Policy Analysis of Road Traffic Injury Prevention in Iran

Saber Azami-Aghdash[1], Hassan Abolghasem Gorji[2,3], Hosein Shabaninejad[2], Homayoun Sadeghi-Bazargani[4]

[1] Ph.D. Candidate of Health Policy, Department of Health Services Management, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran
[2] Ph.D. Assistant Professor, Department of Health Services Management, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran
[3] Ph.D. Assistant Professor, Health Management and Economics Research Center, Iran University of Medical Sciences, Tehran, Iran
[4] Ph.D. Associate professor, Road Traffic Injury Research Center, Department of Statistics & Epidemiology, School of Health, Tabriz University of Medical Sciences, Tabriz, Iran

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Abstract

Introduction: Due to the large number of Road Traffic Injuries (RTIs) in Iran, authorities have implemented a number of policies for the prevention of RTIs. However, a scientific analysis of these policies has thus far been neglected. Therefore, this study was conducted for policy analysis of RTIs prevention in Iran.

Methods: This qualitative study with a case study approach was conducted in Iran during 2016 in two phases: First, by reviewing literature and documents of the past ten years, policies that have been executed to prevent RTIs in Iran were identified. In the second phase of the study, the identified policies were ranked by prioritization matrices. The two policies with the highest scores were selected. 'Policy triangle framework' was used for Policy analyzing. Stakeholders of these policies (42 people) were interviewed. Data were analyzed manually by implementing Content-Analysis methods.

Results: The policies of "pupil liaisons" and "safety belt" were selected for analysis from thirteen potential identified polices. The results of some studies revealed that safety belts had not been properly used in Iran (less than 80%). There was an eight-year hiatus between the approval of the safety belts policy and implementation of this policy. Eight actors were identified for safety belts policy. Lack of diligence in implementation of the policy, failing to pay adequate attention to education and the culture of driving, and failing to select an organization for the implementation of the policy, were identified as the main weaknesses of this policy. For 'pupil liaisons' policy, five actors were identified. Following the implementation of this policy, the number of penalties was reduced (17.9%). Neglecting scientific findings and individual-based nature of the policy were identified as the primary weaknesses of this policy.

Conclusions: Taking serious measures to properly execute the policy, educating people, selecting an efficient organization that is responsible for the implementation of the policies, and using international experience are the measures that can be taken to reduce the number of RTIs in the country.

Keywords: Road Traffic Injuries, Prevention, Policy analysis, Policy triangle framework

1. Introduction

Road Traffic Injuries (RTIs) are the primary cause of death and permanent disability worldwide, particularly in Low and Middle Income countries (LIMCs) (1-4). A large number of people who are taken into the emergency departments of hospitals are injury cases caused by RTIs (1, 5). Such accidents impose huge direct and indirect costs on the shoulders of government and society not to mention the personal loss and tragedy to families. (6). It is estimated that two million people are killed and fifty million others are injured in RTIs each year (7). It is predicted

that an increase of 65% will be observed in these figures in the next twenty years (8). In Iran, RTIs are the first cause of injury and the second cause of death (9, 10). On average, each day 64 people are killed and 1,967 people are injured in RTIs in Iran (11-13). Historically, RTIs are often considered as accidents that happen to other people and are inevitable and unpreventable circumstances. However, the results of an extensive body of research have shown that RTIs are preventable (14, 15). It is a conclusion that has been confirmed by all experts and actors in this field (16, 17). In High Income Countries (HICs), effective interventions have been taken, to reduce the number of RTIs. These interventions include speed control laws, the banning of drinking alcohol before driving, the necessity of using safety belt and child safety car seat, and improving the conditions of roads and vehicles (18-20). Similar to other LIMCs, a large number of interventions have been executed in order to reduce the number of RTIs (21, 22). According to a 2009 study by Soori and colleagues, the most outstanding problem in the execution of traffic policies is the lack of proper policy-making (23). Since a large number of policies have been executed in order to prevent the growth of RTIs in Iran, this study was conducted for a policy analysis of these preventive policies.

