

Article citation info: Babalola, A., J., Olorunnimbe, R., O., Salaam, T., O., Towards informed road traffic fatalities and injuries reduction: A systematic literature review. Transport and Logistics: the International Journal, 2025; Vol. 25, No. 59, ISSN 2406-1069, <https://doi.org/10.46544/TNL.v25n59.07>

Towards informed road traffic fatalities and injuries reduction: A systematic literature review

Adebola J. Babalola^{1*}, Rafiu O. Olorunnimbe¹, Taiwo O Salaam¹

¹ School of Transport and Logistics, Lagos State University, Lagos, Nigeria PMB 0001, Ojo, Lagos. Email: adebolababalola19@yahoo.com, rafiu.olorunnimbe@lasu.edu.ng, taiwo.salaam@lasu.edu.ng

*Corresponding author: adebolababalola19@yahoo.com

Abstract:

Road traffic fatalities remain a major public health concern, particularly in low- and middle-income countries (LMICs), where the burden is disproportionately high. This study aims to conduct a systematic review of existing literature on road traffic fatalities, associated risk factors, prevailing safety strategies, and the applicability of the Safe System Approach (SSA), with a focus on its potential to strengthen countermeasures against road traffic injuries and deaths. Using the PRISMA framework, 55 peer-reviewed articles were examined. The review reveals significant methodological limitations, including the predominance of cross-sectional studies, limited generalisability, and a lack of context specific interventions. While the SSA has shown considerable success in high-income countries, its adaptation in LMICs is constrained by infrastructural challenges, weak enforcement mechanisms, and socio-cultural factors. The review also identifies a notable gap in empirical and longitudinal research evaluating the effectiveness of preventive measures. Findings suggest that tailored SSA frameworks, grounded in local realities and supported by reliable data systems, are essential for achieving meaningful road safety improvements in LMICs. This review highlights the urgency of bridging geographical and methodological gaps in current research and advocates for evidence based strategies supported by interdisciplinary collaboration to reduce road traffic fatalities.

Key words:

Road traffic fatalities, Safe System Approach, Low- and middle-income countries (LMICs), Risk factors, Road safety strategies

Introduction

Road traffic fatalities and injuries continue to be a significant global challenge, Particularly in Low- and middle income regions such as Africa and Asia. The mortality rate per capital is thrice greater in low-income countries compared to high-income countries (WHO, 2022). The proclamation of the first and second Decade of Action on Road Safety in 2010 and 2021, which was founded on the safe system concept, made it clear to the world that there is a

pressing need for global action on road traffic safety. Every year, 1.19 million individuals lose their lives due to road traffic crashes, and 90% of these deaths occur in Low - and Middle-Income Countries (LMICs).(WHO, 2023).

Road safety is recognised as a critical issue worldwide, with the United Nations urging nations to adopt strategies to prevent road traffic deaths and injuries. Central to these strategies is the Safe System Approach, which seeks to create a transportation environment that accommodates human error and reduces injury severity through systemic solutions rather than focusing solely on individual behaviours (Khan andDas, 2024). In most Low- and Middle-Income Countries (LMICs), the majority of road traffic incidents are attributed to factors such as poor road conditions, inadequate enforcement of traffic regulations, vehicle overloading, and driver errors. Both rural and urban areas feel the burden of these accidents, resulting in loss of lives, long-term disabilities, and significant economic costs. (Elyse et al., 2024), Despite various interventions, including stricter driving laws and public awareness campaigns, a significant reduction in road traffic fatalities remains elusive.

A more equitable strategy for identifying the causes of road traffic fatalities and developing countermeasures is necessary, and the Safe System Approach appears to be the most suitable option. The Safe System Approach to road safety is a proactive and holistic strategy, predicated on the principle that any number of road deaths or serious injuries is unacceptable (Wegman, 2023). The European region such as Sweden, Norway, Netherlands, and Australia has witnessed the greatest concentration of countries adopting this approach, subsequently reporting the largest global reduction in road traffic deaths (WHO, 2023)

The Safe System Approach offers a more comprehensive and effective framework for addressing road traffic issues by considering all aspects of the road transportation system (Michael et al 2022). This approach shifts the focus from blaming individual road users to recognizing that the system as a whole—roads, vehicles, users, and post-crash care—must be made safer. Acknowledging that humans will make mistakes, the Safe System Approach emphasizes shared responsibility and aims to minimize the consequences of crashes through safer road infrastructure, vehicles, speeds, and effective care systems (Elvik and Nævestad, 2023).

