



# The Challenges of Vision Zero Implementation in Iran: A Qualitative Study

Hamid Safarpour<sup>1,2</sup>, Davoud Khorasani-Zavareh<sup>3\*</sup>, Hamid Soori<sup>4</sup>, Zohreh Ghomian<sup>5</sup>, Kamran Bagheri-Lankarani<sup>6</sup> and Reza Mohammadi<sup>7</sup>

<sup>1</sup>Non-Communicable Diseases Research Center, Ilam University of Medical Sciences, Ilam, Iran, <sup>2</sup>Department of Nursing, School of Nursing and Midwifery, Ilam University of Medical Sciences, Ilam, Iran, <sup>3</sup>Workplace Health Promotion Research Center (WHPRC), Department of Health in Disasters and Emergencies, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran, <sup>4</sup>Safety Promotion and Injury Prevention Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran, <sup>5</sup>Department of Health in Disasters and Emergencies, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran, <sup>6</sup>Health Policy Research Center, Institute of Health, Shiraz University of Medical Sciences, Shiraz, Iran, <sup>7</sup>Department of Neurobiology, Care Sciences, and Society, Division of Family Medicine, Karolinska Institutet, Huddinge, Sweden

## OPEN ACCESS

### Edited by:

Nic Ward,  
Montana State University,  
United States

### Reviewed by:

Kavi Bhalla,  
The University of Chicago,  
United States  
Tariq Usman Saeed,  
Purdue University, United States

### \*Correspondence:

Davoud Khorasani-Zavareh  
davoud.khorasani@gmail.com

### Specialty section:

This article was submitted to  
Transport Safety,  
a section of the journal  
Frontiers in Future Transportation

Received: 27 February 2022

Accepted: 23 May 2022

Published: 05 July 2022

### Citation:

Safarpour H, Khorasani-Zavareh D, Soori H, Ghomian Z, Bagheri-Lankarani K and Mohammadi R (2022) The Challenges of Vision Zero Implementation in Iran: A Qualitative Study. *Front. Future Transp.* 3:884930. doi: 10.3389/ffutr.2022.884930

**Background:** Road traffic crashes' (RTCs) multidimensional nature has piqued the interest of officials all around the world for many years. Vision Zero is one of the most innovative approaches to road safety. Vision Zero is a government initiative aimed at reducing RTC-related deaths and serious injuries. To effectively apply this approach in Iran, it is required to first identify the obstacles to execution. Therefore, the purpose of this study was to examine the obstacles to Vision Zero implementation in Iran.

**Methods:** The qualitative content analysis method was used in this investigation. The participants were chosen using purposive, snowball, and maximum variety sampling methods. Data were collected through face-to-face interviews. Graneheim and Lundman's method was used to analyze data using the content analysis method.

**Results:** There were 16 interviews with 14 participants in this study. The data were organized into four main categories and 13 sub-categories to determine the obstacles to implementing Vision Zero. Managerial and administrative obstacles, as well as supportive, cultural, and social, and transportation design and development challenges, were the main categories.

**Conclusion:** In Iran, implementing Vision Zero necessitates the establishment of a lead agency that considers administrative and managerial, supportive and logistic, socio-cultural, transportation design and development, and infrastructure components. In addition, Vision Zero implementation and road safety improvement would require political commitment and support from the government and society. Vision Zero implementation and road safety management must take into account the ethics and value of human life.

**Keywords:** Vision Zero, road traffic crash (RTC), road traffic injury (RTI), safety promotion, injury prevention

## 1 BACKGROUND

According to a World Health Organization (WHO) report, 1.35 million people die and 20–50 million people are injured in road traffic accidents each year (RTIs). Furthermore, RTIs are one of the leading causes of death among people aged 5–29. RTIs are the leading cause of death in low- and middle-income nations, accounting for more than 90% of RTC-related deaths (WHO, 2018). In the Middle East, Iran is one of the countries with the highest proportion of deaths caused by RTCs. According to the Iranian Legal Medicine Organization (ILMO), 17,183 persons died in Iran in 2019 due to RTCs, an increase of 1.2 percent over 2018 (Iranian Legal Medicine Organization, 2019). RTCs' multidimensional nature has piqued the interest of officials all around the world for many years. As a result, effective and preventative methods for RTC-related deaths and injuries are required (Safarpour et al., 2020b). RTCs can be prevented through a variety of methods, including traditional and systemic techniques. The traditional or individual method focuses on modifying road user behavior and eliminating human errors. Furthermore, it holds users accountable for the occurrence of accidents and works to change this through education, advertising, and various campaigns (Khorasani-Zavareh, 2011). RTCs are frequently viewed as cases caused by human mistakes, rather than as a public health concern (Safarpour et al., 2020a).

Unlike traditional approaches, the systemic approach is top-down at the strategy level and uses policy measures to ensure long-term safety (Jamroz et al., 2019). The improvement of the transportation system is prioritized over road users in a systemic approach. Such an attitude pays special attention to human weaknesses, inherent characteristics, and tolerance, and holds transportation system designers accountable for enhancing safety and preventing RTC-related death and injury. Furthermore, based on this approach, system authorities should assume greater responsibility for the transportation system, with system authorities and road users sharing responsibilities (Khorasani-Zavareh, 2011).

One of the latest road safety approaches is Vision Zero. Vision Zero is a government initiative aimed at reducing RTC-related deaths and serious injuries. Vision Zero is a long-term philosophy and road safety framework guide (Safarpour et al., 2020b). Philosophical topics such as anthropology, ethics, axiology, and political philosophy are among the most important philosophical hypotheses on which Vision Zero is built (Bany, 2013). Vision Zero is founded on ethics, shared responsibility, safety philosophy, and change processes (Ahmadi, 2020; Bany, 2013; Larsson et al., 2010; OECD/ITF, 2008). This approach emphasizes promoting and changing the transportation system. If governments are unable to modify system safety, such as road and user safety, all attention should be directed toward speed management. These speeds are based on human kinetic energy tolerance (Safarpour et al., 2020a).

