

What can research evidence tell us about:

Reducing Road Traffic Accident: Rapid Evidence Synthesis

[February 2022]

Summary of the review

Intervention identified for reduction of road traffic accidents were:

- **Legislation and enforcement:** Legislation focusing on mandatory motorcycle helmet usage, banning cellular phone usage when driving, seat belt laws, decreasing the legal blood alcohol content (BAC) level from 0.06 g/L to 0.02 g/L reduces road traffic crashes, injuries and deaths.
- **Public Awareness/Education:** focusing on seat belt use, child restraint use, educational training in health centers and schools/universities, and public awareness with media through distribution of videos, posters/souvenirs, and pamphlets are effective in reducing fatalities in short run.
- **Speed Control:** through traffic calming bumps, or speed bumps, rumbled strip are effective in reducing accident and fatality.
- **Mandatory motorcycle helmet:** reduces mortality.
- **Graduated driver license (GDL):** reduces road traffic injury.
- **Street lighting:** is a low-cost intervention which may reduce road traffic accident

What is Rapid evidence synthesis?

Rapid evidence synthesis addresses the needs of policymakers and managers for research evidence that has been appraised and contextualized to a specific context in a matter of hours or days. This rapid evidence synthesis goes beyond research evidence and integrates multiple types and levels of evidence

Where did this Rapid Evidence synthesis come from?

This document was created in response to the current situation of road traffic accident in Ethiopia. It aimed to contribute to the reduction of road traffic accident by availing the best available evidence. It was prepared by the Knowledge Translation Directorate, Ethiopian Public Health Institute, and

+ Included:

- **Key findings** from the available studies

✗ Not included:

- Recommendations
- Detailed descriptions



Background

The number of roads traffic death remains unacceptably high. Global estimate shows that about 1.35 million people die from preventable accident and 50 million are injured by road traffic accident every year. Road traffic accident is the 8th leading cause of death among people of all ages while it is the leading cause of death for age group of 5-29 years. This disastrous problem is worsening with the increasing number of vehicles. It is estimated that road traffic accident will be a cause for 13 million deaths and 500 million injuries in the coming ten years globally (WHO, 2018, WHO, 2021). The rate, scale and other impact of the problem is even worse in low and middle-income countries which makes road safety development a priority in these countries. Even though there is limited number of registered vehicles in developing countries, more than 90 percent of the world's road death happens in these countries. The rate of death in low-income countries is more than 3 times higher compare to the high-income countries. The rate of road traffic death is highest in Africa (26.6/100,000 people) followed by South-East Asia (20.7/100,000 people). It was also estimated that, road traffic accident incurs a total cost of one to three percent of the total Gross National Product (GNP) (WHO, 2018, WHO, 2021; Raffo and Bliss, 2020).

Reports indicated that, worsening trend of road traffic injury (RTI) was observed in two (Africa and Asia) of the six WHO regions. Financial losses in LMICs due to RTIs are also estimated to be US\$100 billion/year. RTI victims are not able to participate in economic activities where RTI consequently put households into poverty, for crash survivors and their families strive to cope with the event and long term effect of the

How this Rapid Evidence synthesis was prepared?

The methods used to prepare in this rapid evidence review were adapted from the SURE Rapid Response Service.

www.evipnet.org/sure/rr/methods

In this review, we have searched for relevant evidence related to reduction of road traffic accident in Low and Middle income countries.

The evidence in this summary comes from systematic reviews and other studies.

It was prepared based on structured searches of the literature and selected evidence-based healthcare databases (PubMed, the Cochrane Library, TRANSPORT, Health system evidence, Epistemonikos and SUPPORT summary).

event limit the activity of the victim. On the other hand RTI affects the young age group which are usually the most productive part of the society (Global Road Safety Facility., 2012; WHO, 2018).

In response to the problem, the United Nations Decade of Action for Road Safety 2011-2020 sets an ambitious goal. The goal was to reduce the estimated level of traffic fatalities in low and middle-income countries by half in the year 2020. This was expected to prevent about 5 million lives, avert 50 million serious injuries and provide an economic benefit of more than US\$3 trillion (UNITED NATIONS, 2016; Raffo and Bliss, 2020). The a Second Decade of Action for Road Safety 2021–2030 stressed the same plan as the previous plan of reducing death and injuries resulting from road traffic accidents by 50% in this decade (WHO, 2021).

