Road Safety in the Twenty-First Century: Researches and Policies

Yirmi Birinci Yüzyılda Yol Güvenliği: Araştırmalar ve Politikalar

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ABSTRACT Traffic injury is the main cause of injury deaths in all age groups. Mortality, severe injuries, disability, and socio-economic burden to society force global community to look for strategies of road safety promotion. For this study, literature overview, document analysis, and descriptive analysis were used. Nearly half of those dying on the world's road are vulnerable road users. The main risk factors for traffic injuries are speeding, drinking and driving, not using seat belts, cell phone use, and fatigue. International studies revealed that the most successful strategies use a combination of education for behaviour improvements and skills training, legislation with enforcement, along with environmental or engineering changes. The use of seat belts, child safety restraints, helmets, and reflectors, control on speed and alcohol, traffic calming, improvements in vehicle and road design, bicycles and pedestrians separation from the main traffic, and comprehensive programmes showed evident-based changes in reduction of traffic injuries.

Key Words: Injury; road; safety; strategy; research; policy

ÖZET Karayolu trafik yaralanmaları, her yaş grubunda, yaralanmalara bağlı ölümlerin başlıca nedenidir. Ölüm, ağır yaralanma, engellilik, sosyoekonomik yük, psikolojik etki ve ölçülemeyen uzun erimli olumsuz etkiler, toplumları trafik güvenliğini artırmak için etkin programlar ve önlemler konusunda araştırmaya zorlamıştır. Bu makale hazırlanırken bilimsel literatür gözden geçirildi; belge analizi ve tanımlayıcı analiz kullanıldı. Karayollarında ölenlerin yaklaşık yarısı tehlike altındaki yol kullanıcılarıdır. Trafik yaralanmaları için başlıca risk etkenleri, hız, alkollü sürüş, güvenlik kemerlerinin kullanılmaması, cep telefonu kullanılması ve yorgunluktur. Uluslararası araştırmalar, en başarılı karayolu güvenliği stratejilerinin, çevresel ve mühendislik alanlarında değişikliklerle birlikte yol kullanıcıların davranışlarını iyileştirme eğitimini ve beceri eğitimini, yasal düzenlemeleri ve kontrolü bir arada kullandığını ortaya koymuştur. Güvenlik kemerlerinin, çocuk güvenlik koltuklarının, koruyucu başlıkların, reflektörlerin kullanımı, hız ve alkol kontrolü, trafiğin yoğunluğunun azaltılması, araç ve yol tasarımında iyileştirmeler, bisikletlerin ve yayaların ana trafikten ayrılması, yaralanmaların önlenmesi ve güvenliğin geliştirilmesi konularında kapsamlı programlar ile birlikte, karayolu trafik yaralanmaların azaltılmasında kanıta dayalı değişiklikler göstermiştir.

Anahtar Kelimeler: Yaralanma; yol; güvenlik; strateji; araştırma; politika

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In the last few decades, the problem of deaths from external causes is among the priority issues in the field of health policy, child and young people health, and public health worldwide. International researchers and safety field experts from various continents, countries, and in different settings focus on injury causes and risk factors, analyse injuries in all environments and all situations, introduce safety

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strategies, and form injury prevention and safety promotion policies.

Injuries, globally are a major cause of death under the age of 45.[1] The majority of these people live in low- and middle-income countries. They suffer disproportionately from reduced life expectancy.[2] Three quarters of individuals in low- and middle-income countries die before the age of 70, compared with 40% in high-income countries. [1] According to Moniruzzaman and Andersson (2008), unintentional injuries are heavily influenced by the socioeconomic status of the population.[3] Injuries constitute a major cause of deaths in children; worldwide they are the leading cause of deaths in children age 10-19 years.[4] Imamura et al. stated that traffic crashes are the leading cause of death, followed by accidental drowning and submersion across the paediatric age group. Traffic injury constitutes the leading external cause of unintentional death in children.[5]

The aim of the study was to review the road safety research and to analyse road safety strategies and policies.

MATERIAL AND METHODS

The scientific literature overview, document analysis, and descriptive analysis were used for the study. In addition, the reports, resolutions, documentary sources, and sources available at the internet were used.

RESULTS

ROAD TRAFFIC INJURIES

Road traffic injury is the main cause of injury deaths in different settings and in various age groups. Mortality, severe injuries, disability, socio-economic burden to society, psychological impact, and immeasurable long-term suffering force global community to investigate the effective programmes and measures in order to enhance traffic safety.