2. Material and Methods
This study was conducted in 2016 to analyze RTIs prevention policies in Iran. 'Policy triangle framework' was used for policy analysis.

2.1. Policy triangle framework
Policy triangle framework was designed in 1994 by Walt and Gilson for the analysis of health sector policies. In 2008 Walt and colleagues made some slight changes to this framework. This model covers four general areas: content, context, actors, and policy-making process. Content includes policy objectives, operational policies, etc. Actors refer to acting and influential individuals and organizations. Context refers to social, economic, political, cultural, and other environmental conditions. Process includes four sections: agenda setting, policy formulation, policy implementation, and policy evaluation (24). In this study, initially, RTIs prevention literature and documents of the past ten years were gathered from data bases, websites, organizational reports, and documents of acting organizations. In the next phase of study, policies which had been identified, using opinions of experts and stakeholders were ranked by prioritization matrices. After the ranking of policies, the two policies with the highest priority were selected. Then, these policies were analyzed by policy triangle framework.

2.2. Policy identifying
In order to identify policies, literature review and document analysis methods were used.
2.2.1. Literature review
In this phase of study, online articles and reports were collected. These data were gathered from websites, search engines, libraries, and various data bases. Both English data bases (Scopus, PubMed, and Google scholar) and Persian data bases (MagIran, SID, IranMedex, IranDoc) were used for the collection of data. The keywords of 'road, Iran, prevention, traffic collision injuries, road traffic injury, road traffic crashes, traffic accidents' and their Persian equivalents were used to collect the data. Also, the published hard copy versions of magazines, articles (reference of reference), reports, and documents were used, to gather the data.
2.2.2. Document analysis
In this phase of study, documents whose online versions were not accessible were collected from offices. Documents of RTIs prevention were collected from organizations which were involved in traffic planning, including Traffic Police, parliament (Majlis), Ministry of Roads and Transportation, Ministry of Industry, Ministry of Health and Medical Education, Ministry of Culture and Islamic Guidance, Ministry of Education, Medical jurisprudence Organization, Central Insurance Organization, Ministry of Interior, Red Crescent, and Emergency Department.

2. 3. Ranking of policies
In this phase, the identified policies in the previous phase of the study were ranked by using prioritization matrices. This was determined on three indices: importance, relevance to RTIs prevention, and suitability for policy analysis. This ranking was determined on the basis of views of 42 experts and actors in this area. In this phase, 'pupil liaisons' policy and 'safety belt' policy (necessity of using safety belts), which had the highest scores, were selected for analysis in the next phase.

2.4. Data collection
In order to collect the data, three methods were used: semi-structured interviews, published reports and document analysis.
2.4.1. Semi-structured interviews
Participants of the interviews were a number of actors and experts in the RTIs prevention field, and from various organizations, including Traffic Police, Ministry of Health and Medical Education, Ministry of Roads and

Transportation, Ministry of Industry, Ministry of Culture and Islamic Guidance, Ministry of Education, Medical Jurisprudence Organization, Central Insurance Organization, Ministry of Interior, Red Crescent, Emergency Department, and Law Enforcement Forces. These groups of people were specifically selected for their knowledge and experience in this area. Three criteria were taken into account for the selection of this group of people: having a position related to RTIs prevention, having sufficient knowledge in fields related to RTIs (authors, correspondents, report writers, etc.), and having the motivation to participate in the study. Purposive sampling method was used to select participants. In this method, people with the highest degree of knowledge and expertise in this field are selected in order to provide comprehensive information for the study (25, 26). The process of data gathering continued until the time that researchers of the study felt that no new information could be obtained. This phase of study was conducted by the participation of 25 people. In the interviews, a number of questions were used that had been designed by the help of experts and reviewing literature. Each interview took between 60 and 90 minutes. Participants of the study attended these interviews voluntarily. They were informed that they were free to leave the study at any moment they wished. The objectives of the study were explained to the participants before interviews.