The Vision Zero approach not only takes a systemic approach but also considers the flaws and inherent traits of humans, and the ethical dimension. As a result, Vision Zero differs from the systemic approach in terms of the ethical and philosophical perspective on the value of human life (Larsson et al., 2010).

Despite the fact that most statistics show that 90% of RTCs are caused by human mistakes, Vision Zero laws have made planners and designers liable for RTCs (Peden et al., 2004). Vision Zero programs, on the other hand, intend to address these issues through an infrastructure that reduces RTCs by increasing the body's biological tolerance to external stimuli as a guiding mechanism, rather than by minimizing human errors or accidents (Johnston, 2010). The goal of the Vision Zero strategy is to reduce all possible hazards of an accident, whether caused by human error or not (Cushing et al., 2016). Traffic modes at high speeds, integrated traffic flow management, and lowering the angles of conflict at probable crash spots all help to reduce risk (Johansson, 2009).

Sweden was the first country to put Vision Zero into action. In 1996, Sweden introduced Vision Zero, and the Swedish parliament enacted the "Vision Zero" policy in 1997, with the goal of reducing major casualties to zero by 2050 (Safarpour et al., 2020a; Safarpour et al., 2020b). In Sweden, this strategy has been very successful. Sweden has one of the world's lowest annual death rates. Furthermore, pedestrian mortality has decreased by about 50% in the last 5 years (Safarpour et al., 2020b). RTC deaths decreased by 44% in 2013, from 471 in 2007 to 265 in 2013. During the last 20 years, Sweden's deployment of Vision Zero has reduced RTC-related deaths and injuries by more than half. The long-term efforts to apply this strategy have resulted in such success (Salmon et al., 2012; Safarpour et al., 2020b).

Given the success of Vision Zero and its effective implementation in leading countries such as Sweden, it appears that more countries are adopting this method to reduce road traffic injuries and increase road safety (Safarpour et al., 2020b). Many countries have embraced and implemented Vision Zero or parts of it at the national, regional, and local levels since its inception (Atkins and Granhed, 2012; Sigbórnsson et al., 2013; Fleisher et al., 2016; Jamroz et al., 2017a; Mendoza et al., 2017; Kristianssen et al., 2018). After Sweden, numerous countries have been influenced by this approach to road safety management, including Canada, Norway, the United States, Poland, and the United Kingdom. Leading countries' experiences, particularly Sweden's, suggest that this method is highly effective in preventing RTCs.

The European Union welcomed this approach and made it a goal in 2001 (Šucha, 2014). The evaluation of present traffic safety procedures, the assessment of previous traffic safety program implementation, the description and evaluation of the present status, and the prediction of traffic safety are all dependent on safety status detection (Jamroz et al., 2017b).

The Vision Zero policy's effectiveness in Sweden has prompted it to be used in the United States for road safety (Cushing et al., 2016). After implementing Vision Zero, some of these states saw considerable results, such as a 43% drop in traffic fatalities in Minnesota, a 48% reduction in Utah, and a 40% reduction in Washington State (Johnston, 2010; Safarpour et al., 2020b). The United States has likewise prioritized strengthening cycling laws and infrastructure based on Vision Zero concepts (Zahabi et al., 2011; Safarpour et al., 2020b). Poland has also achieved significant steps in implementing Vision Zero. The most effective measures are developing and implementing regional and

local road safety programs, beginning the construction of a road safety observatory and establishing two monitoring areas, changing driver training and testing methods, implementing and developing monitoring systems (clock control driver work and speed control), standardization of bicycle regulations, construction of roads and highways, the establishment of safe intersections, the implementation of traffic mitigation measures, the implementation of road safety audits, and the promotion of emergency rescue and post-crash protection systems and use of telecommunications (Jamroz et al., 2017b; Safarpour et al., 2020b).

In general, true progress in road safety management necessitates a fundamental paradigm shift in both the perception of road safety and the tools and strategies used to attain it (International Tele-Film Enterprises, 2016). This paradigm change from traditional road safety policies to an integrated vision in which road traffic becomes a safe system is a significant step forward (Safarpour et al., 2020a).

These positive outcomes demonstrate that reducing RTCs in Iran requires an effective strategy such as Vision Zero. To put this strategy into action in Iran, it is first vital to figure out what the hurdles and roadblocks are. The goal of this study was to evaluate the problems of implementing Vision Zero in Iran.

## 2 METHODS

### 2.1 Study Design and Setting

A qualitative content analysis was used to perform the research. All active organizations and institutes on the subject of road safety in Iran were included in the study setting. The Ministry of Roads and Urban Development, Ministry of Health and Medical Education, Traffic Police, Road Safety Commission, and the Iranian Society of Traffic Thinkers were among the participants in the study.

### 2.2 Participants

Experts and researchers in the field of road safety, including epidemiologists, health in disasters and emergencies, injury prevention and safety promotion, and experts from involved and responsible organizations, including the Ministry of Roads and Urban Development, Ministry of Health and Medical Education, Emergency Organization, traffic police, Road Safety Commission, and the Iranian Society of Traffic Thinkers, were among the participants. All participants were from Iran.

The participants were chosen using purposeful and snowball sampling methods with the maximum possible variability. With the progress of data collection, the number of participants was determined using saturation criteria. Interview willingness and research experience were both required for inclusion. The researchers of this study used connected organizations to collect data to identify important informants. Based on the codes and categories collected, sampling was carried out until a sufficient number of samples was gathered for analysis, comparison, and the extraction of significant logical meaning units from the data.

### 2.3 Data Collection

Face-to-face interviews were performed to collect data in this study. Three unstructured interviews were conducted first. Then, semi-structured in-depth interviews were undertaken. The initial concepts were derived from the data, and the interviews were formed over time. The researcher did not set any time limits for the interviews. As a result, the length of each interview was determined by the natural process of presenting questions, data collection content, received responses, and the design of subsequent questions based on those responses. The duration of the interviews ranged from 18–51 min on average. The interviews were transcribed after being recorded on a gadget.