The escalating road traffic fatalities and injuries in Low- and Middle-Income Countries (LMICs) necessitate a paradigm shift in road safety management. The adoption of the Safe System Approach offers a promising framework to address the multifaceted nature of this pressing public health challenge. By recognising human fallibility and creating a forgiving road environment, we can significantly reduce the burden of road traffic incidents and progress towards a safer and more resilient transport system. This paper aims to conduct a systematic review of existing literature on the Safe System Approach, with a focus on its potential to enhance countermeasures against road traffic fatalities and injuries. The objectives are to provide a global overview of current research on reducing road traffic fatalities and injuries, examine the strengths and limitations of the existing literature, and propose directions for future research to improve road safety and inform evidence based policymaking.

1 Methodology

The study adopts a systematic literature review approach, which involves the identification, selection, and critical examination of relevant studies on road traffic crashes, fatalities, and injuries , safe system approach adoption, and implementation. The study utilized the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA).

1.1 Search Strategy

An extensive search of electronic databases such as google scholars, PubMed, researchgate, Academia, connected paper was conducted using key terms relevant to the study such as risk factors for road traffic crash, fatalities and injuries, road fatalities and injuries countermeasures, challenges and perception towards the implementation of a safe system approach.

1.2 Inclusion and Exclusion criteria

- Relevance and outcome: road traffic fatalities and countermeasures, safe system approach adoption and implementation challenges, road safety issues in high income and low income countries.
- Duration: The study considered articles or reports from 2015- 2024
- Publication language: English
- Study design: No restriction
- Region : No restriction.
- Research type: All types of publications related to the study were considered.

1.3 Exclusion criteria

- All studies that are not on traffic safety. Particularly road fatality injury and countermeasures.
- All studies conducted and published before 2015
- All studies not written in English.

The comprehensive search of the literature related to the study for a 10-year period was conducted. A total of 240 articles and publications were identified and extracted. 201 studies were retained after the removal of duplicated studies. The studies were further screened to identify the papers that satisfied the eligibility criteria. This generated a total of 91 articles that were then subjected to full-text screening. After this, 36 articles were extracted, and a total of 55 studies were included and selected for the final review, as shown in Fig. 1. As depicted in Fig. 2, the 55 studies were grouped based on the stated objectives of the study, resulting in 19 studies on risk factors for road traffic crashes, injuries, and fatalities; 22 studies on road safety measures and strategies; 8 studies on attitude and perception towards a safe system approach to road traffic safety; and 6 studies on safe system implementation challenges.

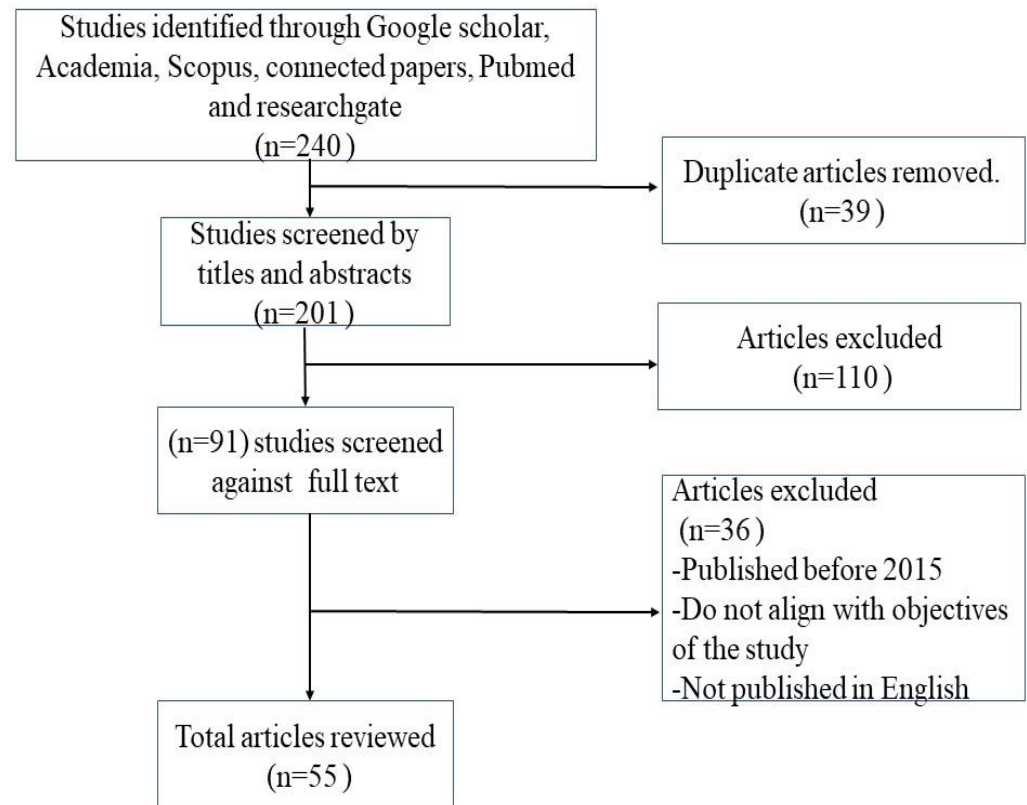


Fig. 1 Flow chart for the study identification and selection process
Source: The researcher, 2025

