways, including:

Traffic reduction: Authorities work to reduce the volume of motor vehicle traffic, for example, by encouraging greater use of the safest modes of travel such as public transport.

Education: Safe systems create risk-aware drivers through education and publicity; for example, making new drivers aware of the risks they face, and encouraging all road users to travel unimpaired, alert, at safe speeds and without distraction, complying with road rules at all times. In-vehicle technologies may be used to give safety feedback and reduce risky behaviors by monitoring how a vehicle is driven, and feeding back information on speed, seat belt use, hard acceleration and braking. Drivers who do not follow rules are required to undertake further education.

Use of streets for other purposes: By encouraging streets to be used for a range of community purposes, everyone is encouraged to have a stake in their streets. This may be small-scale, street-wide activities such as street parties and playing-out activities, or larger-scale municipal closures like "Paris Respire", where roads along the Seine are closed to traffic on Sundays.

Examine new ways of measuring safety: Traditionally, casualty statistics have been the primary method of measuring road safety. Safe systems look for additional ways of measuring safety, e.g. the public's perception of road danger.

Integrated school travel planning initiatives: Children are encouraged to use roads more safely. Transport authorities might work closely with schools to create safe walking routes for children, or expand the number of School Crossing Patrols in the area.