### 2.4 Data Analysis

The core research topic was used to guide the data analysis. Using Graneheim and Lundman's method, data were analyzed using the content analysis method with an inductive approach (Graneheim and Lundman, 2004). As a result, the interviews were conducted right after each one, and the material was read numerous times to get a general sense of the contents. The codes were then defined by recognizing certain elements of the text, such as key code thinking. Finally, the retrieved codes were classified into several categories based on their similarities and differences.

### 2.5 Trustworthiness

Four strategies advocated by Lincoln and Guba (Guba, 1981; Sheikhbardsiri et al., 2020) were used to develop trustworthiness: credibility, confirmability, transferability, and dependability. The prolonged engagement of researchers in the investigated issue was used to establish credibility. The study group conducted peer reviews by conducting meetings and debating the data and analysis among the researchers and experts. Furthermore, each interview was recorded and transcribed. After that, a member checked and reviewed the interview summaries, data, and codes, and feedback on their comments and ideas was taken into account. When the extracted codes were not confirmed by the participants, some necessary explanations were obtained and the coding method was reviewed. Confirmability indicates the relationship between data and the used resources. Based on this criterion, the results have no relationship with the researcher's knowledge (Lauridsen and Higginbottom, 2014). A senior researcher conducted data confirmability by evaluating and collecting the ideas and opinions of other researchers, and gathering articles from connected studies. Observers performed confirmability in this study by reviewing the data. The interviews, codes, and classifications collected by different specialists on the research topic were reviewed for this purpose. For attaining reliability, audit trails, stepwise replication, code-recode technique, and peer inspection were used (Anney, 2014). A holistic data description and a theoretical/purposeful sampling method were used to ensure transferability (Guba, 1981; Anney, 2014). Furthermore, the field of interviews, codes, and categories extracted by the research team and other professional colleagues in the field of qualitative research were evaluated. Using maximum variation sampling, the researchers could collect a wide range of opinions and different interpretations (Anney, 2014).

**TABLE 1** | Demographic characteristics of the participants in the study of the challenges of Vision Zero implementation in Iran.

Demographic characteristics		Frequency	Percent (%)
Sex	Male	11	78.57%
	Female	3	21.43%
Age	30–40	2	14.28%
	41–50	7	50.00%
	>50	5	35.72%
Work experiences (year)	1–10	0	0
	11–20	8	57.14%
	21–30	6	42.86%
Level of participation	Top level	4	28.56%
	Middle level	5	35.72%
	Operational level	5	35.72%
Total		14	100%

### 3 RESULTS

There were 16 interviews with 14 individuals in this study. To saturate some specific data and concepts, the authors referred to two interviewees who were interviewed previously. The participants ranged in age from 35 to 59 years, with at least 10 years of job experience (Table 1). A total of 1,125 codes were extracted from the interviews. After summarizing and removing similar codes, their number was reduced to 310 and the codes were used for creating sub-categories and categories. Finally, the data were organized into four main categories and thirteen sub-categories to determine the problems of implementing Vision Zero (Table 2). The lead agency, inter-organizational collaboration, traditional approach to road safety, responsibility and accountability, and scientific and training factors are among the managerial and administrative obstacles. Political commitment and advocacy, and legislation and regulations, are all supportive challenges. Design and development of transportation systems include information and road traffic injury surveillance systems, engineering and design standards, and transportation network infrastructure. Cultural and social challenges include dignity and value of human life, safety attitude, and demand for change (Table 2).

#### 3.1 Administrative and Managerial Factors

##### 3.1.1 Lead Agency

According to the participants' accounts, one of the most significant problems in implementing Vision Zero in Iran was the lack of a lead agency. The most essential justification for the presence of a lead agency, according to stakeholders, is that it has a vision. According to most of the participants, the presence of a lead agency is the most important aspect of Vision Zero implementation in Iran, and the lead agency should be established before taking any action.

“In Iran, there is no main agency, no leading organization that controls this issue and oversees all operations and policies.” We don't have somebody with sufficient power to oversee such actions.” (P4)  
 “Organizations believe that being the lead agency

confers influence, which is why everyone claims to be the lead agency.” (P7) Iran.

##### 3.1.2 Inter-Organizational Coordination

One of the greatest obstacles in implementing Vision Zero, according to most of the participants, is a lack of inter-organizational cooperation. Furthermore, they believed that organizations involved in traffic safety operated independently and lacked sufficient cooperation. Although the organizations stress the importance of Vision Zero, there is insufficient inter-coordination. For example, there is no coordination process between some Ministry of Health and Ministry of Roads and Urban Development organizations. The police initiatives are focused on lowering the rate of accidents, whereas the Ministry of Health strategies are focused on lowering mortality and morbidity.

“Each organization operates with its own authority, with no regard for the coordination of other organizations. There is no coordination between the police, the Ministry of Roads, and other associated entities who work for themselves.” (P3).

##### 3.1.3 Traditional Approach to Road Safety

One of the most fundamental problems of Vision Zero implementation, according to the participants, is the traditional approach to road safety. In this regard, Iran's approach to avoiding and maintaining road safety is individual and traditional, rather than systemic. According to the authorities' present attitude, road users are frequently blamed, but human weakness, traits, and limited tolerance are ignored. Currently, the police approach to accidents is to identify the culprit, focus on road users, and determine who caused the collision. The transportation system's flaws, such as the vehicles and roads that caused the disaster, as well as death and injuries, were given less attention. In other words, there is no holistic and systematic approach to road safety.