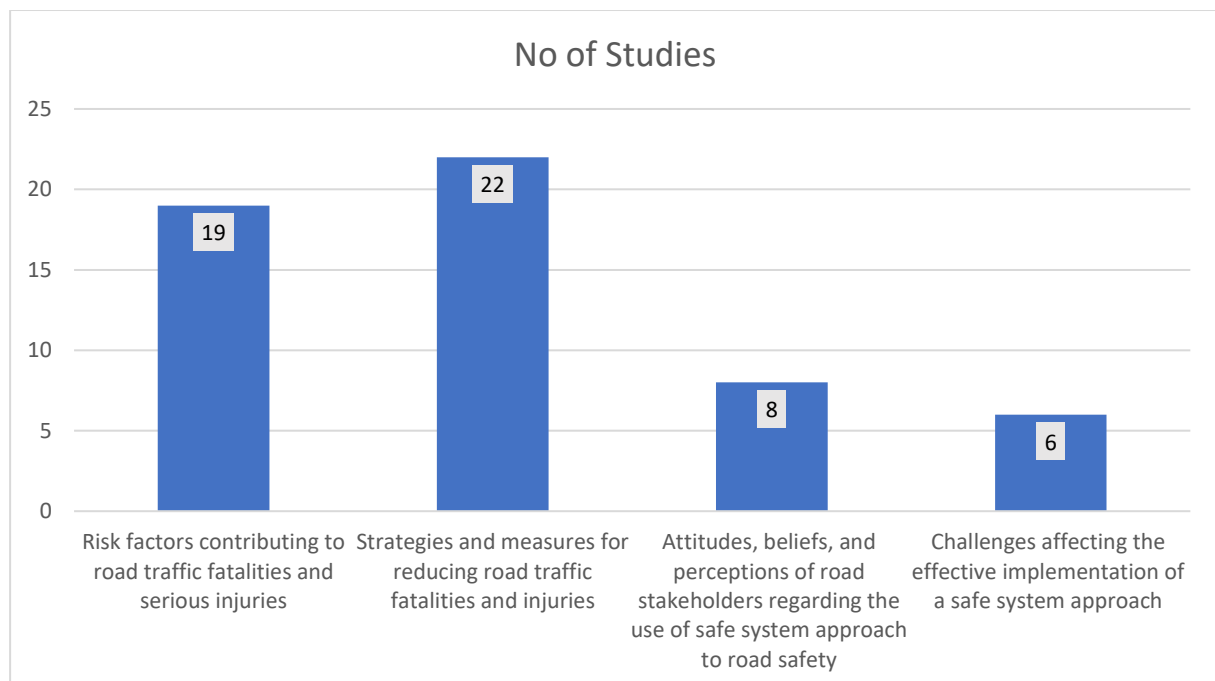


Fig. 2 Classification chart of studies into relevant categories
Source: The Researcher, 2025