Globally, over 1.2 million people die each year from road traffic crashes, and between 20 and 50 million suffer from non-fatal injuries.[6] Global economic burden of motor vehicle collisions and pedestrian injuries approximates $500 billion.[7] Road traffic injury is a leading cause of death for young people aged 15-29. Young adults aged between 15 and 44 years account for 59 % of global road traffic deaths.[8] In terms of total crashes per million miles driven, 16- to 19-year-olds have a crash rate almost twice that of 20- to 24-year-olds, almost 3 times that of 25- to 29-year-olds, and more than 4 times that of 30- to 69-year olds.[9] Teens aged 18+ are more at risk (two-fold) than aged 16 or 17 years.[10] In the European Union, road traffic injuries account for 46 % of all causes of fatal injuries in young adults between 15-24 years. Road traffic injuries are the leading cause of death among 15-19-year-olds and the second leading cause among 10-14-year-olds globally.[4]

Road traffic injuries are the leading cause of death among Europeans aged 5-19 years.[11] Low and middle-income countries have higher road traffic fatality rates than high-income countries.[6] In the EU, 50,000 fatal road traffic injuries occur per year.[12] Moreover, every year 4.3 million of road traffic injuries are treated in EU hospitals. [12] In the European Union, road traffic injuries account for 46 % of all causes of fatal injuries in young adults between 15-24 years.[13] Automobiles are the main mode of transport for adolescents (15-24) involved in road injuries; they account for 32 % of all road injuries in this age group.[13]

ROAD USERS

Nearly half of those dying on the world's road are vulnerable road users.[6] Pedestrians, cyclists and motorised two-wheelers are the most vulnerable road users, as they are at the highest risk of death, severe injuries or disabilities from traffic crashes and collisions. In some low-income and middle-income countries up to 80% of road traffic deaths are among vulnerable road users.[6] In Mexico, pedestrians comprise 48% of all road traffic deaths.[14] In India, a vast majority of those killed and injured in road traffic crashes are pedestrians, motorcyclists and pillions riders, and bicyclists.[15] In South Asia and Sub-Saharan Africa, pedestrians occupy significant proportion of road traffic injuries.[16] In Australia, pedestrian deaths comprise approximately 25% of transportation injury.[17] In US, pedestrian injury remains the second leading cause of unintentional injury-related death among children aged 5-14 years.[7] In Turkey, most of child traffic deaths (87%) are pedestrian fatalities.[18]

In the EU, one-third of fatal traffic crashes are vulnerable road users (pedestrians, cyclists, two-wheelers); from all road traffic injuries treated in EU hospitals per year, two-thirds are vulnerable road users.[12] According to the type of road users, the highest percentage of pedestrian deaths in European Union occur in Lithuania (36%), motorcyclists' deaths - in Malta (23%) and pedal cyclists deaths - in the Netherlands (22%).[12] Especially children are one of the main groups at risk of having a fatal or severe injury as pedestrians or cyclists.[4]

RISK FACTORS OF TRAFFIC INJURIES

According to the international research, the main risk factor for traffic injuries are speeding, drinking and driving, not using seat belts, cell phone use, and fatigue.[4,19-23] In addition, the crash risk for young drivers is higher than for other age groups.[9,24]

Nearly one quarter of young drivers aged 19 years always or sometimes drives after having consumed alcohol.[23] Peden et al, found that young and inexperienced drivers who drink and drive have a greatly increased risk of a crash compared to more experienced drivers.[4] Almost every teenager uses a mobile telephone, reads or writes text messages when driving; they contribute to a significantly higher risk of a traffic crash.[23] Eaton et al, investigated high school students in the United States and found that 32.8 % of high school students nationwide had texted or e-mailed while driving.[24] Meta-analysis studies on cell phone use while driving found significant changes of driver reactions to external hazards and increased reaction time.[25, 26] Study in Lithuania revealed that the majority of young people are speeding when they drive.[23] Data from the United States showed that in 2004, 38% of male and 25% of female drivers 15 to 20 years of age involved in fatal crashes were speeding at the time of the crash.[20] The majority of young people drive when feeling tired or sleepy.[23] Sleepiness and fatigue are important risk factors contributing to road crashes. Although it is more difficult to drive when feeling fatigued for drivers of all ages, fatigue may contribute a great risk particularly for teenagers.[21,23,27,28]

ROAD SAFETY STRATEGIES AND POLICIES

Current trends suggest that by 2030 road traffic deaths will become the fifth leading cause of death unless urgent action is taken.[29] Eighty-eight countries -in which almost 1.6 billion people live- reduced the number of deaths on their roads between 2007 and 2010, showing that improvements are possible, and that many more lives will be saved if countries take further action. However, the total number of road traffic deaths remains unacceptably high at 1.24 million per year.[8]

In most of high-income countries, there has been a significant decline in the last decades with regards to road traffic fatalities. From their experiences much can be learned, and high-income countries share their experiences and knowledge with low-and middle-income countries. A national road safety strategy and plan of action, a specific national policy for road safety, a national approach to this problem and a national coordination are necessary in low- and middle-income settings. However, according to WHO (2013), less than 35% of low and middle-income countries have policies in place to protect their road users.[8]