“We don't have a systemic approach to road safety, which is one of the issues. For example, the regulations we must pass to reduce RTCs always place the blame on the drivers.” (P5) “We don't take a systemic approach. Neither is our approach systemic. In the transportation system, human weakness and error, as well as human tolerance should be considered.” (P4)

##### 3.1.4 Responsibility and Accountability

One of the major problems of Vision Zero implementation, according to most of the participants, is transportation system responsibility and accountability. The participants believed that effective road safety management and Vision Zero implementation are unattainable without proper responsibility and accountability. Organizations responsible for road safety will be mismanaged because of their lack of accountability. In the event of an accident, the road authorities' responsibilities and accountability are significantly reduced. Many participants emphasized the dangers of driving. Car manufacturers,

**TABLE 2** | Codes, sub-categories, and categories of the challenges of Vision Zero implementation in Iran.

Categories	Sub-categories	Example of codes
Administrative and managerial	Lead agency	Lack of a leading organization Lack of a responsible person with high authority Lack of a policy-making organization
	Organizational coordination	Lack of an organization with an independent budget Bewilderment of trustee organizations Parallel work Inconsistent goals Working independently
	Traditional approach	Traditional approach to road safety Lack of a holistic approach to road safety Lack of a certain paradigm for road safety Insufficient attention to prevention An attitude of merely reducing accidents Insufficient attention to human ability and tolerance
	Responsibility and accountability	Lack of shared responsibility Lack of responsibility in organizations Unaccountability of organizations Lack of organizational commitments
	Scientific and training factors	Non-scientific approach of authorities Lack of up-to-date knowledge of authorities Inadequate training of authorities Ignoring the experiences of successful countries
Supportive and logistic	Political commitment and advocacy	Lack of sufficient political commitment Not supported by the government Lack of advocacy in society Lack of support in the private sector
	Laws and regulations	Lack of deterrent laws Weak laws and regulations Lack of holistic laws Weakness in law enforcement/law weakness at the monitoring and enforcement phase Lack of up-to-date laws
Cultural and social	Human dignity and value of life	Considering no value for human life Lack of attention to ethics Lack of a valuable look at humans Considering no value for humans Illogical look at humans
	Safety attitude	Lack of safety priority Lack of belief in safety Low demand for safety
	Demand for change	Unwillingness to change approach Lack of demand for Vision Zero implementation Resistance to change approach
Design and development of transportation system	Information and road traffic injury surveillance	Lack of a correct registration system Lack of a holistic database Lack of surveillance in accurate statistics registration Undercounting death Lack of traffic accident surveillance
	Engineering and design standards	Defects in road design Weak road engineering Lack of adequate traffic signs Uselessness of some signs Inappropriate design of urban roads Lack of a sufficient space for urban roads Non-standard speed bumpers Unspecified blind spots Numerous and dangerous U-turn roads
	Transportation network infrastructure	No use of advanced technologies in road safety Lack of attention to alternative vehicles Weak attitude to the public transportation system Insufficient attention to subway expansion Insufficient attention to equipping public transportation Non-development of public transportation fleet

however, are not held liable for accidents; instead, road users are held liable and blamed. When there are multiple casualties and public opinion is affected, organizational projection and refusal to accept responsibility become more apparent.

“Every organization defends itself, and no final sharing takes place. Organizations are not accountable because they are not responsible enough.” (P1) “In Iran, only road users are expected to bear full responsibility, while system administrators remain unconcerned. This is not accountability. Responsibility should be shared by all entities concerned in road safety.” (P9)

### 3.1.5 Scientific and Training Factors

Some top executives are unfamiliar with Vision Zero and believe that it will have no impact on road safety management. Furthermore, certain authorities are unfamiliar with updated road safety science, particularly Vision Zero, and they should be trained. Managers’ and authorities’ attitudes and performance are not founded on experience, and they fail to learn from successful road safety management practices in other nations. Road authorities, according to some participants, should be trained more than people and become familiar with scientific and systemic approaches.

“The authorities’ approach to this problem is neither scientific nor based on experience.” (P17) “I believe Iran is actively implementing Vision Zero strategies. They are most likely ineffective. If that’s the case, we’re following suit.” (P11).

## 3.2 Supportive and Logistic Challenges

### 3.2.1 Political Commitment and Advocacy

Political commitment and advocacy, according to stakeholders, were two major hurdles in implementing Vision Zero. Moreover, they believe that the government and parliament must support Vision Zero’s implementation. Furthermore, support from the non-governmental organizations (NGOs), media, and society can aid in the execution of Vision Zero. NGOs should be involved in lobbying the parliament and seeking support for Vision Zero implementation. However, the potential of NGOs has yet to be fully realized. In society, the media plays an important role in advocacy, but their role in this case has decreased, and there is a need to use the media more effectively. Speeches by officials on Vision Zero implementation in the media, for example, can be beneficial to Vision Zero implementation.

“We need the government to back us up. This requires the commitment of the administration and parliament.” (P16) “We require assistance from a variety of organizations and individuals. Also, the media must support us.” (P13) “Non-governmental organizations (NGOs) have a lot of potential for advocacy, but they have not been well utilized.” (P14)

### 3.2.2 Laws and Regulations

The lack of strong, consistent, and deterrent laws, and of law enforcement, was cited by most of the participants as a barrier to

Vision Zero implementation. The participants believed that effective management of road safety and Vision Zero implementation could not be achieved without integrated laws and regulations approved by all organizations. Without approved laws and regulations, road safety management measures and Vision Zero implementation are impossible.

“Our laws do not serve as deterrents. They should be updated at any time, but they are not, and I believe that many difficulties in this area will persist unless the laws are updated more frequently. The police offer the parliament a bill to prevent violations, which must be approved and passed into law. All organizations have not yet approved the laws and regulations.” (P11).

## 3.3 Cultural and Social Factors

### 3.3.1 Human Dignity and Value of Life

The lack of dignity and value for human life was cited by most of the participants as an important challenge in implementing Vision Zero. According to them, for stakeholders, the dignity and value of human life are less significant. Furthermore, they stressed that Vision Zero’s execution requires respect for human dignity. Without incorporating human ethics in traffic accident management, it is impossible to have a proper understanding of human beings and their qualities and behaviors.

“Our attitude toward humans is inappropriate. It has nothing to do with ethics. Our attitude toward people is not founded on values. This is one of the most difficult tasks.” (P4) “Human beings are not highly valued; ethical aspects of road safety are not observed; human dignity is not taken into account in road safety management as it should be; authorities should adhere to ethics and the value of human dignity.” (P8).

### 3.3.2 Attitude to Safety

One of the challenges associated with Vision Zero implementation, according to some of the participants, is a lack of safety mentality. Authorities do not prioritize safety and do not consider it to be the center of their activity. Safety attitudes are ingrained in society’s culture, according to the participants, and authorities are no exception. In Iran, safety is given little attention, whether it be car safety, road safety, or even personal safety. Economic and political agendas have trumped authorities’ commitment to safety. The lack of a proper attitude toward safety leads to a lack of appropriate understanding of traffic accident prevention and control procedures. Vision Zero necessitates a strong safety concept and mindset, particularly among authorities.