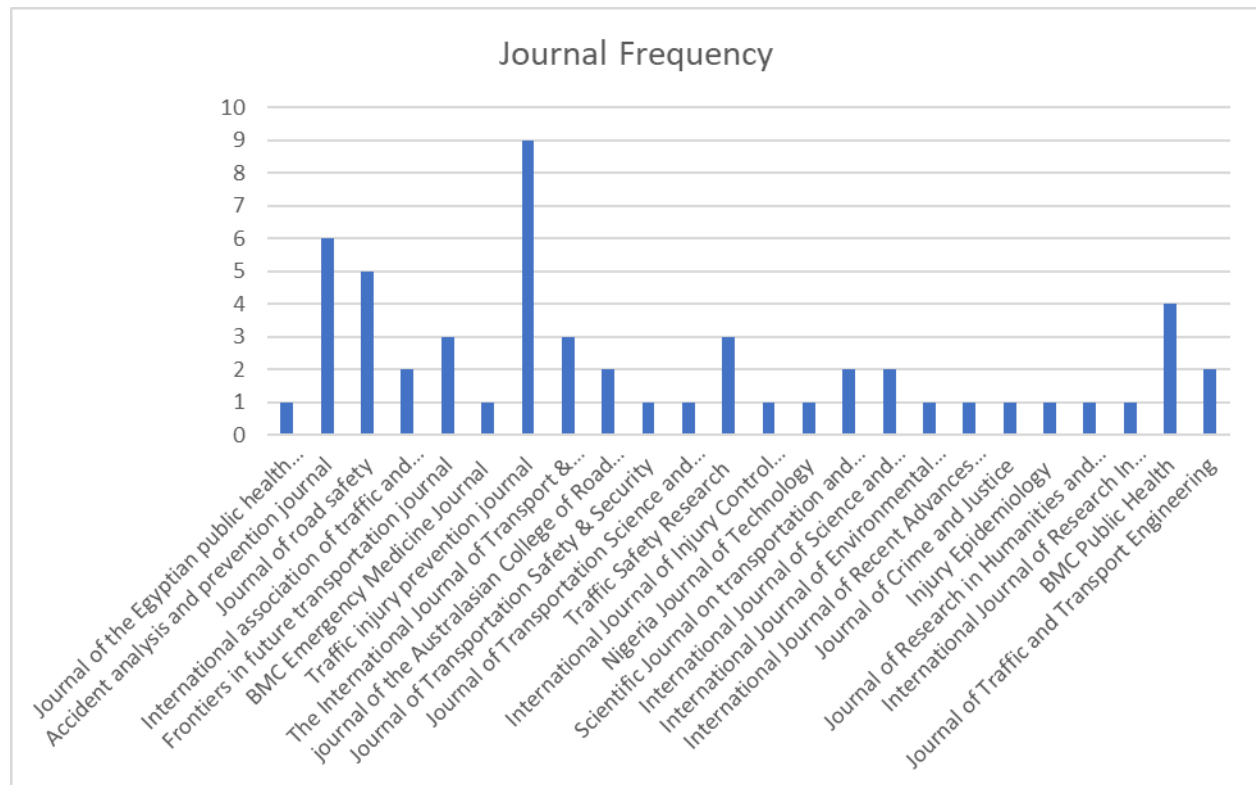


Fig. 3 Distribution of articles by journals Source:
Source: The researcher, 2025

Tab. 1 Journals distribution Table

Journals	Frequency	(%)
Journal of the Egyptian public health association	1	1.82
Accident analysis and prevention journal	6	10.91
Journal of road safety	5	9.09
International association of traffic and safety science	2	3.64
Frontiers in future transportation journal	3	5.45
BMC Emergency Medicine Journal	1	1.82
Traffic injury prevention journal	9	16.36
The International Journal of Transport and Logistics	3	5.45
journal of the Australasian College of Road Safety	2	3.64
Journal of Transportation Safety and Security	1	1.82
Journal of Transportation Science and Technology	1	1.82
Traffic Safety Research	3	5.45
International Journal of Injury Control and safety Promotion	1	1.82
Nigeria Journal of Technology	1	1.82
Scientific Journal on transportation and Logistic	2	3.64
International Journal of Science and Technology.	2	3.64
International Journal of Environmental Research and Public Health	1	1.82
International Journal of Recent Advances in Science and Engineering	1	1.82
Journal of Crime and Justice	1	1.82
Injury Epidemiology	1	1.82

Tab. 1 Journals distribution Table - continued

Journals	Frequency	(%)
Journal of Research in Humanities and Social Science	1	1.82
International Journal of Research in Business And Social Science	1	1.82
BMC Public Health	4	7.27
Journal of Traffic and Transport Engineering	2	3.64
	55	100

Source: Authors, 2025

This study reviewed 55 research articles published across various journals addressing diverse aspects of road safety. The highest number of publications appeared in Traffic Injury Prevention 9(16.36%), followed by Accident Analysis and Prevention 6(10.91%), Journal of Road Safety 5(9.09%), and BMC Public Health 4(7.29%). The remaining journals each contributed three or fewer articles, as shown in Fig. 3 and Table 1.

2 Results

The results of the systematic literature review will be discussed based on the following themes: risk factors associated with road traffic crashes, fatalities and injuries; existing road safety measures and strategies; and perceptions of, and challenges related to, the Safe System Approach.

2.1 Risk Factors for Road Traffic Crash, Fatalities and Injuries

Numerous studies, including Afolabi and Gbadamosi (2017) and Nkosinathi et al (2023), have identified several common risk factors contributing to road accidents. These factors encompass human error (alcohol and substance abuse, speeding, non-use of seatbelts and helmets), vehicle condition, road design, and environmental factors. For instance, Atubi (2022) highlights the significant impact of road design and vehicle condition on road safety. Conversely, studies such as Benlagha et al. (2020) focus on risk-taking behaviours, particularly among male drivers, and their correlation with crash severity. Furthermore, geographical factors also play a crucial role. Sherafati et al. (2017), for example, found that rural areas in Northern Iran exhibited a higher accident prevalence. Several studies identify behavioural risks as significant contributors to road crashes and fatalities. Kiwango et al. (2024) and Mokhtar et al. (2019) found that risky behaviors like alcohol consumption, non-use of helmets, and seatbelt, speeding, and mobile phone use were prevalent among drivers and motorcyclists, leading to increased accident risks. Uzundu et al (2019) found that incorrect use of indicators and tailgating were the most prevalent unsafe acts in Nigeria.