2.4.2. Published articles and reports

In this phase of the study, online articles and reports on "pupil liaisons" and "safety belt" policies were collected. Results obtained from reviewing the literature were combined in policy identification phase.

2.4.3. Documents analysis

Eight organizational and governmental documents of "pupil liaisons" policies and "safety belt" policies were examined. This was done after obtaining permission from respected authorities and observing the principles of confidentiality. This was conducted by two researchers of the study.

2.5. Data analysis

Data obtained from the literature, documents, and semi-structured interviews were manually analyzed by Content-Analysis methods. Codification of data was carried out by two researchers of the team.

3. Results

3.1. Ranking (prioritization) of policies

After reviewing the literature and documents, thirteen policies of RTIs prevention were identified. These policies were ranked on the basis of the views of forty two experts and actors of this field. At this stage, "pupil liaisons" policy with an average score of 14 (out of 15) and "safety belt" policy with an average score of 13 (out of 15) were selected for analysis in the next stage of study.

3.2. Context

3.2.1. An overall picture of RTIs in Iran

According to the 2015 World Health Organization (WHO) report, the number of fatalities caused by RTIs in Iran was 17,994 in 2013-2014 (according to information provided by Iranian officials). However, according to an estimation made by WHO, the number of fatalities caused by RTIs in Iran was higher (24,896 cases). Among these fatalities, 77% were men and 23% were women. According to the estimations of WHO, number of fatalities is 32.1 in 100 thousand people. According to this report, the highest numbers of deaths have been caused by accidents involving 4-wheeled passenger cars and light vehicles (24%) and pedestrians (23%). Based on the information provided in this report, the number of fatalities caused by RTIs has reduced from 40 deaths in every 100 thousand people in 2005 to 24 deaths in every 100 thousand people in 2014 (27).

3.2.2. Using safety belts by Drivers in Iran

According to a 2015 WHO report, 85% of Iranian people sitting in the front seat of cars and 10% of passengers sitting in the back seats used safety belts. The results of some studies in Iran have been given in table 1. As can be seen, the percentages of using safety belts by drivers and passengers are different (between 50% and 77.9%).

3.2.3. Pupil liaisons

A Pupil Liaisons policy was introduced for students of elementary and guidance schools. The aim of this policy was to improve a culture of safety and social discipline among students and their parents, to enhance responsibility and self-confidence among students, to teach students safety and traffic points, to familiarize students with those law violations that might cause accidents, and to teach students how to respect laws and social regulations. The aim of this policy was to reduce the number of traffic law violations and the subsequent damages which might be caused by these violations. The execution of this policy began in 2007. The Pupil Liaisons approach, trains pupils to remind drivers of traffic law violations in cases where drivers do not observe traffic laws. They were trained to carry out their duty in a respectful way, and assigned to report such traffic law penalties in necessary cases. These pupil liaisons were expected to do this duty in areas inside and outside the cities (28).

Table1. The results of some studies about using safety belts by drivers and passengers in Iran

Ref. no.	Participants	Results
41	All car occupants injured in RTAs (n = 822) who were transported to hospital and hospitalized for more than 24 hours from March 2012 to March 2013	A total of 560 patients used seat belts (68.1%). The unbelted occupants were younger (28 years vs. 38 years) and had more frequently sustained head, abdomen and multiple injuries (p = 0.01, p = 0.01 and p = 0.009, respectively)
42	College students	More than 50% of college students traveled unbelted.
43	Cars and taxi drivers (n = 10,752)	The rate of seat belt use was 70.9%, and was significantly higher in females, elders and on freeways and significantly less in afternoon hours
44	Drivers and front passengers	77.9% of drivers and 43.7% of front passenger had seat-belts fastened. More women used seat-belts than did men while driving but fewer as front-seat passengers.
45	15 to 44-years old people	The rate of seat belt use was estimated to be 54.4%
46	Vehicles drivers (n = 10.255)	The overall rate of seat belt use being 51.8%.