“The majority of authorities have little faith in safety. They do not consider road management in terms of safety. In our society, there is a mindset that when calamities happen, we should say, “What can we do now?” The authorities no longer place a premium on safety.” (P12) “The majority of them have an economic-political mindset rather than a safety mindset. In our country, safety has been disregarded.” (P8).

### 3.3.3 Demand for Change

One of the obstacles in implementing Vision Zero, according to the participants, is the absence of demand for change among authorities. The authorities, according to the participants, are unwilling to change their stance. Furthermore, managers are hesitant to adapt their approach to road safety management due to a lack of demand for change in the society and government. As a result, all levels of road safety management should be prepared for change, and society should demand it.

“Authorities are hesitant to change their approach, and society and the government have made no demand for a change in the field of road safety.” (P4) “... All authorities and stakeholders should be willing to change and contribute to it.” (P15)

## 3.4 Design and Development of a Transportation System

### 3.4.1 Information and Road Traffic Injury Surveillance System

One of the barriers to Vision Zero implementation in Iran, according to most of the participants, is a lack of information and a road traffic injury surveillance system. One of the obstacles to Vision Zero implementation is the lack of a suitable registration system, insufficient administration of traffic accident information, and a comprehensive and accurate traffic accident monitoring system. The lack of a traffic accident surveillance system was cited as a result of underreporting the number of deaths caused by RTCs and the failure to monitor serious injuries that result in death. The lack of an integrated and holistic information link between entities involved in road safety will preclude effective management of RTC statistics, resulting in Vision Zero failure.

“We don’t have a proper registration system in place. Every company provides a statistic. We lack a particular and precise registration system as well as an information system that connects all of the data.” (P3) “Our registration and surveillance systems need to be connected and updated. With the system we have now, it is possible to implement Vision Zero.” (P10)

### 3.4.2 Engineering and Design Standards

Most stakeholders viewed engineering and design standards to be the most difficult aspects of implementing Vision Zero. To enhance road safety, stakeholders believe that design infrastructure should be updated with new standards of engineering. The lack of up-to-date road engineering standards and several road design issues were cited as road safety management and Vision Zero implementation hurdles in Iran. When it comes to speed management, the lack of technology in road safety is a roadblock to Vision Zero implementation.

“Our roads are not well-designed, don’t have good asphalt, and are not well-engineered. There are some potentially hazardous turns. There are insufficient traffic signs. The signs do not address drivers or other road users; they are simply warning

indication.” (P5) “In the city where the municipality is in charge, the roadways are not properly built, and there is insufficient space or signage.” (P14) “The world’s contemporary technologies are not being used, and those that are being used are not being used effectively.” (P3)

### 3.4.3 Transportation Network Infrastructure

One of the major challenges of Vision Zero implementation, according to most of the participants, is the development of transportation network infrastructure. The transportation network infrastructure, according to the participants, does not match the potential of Vision Zero implementation. The public transportation fleet is deficient in both quality and quantity. Furthermore, the participants indicated that the public transportation sector and its potential in Iran have received little attention. Iran’s present road safety infrastructure poses a huge barrier to implementing Vision Zero.

“Our infrastructure is worn out, and we were unable to properly develop the public fleet, which today has various problems. Our public fleet should be enhanced in terms of quantity, quality, and accountability.” (P3) “Our public fleet should be upgraded in terms of quantity, quality, and accountability.” (P2)

## 4 DISCUSSION

To our knowledge, this is the first study that explains the challenges of Vision Zero implementation in Iran. The following were found to be the most critical Vision Zero implementation challenges: the lack of a lead agency, a lack of inter-organizational coordination, a traditional approach to road safety, insufficient responsibility and accountability, scientific and educational barriers, a lack of political commitment and advocacy, weak laws and regulations, low human dignity and low value for human life, a lack of safety attitude, a lack of demand for change, a lack of information system and traffic accident surveillance, a lack of engineering and road design standards, and a lack of sufficient transportation network infrastructure. These challenges are divided into four categories: managerial and administrative, supportive, cultural and social, and transportation planning and development.

According to the findings, one of the most significant problems in Iran’s Vision Zero implementation is the lack of a lead agency. The presence of a lead agency is one of the main requirements of the road safety development program (Bliss and Breen, 2009; Khademi and Choupani, 2018; Azami-Aghdash et al., 2019). The lack of a lead agency leads to a lack of coordination among stakeholders and a lack of accountability in terms of safety promotion (Sharifian et al., 2019). The World Bank recommended in a 2009 report that governments should designate a lead agency to manage national road safety measures (Bliss and Breen, 2009). The organizational structure of the management system in low- and middle-income countries

may suffer from the lack of institutional performance among key safety actors. As a result, road safety stakeholders must develop an intra-organizational and inter-organizational evaluation framework that includes all processes, incidents, dependencies, and causality (Khademi and Choupani, 2018). Establishing a lead agency for improving road engineering standards and a more precise enforcement of traffic regulations, with both monetary and non-monetary penalties for unsafe traffic behaviors, can help to improve road safety (Tetali et al., 2013). According to a certain research study in Iran, the absence of a lead agency results in a lack of coordination and responsibility for promoting safety among stakeholders (Azami-Aghdash et al., 2019; Sharifian et al., 2019). In Iran, the Road Safety Commission (RSC) Secretariat was founded in 2003 as the official and national agency in charge of road safety leadership. However, due to a lack of efficient institutional management by the lead agency in several managerial activities, Iran has had little chance to undertake effective interventions in road safety and achieve the intended results (Khademi and Choupani, 2018).