Davey et al. (2020) conducted a case study in Queensland, Australia, showing a strong correlation between substance use and fatal RTCs. Alcohol and illicit drugs were detected in a significant portion of fatal accident cases, which aligns with the findings of Lin et al. (2022) in Taiwan, where drunk driving was shown to significantly increase fatality rates, especially among vulnerable road users (VRUs). While Job et al. (2017) found that Fatigue is a major contributing factor to road traffic accidents, though inconsistencies in identifying fatigue-related crashes hinder uniform responses to the issue. While Balantine (2019), Onyejekwe et al. (2024), Pandey et al. (2021), Job (2020), and Eneh et al. (2023) illustrate how inadequate infrastructure, such as poor road signage, lack of pedestrian walkways, and insufficient road maintenance, contributes to high RTC rates and fatalities. Similar issues were raised in studies conducted in other regions, showing this as a global problem.

Yunus and Abdulkarim (2022) observed that ambulance and emergency healthcare facility distribution in LMICs, is ineffective, with response times far exceeding recommended levels for life-saving interventions. Sherafati et al. (2017), found that Time to admission had a stronger effect on mortality in rural areas, whereas injury severity had a greater effect on urban mortality.

A common thread across the studies is the importance of behavioural risks, road design, and vehicle conditions in contributing to road collisions and fatalities. For example, Atubi (2022) identify inadequate road design and poor car maintenance as serious dangers to road safety, while studies such as Davey et al. (2020) and Lin et al. (2022) highlight the danger of alcohol and substance misuse in raising the severity of crashes. Additionally, regional disparities, as noted in Sherafati et al. (2017) and Zainafree et al. (2022), highlight the variations in RTC prevalence between urban and rural settings, influenced by factors like helmet use, seatbelt use, population density, and access to healthcare.

2.2 Strategies and Measures for Reducing Road Traffic Fatalities and Injuries

Annam et al (2023) and Olagunju (2018) emphasize the role of knowledge and strategic implementations in road traffic fatalities and injuries reduction. Improving driver alertness, attitudes, and understanding of road rules, combined with a national road safety strategy, are seen as critical in enhancing road safety. However, low implementation rates and incomplete achievement of reduction targets remain concerns. Kuruvilla and Saud (2017) found that better road designs and stricter enforcement of traffic laws were essential in crash-prone environments, while Zhai (2022) demonstrated that citywide speed limit reductions led to a significant decrease in fatal crashes in New York City. These interventions highlight the importance of physical and regulatory measures in preventing crashes and reducing road traffic deaths.

Studies focusing on specific road users, such as motorcyclists (Siddiqua et al., 2021) and cyclists (Mahdinia et al., 2023), found that helmet use significantly reduced injury severity, and prompt crash notifications improved survival times for cyclists. Kim et al. (2018) found that motorcycle helmets significantly reduce the likelihood of intracranial injuries, though the study's observational design limits the ability to infer causality. Adetona et al, (2017) found that there is a significant association between restrained drivers and restrained front-right passengers. The study observed Low compliance with seat belt use among rear-seat passengers. Additionally, Li et al. (2016) found that photo enforcement of speeding laws correlated with fewer speed-related collisions. Bermúdez and Morillo (2023) found that road safety measures in Barcelona effectively reduced fatalities but had mixed results on severe injuries. Certain measures, like speed controls, require further evaluation. Liu et al. (2024) tested an automated driving system that showed potential in collision prevention through simulations. Parker et al. (2015) emphasized a systems-based approach to young driver safety, which incorporates a broader range of factors such as policy decisions and vehicle design to provide new pathways for reducing road crashes.

Razzak et al. (2022) reviewed trauma care systems in low- and middle-income countries (LMICs), noting that better emergency care coverage could save over 200,000 lives annually. Result for study conducted by Lukumay et al. (2018) showed that only 3% of traffic police officers in Dar es Salaam had good post-crash first aid knowledge. Mahdinia et al. (2023) found that advanced automatic crash notification systems reduce delays in notifying emergency services, potentially saving lives

Job (2020) highlighted that cultural biases, such as victim-blaming attitudes, hinder the adoption of effective pedestrian safety interventions. Similarly, Jamroz et al. (2019) found that Poland's Vision Zero policy contributed to a 60% reduction in road fatalities over 30 years.

Studies in the Netherlands (Wegman and Schepers, 2024) and rural road designs (Stigson et al., 2022) demonstrate that Safe System measures, including clear zones and forgiving road designs, effectively reduce serious injuries and fatalities. However, the long-term impact of these measures remains uncertain. Some global efforts, such as Bloomberg Philanthropies' road safety initiatives have successfully reduced fatalities in low- and middle-income countries, particularly through legislative changes and social marketing campaigns (Hendrie et al., 2021). In the work of Mohammed et al (2023) the study found that lack of political priority for road safety is identified as the most significant challenge in road safety intervention.