Middle and high-income countries made more progress in reducing the number of road traffic deaths than low-income countries. Between the years 2013 and 2016, no decrement in the total number of road traffic death was observed in any low-income country (WHO, 2018). The problem remained unchanged globally in the past 20 years in both relative and absolute terms too (WHO, 2021).

The objective of the review:

The objective of this review is to summarize the best available evidence on intervention that can reduce road traffic injury.

Methods

A rapid evidence synthesis approach adapted from the SURE Rapid Response Service was applied to search, appraise and summarize the best available evidence on effective intervention in reducing road traffic injury. To answer the question under review we searched for relevant studies from databases including PubMed, the Cochrane Library, TRANSPORT, Health system evidence, Epistemonikos and SUPPORT summary. The following key terms were used for searching: Road traffic accident, RTA, Injury, Reduc*, Prevent*, Minimiz*, “Low and middle income country”, LMIC.

We found 18 articles through search of different data bases mentioned above. After screening for the titles and abstracts of the articles, four of them which satisfy the inclusion criteria were included in the final review (Beyer and Ker, 2009; Salam *et al.*, 2016; Staton *et al.*, 2016; Lepard *et al.*, 2021).

Inclusion and exclusion criteria

All systematic reviews conducted on road traffic accidents in low and middle-income countries were included for this review. The included studies were filtered for the English language. The last search was made on Dec 08, 2021, with no date restriction. News, letters, editorials, reports, communications, comments, and correspondence were not included.

Review findings

We searched for relevant studies on different databases to answer the objectives under review. Based on our search, we identified systematic review, meta-summary, meta-analysis and review. Then we appraised and graded the methodological quality of systematic reviews that are deemed to be highly relevant using AMSTAR 2.

Evidence on interventions to reduce road traffic accident (RTA)

We found four eligible evidence that discuss reducing road traffic accident (RTA) specifically from low and middle income countries. All the identified studies were systematic reviews. The identified interventions to reduce road traffic accident were Legislation and enforcement, Public Awareness/Education, Speed Control/ rumble strips, Road Improvement, Mandatory motorcycle helmet, graduated driver license (GDL), and Street lighting (Beyer and Ker, 2009; Salam *et al.*, 2016; Staton *et al.*, 2016; Lepard *et al.*, 2021). The summary of the findings related to interventions to reduce road traffic accident (RTA) is found in table 1.

1. Legislation and Enforcement

Legislation interventions reduced road traffic crashes, injuries and deaths with the best results in the setting of good enforcement initiatives. Legislation focusing on mandatory motorcycle helmet usage, banning cellular phone usage when driving, seat belt laws, decreasing the legal blood alcohol content (BAC) level from 0.06 g/L to 0.02 g/L (Staton *et al.*, 2016).

2. Public Awareness/Education

A significant reduction in fatalities appeared immediately following enactment public awareness campaigns with non-significant decreases over time. Public awareness focusing on seat belt use, child restraint use, educational training in health centers and schools/universities, and public awareness with media through distribution of videos, posters/souvenirs, and pamphlets are highlighted (Staton *et al.*, 2016).

3. Speed Control

Public awareness and speed control interventions alone appeared to have no significant effects on reducing road traffic injuries or fatalities. But when these are combined with other approach, they were shown to be more effective at significantly reducing road traffic fatalities and injuries over time. Means of speed control includes traffic calming bumps, or speed bumps, rumbled strip (Staton *et al.*, 2016).

4. Road Improvement

Because speed control is crucial to crash and injury prevention, road improvement interventions should consider how the impact of improved roads will affect speeds and traffic flow. In LMICs where enforcement and resources are limited, rumble strips could be effective at reducing road traffic crashes and fatalities through speed control (Staton *et al.*, 2016).

5. Street Lighting

Street lighting is a low-cost intervention which may reduce road traffic accident. Street lighting improves a driver's visual capabilities and ability to detect roadway hazards. It is

also argued that street lighting may have an adverse effect on road safety where drivers may 'feel' safer because lighting gives them improved visibility which could result in increasing speed and reducing concentration. This is important to low and middle-income countries where the installation of suitable lighting systems is less common than in high-income countries (Beyer and Ker, 2009).