According to the findings of the study, another significant barrier to Vision Zero implementation in Iran is the traditional approach to road safety management. Instead of focusing on the cause of injury, the traditional approach discusses human errors, poor vehicle design, and the road environment. In many LMICs, the majority of preventive efforts focus on road user behavior, which is normally addressed through training and implementation. While road user safety is one of the most important components, changing such behaviors should not be limited to education and rules (Khorasani-Zavareh, 2011). Vision Zero is basically system-oriented, with a holistic and systemic approach (Safarpour et al., 2020a). The weakness, intrinsic qualities, and human tolerance are all taken into account in a systemic approach, which holds transportation system designers accountable for promoting safety and preventing the injuries caused by RTCs. In addition, based on this approach, responsibility should be distributed among the system authorities and road users (Safarpour et al., 2020a). Unlike the usual approach, this one is top-down and uses policy instruments at the strategy level, with a long-term safety view (Jamroz et al., 2019).

Lack of responsibility and accountability is considered another significant challenge of Vision Zero implementation from the stakeholders' perspective. Vision Zero emphasizes the change in responsibility for road safety, stating that system designers are always in charge of creating, controlling, and using the road transportation system. Thus, they are responsible for the level of safety in the entire system (Tingvall and Haworth, 2000; Larsson et al., 2010; Belin et al., 2012; Mendoza et al., 2017). System designers should take additional measures to prevent death or serious injury if road users do not respect the laws (Belin et al., 2012; Larsson et al., 2010; OECD/ITF, 2008). In general, Vision Zero seeks to influence roles and responsibilities. Given the increased political responsibility, Vision Zero advocates for a wide variety of sectors, including public health and the private sector, to be held accountable in making road safety decisions (McAndrews, 2013). Before the implementation of Vision Zero, it was assumed that road users would be responsible for looking back and forth. However, Vision Zero goes further by giving system designers a precise description of forward-looking responsibility. Road users are nonetheless responsible for road

safety under this new concept, with the primary distinction being that system designers openly bear significant responsibility (Fahlquist, 2006).

Based on the findings, the lack of political commitment and advocacy was another significant challenge in implementing Vision Zero. Political or governmental commitment is considered one of the operational strategies of Vision Zero (Mendoza et al., 2017). Political commitment plays a critical role in road safety management (Azadi et al., 2019). Improving road safety requires long-term commitment from the government at the highest levels. To achieve this, road safety managers must not only establish evidence-based road safety programs but also promote solutions that take into account political restrictions such as the election cycle (OECD/ITF, 2008). Political support is consistent not only with a commitment to laws and regulations but also with a commitment to the budget with a long-term perspective (OECD/ITF, 2008). Advocacy removes major obstacles interfering with the implementation of proven policies and measures (Breen, 2004). When attempting to implement proven road safety measures, some groups with vested interests frequently object. Thus, experts and authorities should act as a powerful change lobby (Breen, 2004). Furthermore, NGOs can engage in a variety of advocacy activities, ranging from raising public awareness to campaigning for specific legislative changes (World Health Organization, 2012).

The lack of dignity and value for human life is regarded as another significant challenge to Vision Zero implementation. Vision Zero is an approach based on ethics, values, and human dignity (Safarpour et al., 2020a). Based on this approach, it is unethical to accept many casualties in RTCs as an ethical principle (Elvebakk, 2007). It is also regarded as an ethical vision of what has been defined as an irreplaceable vision of the right to human life because of its focus on final goals. Furthermore, authorities are considered ethically responsible for road traffic crashes based on Vision Zero (Elvebakk, 2005). The most ethical part of Vision Zero is that when an accident occurs, its consequences should be minimized to avoid inflicting death or serious damage. Furthermore, deadly accidents are caused not just by road user mistakes, but also by the entire system, implying that authorities bear the ultimate responsibility for protecting people's lives (Elvebakk, 2005). The responsibility of stakeholders for road safety can take the shape of ethical and legal obligations imposed by legislation or other rules, and material, criminal, and legal violations (Babanoski et al., 2018). In general, the measures used to combat RTC mortality, and the function of road safety, should be ethically reviewed (Fahlquist, 2009).

Another challenge for Vision Zero implementation in Iran was the lack of information and a road traffic injury surveillance system. Because the incidence of RTCs in these countries is substantial and interventions are often not based on evidence, effectively recording information and implementing a monitoring system for traffic crash victims is a major problem in most LMICs (Sharifian et al., 2019). In LMICs, RTC data are often collected from different sources and are normally undercounted (Sharifian et al., 2019). High-income countries often have a well-established surveillance system, whereas most LMICs lack or have an incomplete registry trauma and surveillance system (Sharifian et al., 2019). The results of a study



indicated that the lack of a road traffic injury surveillance system is one of the important road safety challenges in Iran (Sharifian et al., 2019). The surveillance system is effective in developing strategies, organizing interventions, and allocating resources to prevent injuries (Mirani et al., 2020). This system increases data access at any time and place, makes injury prediction easier, and connects data from diverse sources and regions (Mirani et al., 2020). Thus, a holistic system of traffic accident surveillance is required for Vision Zero implementation in Iran.

Other hurdles for Vision Zero implementation in Iran include road design engineering and transportation network infrastructure. One of Vision Zero's operational strategies is to design cars and safety features (Mendoza et al., 2017). Road design can have a significant effect on their safety. Roads should ideally be designed with the safety of all road users in mind, which entails providing adequate facilities for pedestrians, cyclists, and motorcyclists. Sidewalks, bike lanes, safe passageways, and other traffic-calming measures can all help to reduce the risk of harm among these vulnerable road users (WHO, 2018). According to Vision Zero, RTCs cause catastrophic injuries or deaths as a result of a chain of accidents that should be stopped at any point. Therefore, vehicle design, improved road infrastructure, and road safety regulations, even in case of human error, are among the factors which help to break the chain of accidents leading to death or serious injuries (Ahmadi, 2020). Reducing the use of personal vehicles and increasing the share of public transportation, along with improving the use of this fleet are among the important solutions to solve the problems of road safety management. In the urban transportation sector, the existing solutions include expanding the public transportation network such as the subway, tram, bus, and rail networks, and encouraging the use of bicycles, and walking.