International studies and research projects revealed that the most successful road safety strategies use a combination of education for road user behaviour improvements and skills training, legislation with enforcement, along with environmental or engineering changes.[12, 23,30-37] A long-term decline in fatal and non-fatal traffic injury rates can be achieved by sustainable and permanent road safety promotion efforts. Australia, US, Nordic states and many Western European countries showed how traffic safety measures have resulted in important changes of road traffic mortality. Unfortunately, as stated by WHO (2013), only 28 countries, representing 449 million people (7% of the world's population), have adequate laws that address five risk factors (speed, drink– driving, helmets, seat belts and child restraints), and, for instance, only 44 countries have banned the use of handheld phones while driving.[8,26]

Moreover, international research showed that there is an opportunity to influence young drivers through mentoring and educating parents. A positive moderate correlation between road safety behaviours of teenagers and their parents confirm that it could be a valuable application of family therapy, and a new concept of "family climate for road safety".[23,38,39] Work with family, enhanced education of adult family members is of importance. The research studies reveal that parents drive under the influence of alcohol, they speed, they drive while tired, and do not always allow pedestrians to cross at crossings. This negative behaviour of parents, serving as role models for unsafe behaviour, is dangerous particularly for teenagers and for those travelling with them (usually other teenagers).[23] The effects of family to adolescent behaviour in traffic, correlation between adolescent and parents' driving styles or risk perception, parents' skills, concepts, and learning methodologies are widely discussed nowadays in the scientific community.[23,38- 41] Driving behaviours of parents can influence their children, and observing the drunken driving behaviours of parents may increase the risk of driving when feeling drunk in young people. It is evident that parents' driving behaviour influences their children's driving, and that among the factors that help to keep teens safe is parental involvement.[10,23,42-45] Some evidence-based strategies and the suggestions from the United States, such as "rules of the road" for new drivers,

the Checkpoints Program on parent-teen driving agreement (PTDA), teenager-parent written contract or other practices could be adapted and evaluated for middle-income countries.[10, 21,46]

The last decades globally for community safety promotion is widely used an effective Safe Community Program as injury prevention strategy.[47] Nowadays many of road safety strategies are implemented within Safe Community module, and this comprehensive strategy shows successful results in road safety promotion. Safe Community concept helps to get support from decision-makers, to create safe environment, to involve local community in safety activities, and to coordinate those activities. The most important is that this program empowers reduction of injury mortality, injury rate, and disabilities from injuries. The comprehensive Safe Community Program can be used for health and safety promotion in community. The Safe Community Program helps to identify risk factors, to underline the problem and to use evident arguments for policy-decisions. It is an effective program for injury prevention and safety promotion. Safe Community strategy is successfully used for road traffic injury prevention. The analysis of Safe Community program impact on traffic injury severity showed that by almost half was reduced the relative risk for moderate injuries. Moreover, by half was reduced the relative risk for moderate injuries in moped drivers, cyclists, and pedestrians. The Safe Community model can be a complement to national road safety programs and transportation product development. The national programs addressing alcohol and drug control, speed limits, and seat belt use still remain critical in order to keep down the number of severe road injuries. A shared community awareness of hazards was found to be essential to be able to support the groups at highest risk.[48]

Global road safety experts and international organizations show priority attention to traffic injury prevention and safety promotion, and the road safety strategies. In 2010, the United Nations General Assembly adopted resolution 64/2551, which proclaimed a Decade of Action for Road Safety. The goal of the Decade (2011-2020) is to stabilize and reduce the increasing trend in road traffic fatalities, saving an estimated 5 million lives over the period.[8] Sustainable, coordinated and combined road safety measures and actions help to prevent avoidable road crashes and traffic injuries. The use of seat belts, child safety restraints, helmets, and reflectors, control on speed and alcohol, traffic calming, improvements in vehicle and road design, bicycles and pedestrians separation of the main traffic, along with comprehensive injury prevention and safety promotion programmes showed evident-based changes in reduction of road traffic injuries. Improvements and changes in legislation, including mandatory seat belt usage in the front and the back seat, the usage of child restraints and helmets, age limits for motorized two-wheelers, speed restrictions, laws on mobile phone usage in the car, laws on blood alcohol concentration, sale of alcohol restrictions, and fatigue prevention measures for drivers help to decrease traffic injury rates. There is still room for improvement, and there is still much to be done in the areas such as road safety. Implementation of good practices on road safety, formulating and implementing road safety policies, effective strategies and interventions help to enhance road safety all over the world.

CONCLUSION

Improvements and changes in legislation, including mandatory seat belt usage in the front and the back seat, the usage of child restraints and helmets, age limits for motorized two-wheelers, speed restrictions, laws on mobile phone usage in the car, laws on blood alcohol concentration, sale of alcohol restrictions, and fatigue prevention measures for drivers help to decrease traffic injury rates. A national road safety strategy and a national coordination are necessary too. Mentoring and educating parents, family therapy and family climate for road safety are modern concept for road safety promotion. Nowadays widely used an effective Safe Community Program is evidence-based injury prevention strategy; this comprehensive strategy showed successful results in road safety promotion. Safe Community concept helps to get support from decision-makers, to create safe environment, to involve local community in safety activities, and to coordinate those activities. This program empowers reduction of traffic injury rate and injury mortality.

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