Table 2. The summary of results related to the content of "safety belt" and "police assist" policies

Content	Safety belt policy	Pupil liaisons
Law	Yes	No
Year of ratification	1997	2006
Year of execution	2005	2007
Currently being executed	Yes	Yes
Ratifying organization	Parliament (Majlis)	Ministry of Education and Traffic police that executed this policy
Executive directive	Executive directive: 18/3/2001, 25/6/2005	-
Target group	Drivers and passengers sitting in the front seat in inter-city roads, ring roads, and highways in the cities	Pre-school and elementary school students as well as first grade guidance school students
Proposing organization	Traffic police of law enforcement forces	Traffic police of law enforcement forces
Objective	Reducing the number of deaths and injuries and also economic losses caused by driving accidents	Improve the culture of safety and social discipline among students and their parents, to enhance responsibility and self-confidence among students, to teach students safety and traffic points, to help students become accustomed to those law violations that might cause accidents, and to teach students how to respect laws and social regulations
Summary of the manner of execution	All owners of cars are required to equip their cars with standard safety belts in the front seat for drivers and passengers. The use of safety belts for drivers and passengers in the front seat is necessary in inter-city roads, highways in the cities, and ring roads. Children under 12 should not sit in the front seat. Technical check-up license will not be issued for vehicles which do not have safety belts in the front seats.	The person in charge of executing "pupil liaisons" policy holds educational sessions for students and parents at the beginning of school year. Interested students are invited to participate in the policy. Membership cards are issued for students who are interested to participate in the plan. These students attend training courses that are held by the presence of traffic police at schools. After these training courses, these pupil liaisons are obliged to remind drivers of traffic law violations in cases that drivers do not observe traffic laws. They were expected to do this by a respectful language

3.3. Content
The summary of results related to the content of "safety belt" and "pupil liaisons" policies is shown in Table 2.

3.4. Actors
Eight actors were identified for safety belts policy included: Traffic police, Ministry of Interior, Ministry of Industry and Mines, Ministry of education, Ministry of Culture and Islamic Guidance, Ministry of Roads and Transportation, Ministry of justice and Management and Planning Organization. five actors were identified for 'pupil liaisons' policy included: Traffic Police, Ministry of Education, Ministry of Culture and Islamic Guidance, Management and Planning Organization, Parent-teacher council.

3.5. Policy-making process
Policy-making process consists of four parts: agenda setting, policy formulation, policy implementation, and policy evaluation. A summary of these parts has been given in table 3.
The most important strengths and weaknesses of "safety belt" and "pupil liaison" policy have been given in table 4. These are based on the views of interviewed participants.

Table 3. Summary of policy-making processes of "safety belt" and "pupil liaisons" policies in Iran

Policies	Safety belt policy	Pupil liaisons
Agenda setting	Increase RTIs, The identification of safety belt as an effective tool for reducing damages in accidents, The need for increasing safety equipment in vehicles, Pressure from actors	Increase RTIs, The need for the participation of people, The need for encouraging children to observe safety issues, The need for inter-sectional cooperation, The role of children in the implementation of traffic laws
Policy formulation	Policy offer: by Traffic Police, Approval of law: in parliament (Majlis), Designing an executive directive: by Ministry of Interior, Ministry of Justice, Ministry of Industry and Mines, Ministry of Roads and Transportation, Approval of executive directive: by board of government	By Traffic Police and Ministry of Education
Policy implementation	Coercion to using safety belt: from up to down model by Traffic police	Voluntary. Parallel (up to down and down to up)
Policy evaluation	The results of a 2009 study conducted by Soori et al. showed that after the implementation of "safety belt" law, the percentage of deaths caused by accidents reduced from 13% in the first year to 9.7% in the second year (20)	The results of a 2010 study conducted by Soori et al showed that after the implementation of "pupil liaisons" policy, number of penalties reduction was 17.9% (19)

Table 4. A summary of the most important strengths and weaknesses of "safety belt" and "pupil liaisons" policies in Iran on the basis of views of interviewed participants (25 participants)