## 5 CONCLUSION

To implement Vision Zero in Iran, a lead agency must be established, with organizational coordination taking into account management and administrative, supportive, socio-cultural,

transportation design and development, and infrastructural dimensions. In addition, Vision Zero implementation and road safety improvement would require the political commitment and support of the government and community. Considering the ethics, the value of human life is essential in Vision Zero implementation and road safety management. In addition, for Vision Zero implementation and improved road safety management, an information management network and a road traffic injury surveillance system are required. To implement Vision Zero in other countries, attention should be paid to this challenge and factors as a checklist or tools in road safety. Furthermore, for the successful implementation of this approach, each country should assess these factors in its own socio-cultural status.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## ETHICS STATEMENT

The present study was retrieved from a PhD thesis under the number IR.SBMU.PHNS.REC.1398.149 by the ethics committee of Shahid Beheshti University of Medical Sciences in Tehran. Oral informed consent was given by the participants.

## AUTHOR CONTRIBUTIONS

Conceiving and designing the study: HS and DK-Z. Data collection in the field: HS. Data transcription and coding: HS, DK-Z, and ZG. Data analysis: HS, DK-Z, HSO, and RM. Writing the original draft and editing of the manuscript: HS and DK-Z. Critical revision of the manuscript: HS, DK-Z, KB-L and ZG. All authors have read and approved the manuscript.

## REFERENCES

- Ahmadi, N. (2020). "Vision Zero," in *Casebook of Traumatic Injury Prevention*. Editor R. Volpe (Cham: Springer International Publishing). doi:10.1007/978-3-030-27419-1\_19
- Anney, V. N. (2014). Ensuring the Quality of the Findings of Qualitative Research: Looking at Trustworthiness Criteria. *Journal of Emerging Trends in Educational Research and Policy Studies* 5 (2), 272–281.
- Atkins, D., and Granhed, M. (2012). *Vision Zero: Applying Road Safety to Avalanche Safety*. Anchorage, Alaska: Int. Snow Sci. Work.
- Azadi, T., Khorasani-Zavareh, D., and Sadoughi, F. (2019). Barriers and Facilitators of Implementing Child Injury Surveillance System. *Chin. J. Traumatology* 22, 228–232. doi:10.1016/j.cjtee.2018.09.003
- Azami-Aghdash, S., Abolghasem Gorji, H., Derakhshani, N., and Sadeghi-Bazargani, H. (2019). Barriers to and Facilitators of Road Traffic Injuries Prevention in Iran; A Qualitative Study. *Beat* 7, 390–398. doi:10.29252/beat-070408
- Babanoski, K., Ilijevski, I., and Dimovski, Z. (2018). The Traffic Morale, Ethics and Culture Among the Road Traffic Users. *Horizons* 22, 77–85. doi:10.20544/horizons.a.22.1.18.p06
- Bany, P. (2013). Philosophical Considerations on Vision Zero. *Archives Transp.* 25, 5–15.
- Belin, M.-Å., Tillgren, P., and Vedung, E. (2012). Vision Zero - a Road Safety Policy Innovation. *Int. J. Inj. control Saf. Promot.* 19, 171–179. doi:10.1080/17457300.2011.635213
- Bliss, T., and Breen, J. (2009). *Country Guidelines for the Conduct of Road Safety Management Capacity Reviews and the Specification of Lead Agency Reforms, Investment Strategies and Safe System Projects*. Washington, DC: The World Bank.
- Breen, J. (2004). Road Safety Advocacy. *Bmj* 328, 888–890. doi:10.1136/bmj.328.7444.888
- Cushing, M., Hooshmand, J., Pomares, B., and Hotz, G. (2016). Vision Zero in the United States versus Sweden: Infrastructure Improvement for Cycling Safety. *Am. J. Public Health* 106, 2178–2180. doi:10.2105/ajph.2016.303466
- Elvebakk, B. (2005). *Ethics and Road Safety Policy*. Norway: Transportøkonomisk institutt Oslo.
- Elvebakk, B. (2007). Vision Zero: Remaking Road Safety. *Mobilities* 2, 425–441. doi:10.1080/17450100701597426
- Fahlquist, J. N. (2006). Responsibility Ascriptions and Vision Zero. *Accid. Analysis Prev.* 38, 1113–1118. doi:10.1016/j.aap.2006.04.020

