

C_{Acc}^E : External costs of congestion due to traffic accidents

C_{Delay}^E : External costs of congestion due to wasted times and delays

C_{AP}^E : External costs of congestion due to air pollution

VOC_{Total} : Additional external operational costs of vehicles

All costs are in Rial/Km. Vehicular operational costs are calculated based on the following relation:

$$VOC_{Total} = VOC_F + VOC_M + VOC_S$$

The elements of operational costs are fuel consumption, periodical services, and repairs. The relation for calculation of costs due to delays is as following:

$$C_{Delay}^E = \frac{VOT_T \times T_{CS} \times (T_{CS} \times \beta_p \times V_{CS})}{L_{CS}}$$

VOT_{Total} : The value of time for all trips in Rial/hour

T_{CS} = delay in comparison with the average speed in freeway (70 km/h)

β_p = factor related to vehicle occupation (person/veh)

V_{CS} = average of traffic volume (veh/h)

L_{CS} = total length of the freeway in this study (km)

The additional cost of pollution due to congestion is calculated as following:

$$C_{AP}^E = 10^{-9} * (C_{AP}^{LOSS^E,F} - C_{AP}^{LOSS^D}) * P * U_p^I$$

C_{AP}^E : Additional external cost of pollution

P : Factor of pollution dissipation in passenger cars

U_p^I : The cost of one metric ton of dissipated pollution in Iran

The additional cost of congestion due to traffic accidents, has been based on a comprehensive study of accident cost performed earlier in Iran.

Applying the abovementioned research method, and assuming 6 hours of congestion in Hemmat freeway in Tehran in a working day, the average total cost of congestion for such working day, has been computed for six different average speeds of 10 to 60 km/h. The cost related to average speed of 60 km/h is equal to 3 396 681 162 Rial per one kilometre, which is equal to 91802 US Dollar per kilometre.

Calculating the external costs of density with these number of elements that influence on it, and the data used relative to freeways in Tehran (Iran capital) are the specific features and innovations of this paper. The result of this paper is to provide a comprehensive and practical method for calculating the external costs of highway congestion, that with using this information, it is possible to provide the appropriate solutions to invest properly in order to solve this problem.

608 ENVIRONMENTAL CHANGE TO REDUCE CHILD INJURY IN LOW AND MIDDLE INCOME COUNTRIES: A SYSTEMATIC REVIEW

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Background Injuries sustained in the home are a significant contributor to the burden of death and disabilities among young

children especially those living in Low and Middle Income Countries (LMICs). The objective of this review was to identify and evaluate the effectiveness of environmental change interventions to reduce child injuries and injury hazards in the home in LMICs. **Methods** Seven electronic databases were searched for randomised controlled trials (RCTs) and controlled before and after (CBA) studies of environmental change interventions designed to reduce child injuries and home hazards and published up to 1 April 2014. Where possible, meta-analysis was conducted using RevMan 5.

Results In total four studies were included in the review. Only one study (CBA) reported child injury and three studies (RCTs) home hazards. In the CBA study, child resistant containers were found effective to reduce the incidence of paraffin ingestion by 47% during the intervention period and by 50% after the intervention. Data from two RCTs pooled in a meta-analysis found that a multifactorial intervention (home inspection, safety education and safety device) significantly reduced the post intervention mean scores in the intervention group for poisoning hazards (Mean Difference (MD) -0.77; 95% CI: -1.36, -0.19) and burn related unsafe practices (MD -0.37; 95% CI: -0.66, -0.09) but not for fall, electrical and paraffin burn hazards. The intervention (home inspection and safety education, not safety device) used in a single RCT significantly reduced the post-intervention mean scores in the intervention group for fall hazards (MD -0.5; 95% CI -0.66, -0.33) but not for ingestion hazards.

Conclusions There is limited evidence to determine if environmental change interventions reduce child injuries but some evidence suggested that they may reduce home hazards. More evidence is needed to determine if altering the physical home environment by removing potential hazards reduces injuries.

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ESCALATOR-RELATED INJURIES AGAINST PRESCHOOLERS: AN IN-DEPTH INVESTIGATION IN GUANGDONG PROVINCE, CHINA

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Background Escalator appears more and more in urban public areas like tube, mall, and some sorts of entertainment venue in recent years accompanied by the modernization of Guangdong Province, China. We benefit facilities but suffer injuries simultaneously from it. Preschoolers are more vulnerable to injuries since they have poor recognition capability of danger. How do escalator-related injuries against preschoolers go like?

Methods From all 56 escalator-related injury accidents happened in Guangdong province at the fewest with one child victim aged 12 or below from the year of 2011 to 2014 by having recourse to the local Media who ever reported them, we succeeded in capturing 43 eligible so as to investigate in depth subsequently. Data inputting and analyses were based on the social statistic software SPSS 20.0 to describe the characteristics epidemiologically of escalator-related injury accidents.

Results There were 47 preschoolers in 43 escalator-related injury accidents totally. Victims went to different outcomes like death 2, finger loss 18, scalp or skin elsewhere laceration 33, soft tissue contusion 25, bone fracture 4, functional deformity 28, and post-traumatic stress disorder 12. Mal-dressing was the main direct cause (53.12%) to escalator-related injuries among all victims including slippers, any dress or backpack with cord. Other causes