The review provides a comprehensive overview of various countermeasures for reducing road traffic fatalities and injuries, using different methodologies and settings. A recurring theme is the implementation of the Safe System Approach(SSA), which aims to mitigate crashes by addressing multiple factors, such as infrastructure design, human behaviour, and enforcement mechanisms. For example, the work of Annam et al. (2023) highlights the importance of driver alertness and awareness of road rules as key intervention areas, while Kuruvilla and Saud (2017) emphasise the need for better road design and stricter law enforcement. However, many studies, such as that by Olagunju (2018), reveal significant gaps in the execution of safety strategies, such as the incomplete implementation of the National Road Safety Strategy. These findings underscore the importance of integrated measures targeting both behavioural and infrastructural and policy improvements.

2.3 Safe System Approach to road safety Perception and Challenges

Michael et al. (2022) carried out a qualitative study with Australian stakeholders and international experts, and concluded that the Safe System (SS) framework has potential for improving road safety in Victoria. However, it suffers from an overly ambitious design that practitioners do not fully understand. Similarly, Elvik and Naevestad (2023) used regression models to evaluate changes in road deaths in Norway and concluded that the decrease in fatalities is statistically linked to the implementation of effective safety measures. Agyemang (2021) investigated vulnerable road user (VRU) safety in Ghana using the Analytic Hierarchy Process. and found that the SS approach effectively identifies key safety concerns.

In the work of Szymanek (2020), he provided a theoretical framework for understanding road safety as a complex system that includes infrastructure, vehicle safety, and human aspects. Additionally, the systems-based approach has the potential for improvement. Job (2017) presented a remark on Safe System(SS) advocacy, concluding that the safe system principles and Vision Zero are achieving progress in decreasing road trauma. Ranjbar et al. (2022) utilises a risk-scoring system to assess speed restrictions on Iranian highways and discovered that the Safe System(SS) technique provides an effective framework for examining speed limits. Michael et al. (2024) conducted a cross-sectional survey of 348 respondents and discovered that experts view the SS technique as both forward-thinking and pragmatic. However, the study was limited to Victorian practitioners, and regional variations in interpretation may exist. Finally, Job et al. (2022) critiqued the current SS approach through a review and analysis of global safety documents, noting its misapplication, particularly in the flawed interpretation of shared responsibility. The study calls for a redefinition of the SS approach.

Alavi et al. (2023) investigated Safe System Approach (SSA) challenges in Victoria, Australia, through stakeholder workshops involving 60 participants. The study found that organisational culture, political decisions, policy standards, and technical capability are significant blockers and enablers of the SSA. However, the study's limitations include its applicability primarily to high-income regions, necessitating further research into low- and middle-income countries (LMICs). Safarpour et al. (2022) explored challenges in implementing Vision Zero in Iran, a road safety initiative similar to SSA. Using qualitative content analysis

from face-to-face interviews, the study found that managerial, administrative, cultural, social, and transportation design factors pose major challenges.

The literature highlights that while the Safe System approach has demonstrated success in improving road safety outcomes, its application is often challenged by geographical, contextual, and methodological limitations. For instance, the localised focus in many studies (e.g., Australia, Norway, and Iran) raises questions about the SS's global applicability, specifically in Low- and Middle-Income Countries (LMICs). The complexity and multifaceted nature of the SS, while offering flexibility, can also result in fragmented interpretations, as seen in Michael et al. (2024). Naumann et al. (2020) argue that SSA requires a shift from an individual responsibility model to a systemic approach, ensuring that the safety of road users is prioritised even when they make mistakes. This systemic shift is necessary to realise the full potential of safe system concept, but it has proven challenging in regions of nations where individual enforcement-based policies dominate. The studies underscore the importance of cultural adaptation in SSA implementation. Both high-income countries like Australia and LMICs like Iran face barriers such as organizational inertia, political reluctance, and cultural resistance to systemic changes. SSA must be culturally sensitive to these challenges.

3 Gaps in knowledge and implication for further research

Despite the growing body of literature on road traffic fatalities and the Safe System Approach (SSA), several research gaps remain. Many studies are limited by the use of cross-sectional data and region-specific findings, restricting the generalisability of their conclusions across diverse traffic systems. There is a notable scarcity of longitudinal research capable of establishing causal relationships between risk factors and crash outcomes. Furthermore, limited attention has been given to the evaluation of intervention strategies, particularly those involving road infrastructure improvement and enforcement measures. Existing evidence is often drawn from high-income countries, making it less relevant for low- and middle-income countries (LMICs), where infrastructure, governance, and public awareness differ significantly. In Sub-Saharan Africa, research on SSA remains sparse, revealing both geographical and contextual gaps. Locally adapted frameworks and empirical studies are urgently needed to inform effective, context-specific countermeasures aligned with global best practices.