- Fleisher, A., Wier, M. L., and Hunter, M. (2016). A Vision for Transportation Safety: Framework for Identifying Best Practice Strategies to Advance Vision Zero. *Transp. Res. Rec.* 2582, 72–86. doi:10.3141/2582-09
- Graneheim, U. H., and Lundman, B. (2004). Qualitative Content Analysis in Nursing Research: Concepts, Procedures and Measures to Achieve Trustworthiness. *Nurse Educ. today* 24, 105–112. doi:10.1016/j.nedt.2003.10.001
- Guba, E. G. (1981). Criteria for Assessing the Trustworthiness of Naturalistic Inquiries. *Ectj* 29, 75. doi:10.1007/bf02766777
- International Tele-Film Enterprises (2016). *Zero Road Deaths and Serious Injuries: Leading a Paradigm Shift to a Safe System*. Paris: OECD Publishing. doi:10.1787/9789282108055-en
- Iranian Legal Medicine Organization (2019). *Road Traffic Accidents in 2018-2019*. [Online] (Accessed April 30, 2019) Tehran, Iran.
- Jamroz, K., Budzyński, M., Romanowska, A., Żukowska, J., Oskarbski, J., and Kustra, W. (2019). Experiences and Challenges in Fatality Reduction on Polish Roads. *Sustainability* 11, 959. doi:10.3390/su11040959
- Jamroz, K., Kustra, W., and Żukowska, J. (2017a). Conditions and Capacity for Implementing Poland's Vision Zero. *MATEC Web Conf.* 122, 00001. doi:10.1051/mateconf/201712200001
- Jamroz, K., Michalski, L., and Żukowska, J. (2017b). Polish Experience of Implementing Vision Zero. *Curr. Trauma Rep.* 3, 111–117. doi:10.1007/s40719-017-0086-y
- Johansson, R. (2009). Vision Zero - Implementing a Policy for Traffic Safety. *Saf. Sci.* 47, 826–831. doi:10.1016/j.ssci.2008.10.023
- Johnston, I. (2010). Beyond "best Practice" Road Safety Thinking and Systems Management - A Case for Culture Change Research. *Saf. Sci.* 48, 1175–1181. doi:10.1016/j.ssci.2009.12.003
- Khademi, N., and Choupani, A.-A. (2018). Investigating the Road Safety Management Capacity: Toward a Lead Agency Reform. *IATSS Res.* 42, 105–120. doi:10.1016/j.iatssr.2017.08.001
- Khorasani-Zavareh, D. (2011). System versus Traditional Approach in Road Traffic Injury Prevention: a Call for Action. *J. Inj. Violence Res.* 3, 61. doi:10.5249/jivr.v3i2.128
- Kristianssen, A.-C., Andersson, R., Belin, M.-Å., and Nilsson, P. (2018). Swedish Vision Zero Policies for Safety - A Comparative Policy Content Analysis. *Saf. Sci.* 103, 260–269. doi:10.1016/j.ssci.2017.11.005
- Larsson, P., Dekker, S. W. A., and Tingvall, C. (2010). The Need for a Systems Theory Approach to Road Safety. *Saf. Sci.* 48, 1167–1174. doi:10.1016/j.ssci.2009.10.006
- Lauridsen, E. L., and Higginbottom, G. (2014). The Roots and Development of Constructivist Grounded Theory. *Nurse Res.* 21, 8–13. doi:10.7748/nr.21.5.8.e1208
- Mcandrews, C. (2013). Road Safety as a Shared Responsibility and a Public Problem in Swedish Road Safety Policy. *Sci. Technol. Hum. Values* 38, 749–772. doi:10.1177/0162243913493675
- Mendoza, A. E., Wybourn, C. A., Mendoza, M. A., Cruz, M. J., Juillard, C. J., and Dicker, R. A. (2017). The Worldwide Approach to Vision Zero: Implementing Road Safety Strategies to Eliminate Traffic-Related Fatalities. *Curr. Trauma Rep.* 3, 104–110. doi:10.1007/s40719-017-0085-z
- Mirani, N., Ayatollahi, H., and Khorasani-Zavareh, D. (2020). Injury Surveillance Information System: A Review of the System Requirements. *Chin. J. Traumatology* 23, 168–175. doi:10.1016/j.cjtee.2020.04.001
- Nihlén Fahlquist, J. (2009). Saving Lives in Road Traffic-Ethical Aspects. *J. Public Health* 17, 385. doi:10.1007/s10389-009-0264-7
- OECD/ITF (2008). *Towards Zero: Ambitious Road Safety Targets and the Safe System Approach*. Transport Research Centre.
- Peden, M., Scurfield, R., Sleet, D., Mohan, D., Hyder, A. A., Jarawan, E., et al. (2004). *World Report on Road Traffic Injury Prevention*. Geneva: World Health Organization.
- Safarpour, H., Khorasani-Zavareh, D., and Mohammadi, R. (2020a). The Common Road Safety Approaches: A Scoping Review and Thematic Analysis. *Chin. J. Traumatology* 23, 113–121. doi:10.1016/j.cjtee.2020.02.005
- Safarpour, H., Khorasani-Zavareh, D., Soori, H., Bagheri Lankarani, K., Ghomian, Z., and Mohammadi, R. (2020b). Vision Zero: Evolution History and Developing Trend in Road Safety: A Scoping Review. *Trauma Mon.* 25, 275–286.
- Salmon, P. M., McClure, R., and Stanton, N. A. (2012). Road Transport in Drift? Applying Contemporary Systems Thinking to Road Safety. *Saf. Sci.* 50, 1829–1838. doi:10.1016/j.ssci.2012.04.011
- Sharifian, S., Khani Jazani, R., Sadeghi-Bazargani, H., and Khorasani-Zavareh, D. (2019). Challenges of Establishing a Road Traffic Injury Surveillance System: a Qualitative Study in a Middle-Income Country. *J. Inj. Violence Res.* 11, 179–188. doi:10.5249/jivr.v11i2.1228
- Sheikhbardsiri, H., Doustmohammadi, M. M., Mousavi, S. H., and Khankeh, H. (2020). Qualitative Study of Health System Preparedness for Successful Implementation of Disaster Exercises in the Iranian Context. *Disaster Med. public health Prep.* 2020, 1–10. doi:10.1017/dmp.2020.257
- Sigbórsón, H., Jónsson, R., Einarsson, S., and Briem, V. (2013). *Vision Zero and Traffic Safety*. Icelandic Road Administration. Iceland: Reykjavik University.
- Šucha, M. (2014). Vision Zero from the Perspective of Traffic Psychology. *Trans. Transp. Sci.* 7, 1–8. doi:10.2478/v10158-012-0048-6
- Tetali, S., Lakshmi, J. K., Gupta, S., Gururaj, G., Wadhvaniya, S., and Hyder, A. A. (2013). Qualitative Study to Explore Stakeholder Perceptions Related to Road Safety in Hyderabad, India. *Injury* 44, S17–S23. doi:10.1016/s0020-1383(13)70208-0
- Tingvall, C., and Haworth, N. (2000). "Vision Zero: an Ethical Approach to Safety and Mobility," in 6th ITE international conference road safety & traffic enforcement: beyond, 2000, Melbourne, 6-7 September 1999, 6–7.
- WHO (2018). *Global Status Report on Road Safety 2018*. Printed in France: World Health Organization.
- World Health Organization (2012). *Advocating for Road Safety and Road Traffic Injury Victims: A Guide for Nongovernmental Organizations*. Geneva, Switzerland: WHO.
- Zahabi, S. A. H., Strauss, J., Manaugh, K., and Miranda-Moreno, L. F. (2011). Estimating Potential Effect of Speed Limits, Built Environment, and Other Factors on Severity of Pedestrian and Cyclist Injuries in Crashes. *Transp. Res. Rec.* 2247, 81–90. doi:10.3141/2247-10

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

**Publisher's Note:** All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors, and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Copyright © 2022 Safarpour, Khorasani-Zavareh, Soori, Ghomian, Bagheri-Lankarani and Mohammadi. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.