Strengths and weaknesses	Policies	
	"Safety belt" policy	"Pupil liaisons " policy
Weaknesses	Neglecting the implementation of policy in the second year and the following years, Neglecting educational issues and the culture of using safety belt, The absence of an organization for the implementation of law (decision-making, implementation, and control), The ineffectiveness of fines for non-use of safety belts during driving, Non-standard safety belts	Not using scientific findings (based on scientific findings, the education of traffic laws for children under 8-9 is not useful), Individual-based nature of the policy, Neglecting the implementation of the policy after some time
Strengths	The involvement and participation of various organizations, The increase of using safety belts, The increase of paying more attention to safety issues in vehicles	The increase of inter-sectional cooperation (traffic police and Ministry of Education), Using potential powers and capacities of society, Increasing the culture of safety

4. Discussion

After examining literature and documents, thirteen policies whose aim was to reduce RTIs were identified. "Pupil liaisons" and "safety belt" policies were selected for policy analysis. According to a 2015 WHO report, the number of deaths caused by RTIs in Iran was 24,896 in 2013-2014. Among deaths caused by accidents worldwide (in every 100 thousand people), only six countries had a higher death rate than Iran. According to this report, the efficiency of laws and policies was 70% (7 from10) (27). Also, it was reported that 85% of people sitting in the front seat and 10% of passengers sitting in the back seats use safety belts. The results of studies have shown that safety belts are not properly used in Iran. A review of literature showed that a safety belt is an effective tool for reducing the damage that is caused by RTIs. Therefore, it is necessary to take serious measures for the implementation of "safety belt" policy. Because of the high number of RTIs in Iran, a number of intervention programs have been conducted in recent years, to reduce the number of such accidents. According to a report issued by Traffic Police of Law Enforcement Forces, some interventions and programs such as heavy punishments for high speed, the improvement of safety equipment, and the increase in fines have been relatively effective in reducing the number of RTIs. Other interventions such as increasing the budget of Traffic Police, repairing roads, using CCTV cameras, improving medical care, and improving structural facilities (particularly in railroads) were not significantly successful in reducing the number of RTIs (11). Therefore, it is necessary to reconsider interventions and policies, and to solely employ only those policies which are effective in preventing RTIs.

The policy which made safety belts necessary was approved by parliament (Majlis) in 1997. The executive directive of this law was designed in 2000. In 2004, this directive was reviewed and notified for implementation. There was a period of eight years between approval and implementation of the policy. Because the conditions may change over such a long period between approval and implementation, the policy might lose its effectiveness (29, 30). Eight organizations were selected as actors for "safety belt" policy. A 2009 study by Soori and colleagues identified fifteen organizations (Ministry of Roads and Transportation, Ministry of Industry, Ministry of Health, Traffic Police, Ministry of Science and Higher Education, Ministry of Education, Medical Jurisprudence Organization, Ministry of Interior, Red Crescent, Emergency Department, Law Enforcement Forces, Islamic republic of Iran Broadcasting, Ministry of Justice) as the actors in issues related to RTIs in Iran (23). Among the eight identified actors in this study, six cases were consistent with the results of the study conducted by Soori. Traffic Police and the government cabinet played a key role in the approval and implementation of "safety belt" policy. These results are consistent with the results of the study conducted by Soori et al which identified Traffic Police and the presidential office as the key bodies for dealing with RTIs. Therefore, it seems that Traffic Police can play an integral part in preventing RTIs if it is given the power and enough resource. The approval of effective laws and a clear definition of duties and also the direct support of presidential office can help Traffic Police to achieve this objective. In many countries, traffic police and central government take a responsible role in dealing with RTIs (31-33). There is no doubt that other organizations must support traffic police, because a systematic approach and inter-sectional cooperation is crucial to achieving RTIs prevention (34-36). A research conducted by Soori and colleagues was the only study that had evaluated the effectiveness of "safety belt" policy (37). The results of this study showed that after the implementation of "safety belt" law, the number of deaths caused by RTIs reduced from 13% (in the year before the implementation of policy) to 9.7% in the first year and 11.3% in the second year after the implementation of law. According to these results, the number of deaths in the second year was 1.6% higher than the number of deaths in the first year following the implementation of policy. Authors concluded that "safety belt" policy had been particularly effective in the first year after the implementation of policy. However, it is necessary to make every effort to encourage people to respect this law continuously and in all conditions. People should be encouraged to become accustomed to these laws. s. Similarly, participants of this study believed that neglecting the proper implementation of the policy in the second year and following years is one of the main weaknesses of "safety belt" policy. This is consistent with the results of a 2009 study, conducted by Khorasani-Zavareh and colleagues (38). Also, participants of this study believed that people had not been properly taught how to use safety belts. Therefore, it is necessary to educate people on how to use safety belts and make it a culture among people. We should consider that educational interventions can be leads to an increase in knowledge of people, but cannot be effective if it does not change their behavior (39).