4 Conclusions

The study reveals that although progress has been made in tackling road traffic fatalities, there remains a pressing need for Locally adapted strategies in low- and middle-income countries (LMICs). Future research should build on existing evidence by exploring how the Safe System Approach (SSA) can be adapted to effectively reduce fatalities and injuries within these settings. While the review identifies several well-established risk factors associated with road traffic crashes and fatalities, notable gaps persist in empirical data, generalisability, and the evaluation of preventative interventions. Addressing these limitations would significantly improve our understanding of effective strategies to reduce road traffic deaths on a global scale.

Acknowledgement

The author gratefully acknowledges the School of Transport and Logistics, Lagos State University, for their vital support and insightful contributions to this research.

References

- Adetona, C. O., Ojo, T. and Afukaar, F., 2019. Assessment of seatbelt use in University of Cape Coast campus, Ghana. *Urban Planning and Transport Research*, 6(1), pp.22–34>.
- Afolabi, J. O. and Gbadamosi, K. T., 2017. Road traffic crashes in Nigeria: Causes and consequences. *The International Journal of Transport and Logistics*, 17(42).
- Agyemang, W., 2021. A Safe Systems Approach to Vulnerable Road User Safety Issues in Ghana. The University of Alabama. *ProQuest Dissertations and Theses*, 28774970.
- Alavi, H., Jones, C. and Hunter, C., 2023. Embedding Safe System in Victoria: Blockers, enablers and improvement roadmap. *Journal of Road Safety*, 34(2), pp.38–45. [online] Available at: <<https://doi.org/10.33492/JRS-D-22-00022>>.
- Annam, S., Cheranchery, M. F., Chakraborty, A. and Maitra, S., 2023. Areas of intervention for enhancing the knowledge of safe driving: An experience in West Bengal, India. *Case Studies on Transport Policy*, 13.
- Atubi, A. O., 2022. Road traffic accident, deaths, injuries, drivers' safety and socio-economic development in Nigeria. *Innovations*, 68(3), pp.436–447.
- Balantine., 2019. Road traffic accident in Nigeria: A public health problem. *Afrimedical Journal*, 3(2), pp.35–40.
- Benlagha, N. and Charfeddine, L., 2020. Risk factors of road accident severity and the development of a new system for prevention: new insights from china. *Accident Analysis and Prevention*, 136, 105411. [online] Available at: <<https://doi.org/10.1016/j.aap.2019.105411>>.
- Bermudez, L. and Morillo, L., 2023. Assessing the effectiveness of road safety measures in Barcelona (2013–2018). *Heliyon*, 4(3), pp.1–11.
- Davey, J. D., Armstrong, K. A., Freeman, J. E. and Parkes, A., 2020. Alcohol and illicit substances associated with fatal crashes in Queensland: An examination of the 2011 to 2015 Coroner's findings. *Forensic Science International*, 312, 110190. [online] Available at: <<https://doi.org/10.1016/j.forsciint.2020.110190>>.
- Department for Transport (DfT.), 2018. *Reported road casualties in Great Britain: 2018 annual report*. UK Government.
- Elvik, R. and Nævestad, T.-O., 2023. Does empirical evidence support the effectiveness of the Safe System approach to road safety management? *Accident Analysis and Prevention*, 191, 107227. [online] Available at: <<https://doi.org/10.1016/j.aap.2023.107227>>.
- Eneh, O. C., Okosun, A., Egbenta, I. R., Obi, N. I., Oloto, M. C., Ubani, O., Eneh, C. A. and Eneonwo, C. I., 2023. A comparative analysis of road and vehicle qualities as factors of road traffic carnage in Nigeria. *BMC Public Health*, 23, 2173. [online] Available at: <https://doi.org/10.1186/s12889-023-17089-2>>.
- Hendrie, D., Lyle, G. and Cameron, M., 2021. Lives saved in low- and middle-income countries by road safety initiatives funded by Bloomberg Philanthropies and implemented by their partners between 2007–2018. *International Journal of Environmental Research and Public Health*, 18(21), 11185. [online] Available at: <<https://doi.org/10.3390/ijerph182111185>>.