6. Graduate Driver License (GDL)

Graduate driver license (GDL) reduce road traffic injury by 19%. GDL included two licensing levels of restrictions on teens' driving before they are eligible to drive without restrictions. The first level is a learner license that allows teens to gain driving experience under the supervision of a fully licensed driver (i.e., a parent or parent-designated adult). The second level is an intermediate license that allows teens who have gained experience driving with a learner license to drive independently but with restrictions that limit their exposure to the highest risk driving conditions (i.e., at night and with young passengers) (Salam *et al.*, 2016).

7. Mandatory Motorcycle Helmet Use

Enactment of helmet legislation for motorcycle users is associated with 29% reduction of fatalities (Lepard *et al.*, 2021).

Table 1: Summary findings of interventions reducing road traffic accident (RTA), Feb, 2022.

Studies	Findings	Type of document	Quality of the evidence
Road Traffic Injury Prevention Initiatives: A Systematic Review and Meta summary of Effectiveness in Low and Middle	<ul style="list-style-type: none"> ➤ Legislation interventions reduced road traffic crashes, injuries and deaths with the best results in the setting of good enforcement initiatives. ➤ Legislation as well as education and public awareness campaigns, a significant reduction in fatalities appeared immediately following 	A Systematic Review and Meta-summary	Low Quality

<p>Income Countries (Staton C., et al, 2016)</p>	<p>enactment with non-significant decreases over time.</p> <ul style="list-style-type: none"> ➤ Public awareness and speed control interventions alone appeared to have no significant effects on reducing road traffic injuries or fatalities. But when these are combined with other approach, they were shown to be more effective at significantly reducing road traffic fatalities and injuries over time. ➤ Road improvement interventions should consider how the impact of improved roads will affect speeds and traffic flow. In LMICs where enforcement and resources are limited, rumble strips could be effective at reducing road traffic crashes and fatalities through speed control. 		
<p>Differences in outcomes of mandatory motorcycle helmet legislation by country income level (Lepard JR. et al, 2020)</p>	<p>Mandatory motorcycle helmet laws reduce mortality</p> <p>Enactment of helmet legislation for motorcycle users is associated with 29% reduction of fatalities</p>	<p>A systematic review and meta-analysis</p>	<p>Low quality</p>
<p>Interventions to Prevent Unintentional Injuries Among Adolescents: (Salam RA. Et al, 2016)</p>	<p>possession of a graduated driver license (GDL) for new young drivers significantly reduced road accidents by 19%</p>	<p>A Systematic Review and Meta-Analysis</p>	<p>Low quality</p>
<p>Street lighting for preventing road traffic injuries</p>	<p>Street lighting may prevent road traffic crashes, injuries and fatalities.</p>	<p>(A systematic</p>	<p>Medium</p>

(Beyer and Ker, 2009)		Review)	Quality
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In addition, WHO developed an evidence based road safety strategy called **Save LIVES** to be implemented to support the achievement of SDG targets. The components of **Save LIVES** are **S**peed management, **L**eadership on road safety, **I**nfrastructure design and improvement, **V**ehicle safety standards, **E**nforcement of traffic laws and **S**urvival after a crash as presented in the below table (WHO, 2017). See Table 2 below for details.

Table 2: WHO recommendations on road safety

Recommendation	Detail explanation
S ^{ave} Speed Management	<ul style="list-style-type: none"> ✓ Develop and enforce speed management law at all level ✓ Build or modify roads which calm traffic, e.g. roundabouts, road narrowing, speed bumps, chicanes and rumble strips
L Leadership on road safety	<ul style="list-style-type: none"> ✓ Create and fund body that manage, develop, monitor and evaluate road safety strategy ✓ Awareness creation through campaign and public
I Infrastructure design and improvement	<ul style="list-style-type: none"> ✓ Create safe infrastructure for all road users, sidewalks, safe crossings, refuges, overpasses and underpasses separate line for motors and bicycles, provide better and safer rout for public transport.
V Vehicle safety standard	<ul style="list-style-type: none"> ✓ Develop and enforce vehicle safety standard like seat-belts, frontal impact, side impact, electronic stability control, pedestrian protection, and ISOFIX child restraint points
E Enforcement of traffic law	<ul style="list-style-type: none"> ✓ Create and enforce law related to drinking and driving, motorcycle helmets, seat-belts, and child restraints
S Survival after a crash	<ul style="list-style-type: none"> ✓ Establish integrated pre-hospital and facility base emergency care ✓ Train those who are responsible for the care

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Contribution of Authors

- All authors equally contribute to the development of the rapid evidence brief.

Conflict of interest

- There is no conflict of interest.

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