The implementation of "Pupil liaisons" policy started in 2007 by the cooperation of Traffic Police, heads of schools, and students. In this policy, nine cases of traffic law penalties were taught to students (excessive speed, overtaking ban, maze movement, talking on the phone while driving, talking to others while driving, driving during tiredness and sleeplessness, not using safety belts, eating while driving, and not paying attention to signs and traffic lights). Pupil liaisons are required to remind drivers of any traffic law penalties in cases where drivers do not observe traffic

laws. In necessary cases, these pupil liaisons are obliged to report such penalties. The execution of such policies could help students to become accustomed to safety issues and traffic laws, to improve social responsibility, to strengthen self-confidence, and to propagate the culture of respect for social laws. These can lead to a reduction in traffic law penalties and damages and losses caused by these penalties. According to Iran Census Organization, in the year of 2014-2015, 9,241,825 students were studying at elementary and guidance school levels. The participation of students in RTIs prevention programs can produce positive results in short terms and log terms. The 2010 study conducted by Soori and colleagues evaluated the effectiveness of "Pupil liaisons" policy. The results of this study showed that the implementation of this policy led to a 17.9% reduction in the number of traffic law penalties. The maximum number of penalties was related to eating and drinking while driving. Apart from "talking on the phone while driving", other traffic law penalties reduced once the policy had begun (28). Considering the majority of these pupil liaisons will be future drivers, it can be expected that the number of traffic law penalties will reduce in future, and the roads and streets will be safer. Therefore, the increase of a target group, together with an increase in support, can have short-term and long-term positive results. Many of the participants of the study believed that elementary students who are under 10 years old, should not be the target of this policy. They considered it as a weakness of "pupil liaisons" policy. They believed that such education creates a false confidence among children. The results of an objective 2002 study conducted by Duperrex and colleagues showed that such policies do not produce positive results among students who are under 10 years old (40). In order to solve such problems, it was recommended that the policies be taught during holidays and summer, because there is a sharp increase in the amount of travel in these periods. Also, these educational policies are generally directed towards children who are older than 10 years old. Based on the results obtained from reviewing literature, and our best knowledge, this research was the first to objectively analyze the RTIs prevention policies. However, limited access to documents was the important limitation of this study.

5. Conclusions

Due to the critical role of education in RTIs prevention, "Pupil liaisons" policy was executed to use all current capacities. Safety belts are not properly used by drivers and passengers in Iran. Serious measures must be taken and educational programs must be held to encourage people to use safety belts. Moreover, an organization with sufficient power and budget must take the responsibility for the execution of such RTIs prevention policy. Using international experience about "Pupil liaisons", holding educational sessions during holidays and summer, and executing this policy for children above 10 years old are factors that can contribute to the success of these policies. Policy analyses of other RTIs prevention interventions are recommended for future studies.

Conflict of Interest:
There is no conflict of interest to be declared.

Authors' contributions:
All authors contributed to this project and article equally. All authors read and approved the final manuscript.

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