- 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. [online] Available at: <<https://doi.org/10.3390/su11040959>>.
- Job, R. F. S., 2017. Re-invigorating and refining Safe System advocacy. *Journal of the Australasian College of Road Safety*, pp.64–68.
- Job, R. F. S., 2020. Policies and interventions to provide safety for pedestrians and overcome the systematic biases underlying these failures. *Frontiers in Sustainable Cities, Policy Brief*. [online] Available at: <<https://doi.org/10.3389/frsc.2020.00030>>.
- Job, R. F. S., Truong, J. and Sakashita, C., 2022. The ultimate Safe System: Redefining the Safe System Approach for road safety. *Sustainability*, 14(5), 2978. [online] Available at: <<https://doi.org/10.3390/su14052978>>.
- Khan, N. M. and Das, S., 2024. Advancing traffic safety through the Safe System Approach: A systematic review. *Accident Analysis and Prevention*, 199, 107518. [online] Available at: <<https://doi.org/10.1016/j.aap.2024.107518>>.
- Kim, S., Ro, Y. S., Shin, S. D., Song, K. J., Hong, K. J. and Jeong, J., 2018. Preventive effects of motorcycle helmets on intracranial injury and mortality from severe road traffic injuries. *American Journal of Emergency Medicine*, 36, pp.173–178. [online] Available at: <<https://doi.org/10.1016/j.ajem.2017.07.002>>.
- Kiwango, G., Katopola, D., Francis, F., Möller, J. and Hasselberg, M., 2024. A systematic review of risk factors associated with road traffic crashes and injuries among commercial motorcycle drivers. *International Journal of Injury Control and Safety Promotion*, 31(2), pp.332–345. [online] Available at: <https://doi.org/10.1080/17457300.2024.2319628>>.
- Kuruvilla, G. and Saud, J., 2017. Problem Solving and Counter Measures for Road Accident Prone Environments. *American Journal of Civil Engineering*, 5(2), pp.69-74. [online] Available at: <http://www.sciencepublishinggroup.com/j/ajce>>.
- Li, R., El-Basyouny, K., Kim, A. and Gargoum, S., 2016. Relationship between road safety and mobile photo enforcement performance indicators: A case study of the City of Edmonton. *Journal of Transportation Safety and Security*, 9(2), pp.195–215. [online] Available at: <<https://doi.org/10.1080/19439962.2016.1148184>>.
- Lin, H. A., Chan, C. W., Wiratama, B. S., Chen, P. L., Wang, M. H., Chao, C. J., Saleh, W., Huang, H. C. and Pai, C. W., 2022. Evaluating the effect of drunk driving on fatal injuries among vulnerable road users in Taiwan: A population-based study. *BMC Public Health*, 22, 14402. [online] Available at: <<https://doi.org/10.1186/s12889-022-14402-3>>.
- Liu, C., Chen, J., Nguyen, T.-D., Tomizuka, M., 2024. The Robustly-Safe Automated Driving System for Enhanced Active Safety. In: *WCXTM 17: SAE World Congress Experience, Society of Automotive Engineers (SAE), Detroit, Michigan, United States*. 63116453. [online] Available at: <<https://doi.org/10.4271/2017-01-1406>>.
- Lukmay, G. H., Ndile, M. L., Outwate, A. H., Mkoka, D. A., Padyab, M., Saveman, B. and Erlanson, S. B., 2018. Provision of post-crash first aid by traffic police in Dar es Salaam, Tanzania: A cross-sectional survey. *BMC Emergency Medicine*, 18, 45. [online] Available at: <https://doi.org/10.1186/s12873-018-0203-6>>.
- Mahdinia I, Moradloo N, Mohammadnazar A and Khattak A (2023). Enhancing bicyclist survival time in fatal crashes: Investigating the impact of faster crash notification time through explainable machine learning. *Journal of Transportation Safety and Security*, pp.1-19.

- Michael, G., Muir, C. and Oxley, J., 2024. What is the purpose? Practitioners' perspectives of the Safe System Approach to road safety in Australia. *IATSS Research*, 48, pp.84–99. [online] Available at: <<https://doi.org/10.1016/j.iatssr.2024.01.004>>.
- Michael, G., Muir, C., Oxley, J. and Sobhani, A., 2022. Safe System in road safety public policy: A case study from Victoria, Australia. *IATSS Research*, 46, pp.171–180. [online] Available at: <<https://doi.org/10.1016/j.iatssr.2021.04.002>>.
- Mohammed, M. A. O., Abdirahman, A.M., Barakat, A. A. M., 2023. Investigating of risk factors associated with exposure to road traffic accidents among drivers, El-Obeid, North Kordofan State, Sudan; a cross-sectional study. *International Journal of Endocrinology Research and Reviews*, 3(1), pp.20-30.
- Naumann, R., Sandt, L., Kumfer, M. B., Lajeunesse, S., Heiny, S. and Lich, H., 2020. Systems thinking in the context of road safety: Can systems tools help us realize a true “Safe Systems” approach? *Epidemiologic Reviews*, 7(4), pp.343–351. [online] Available at: <<https://doi.org/10.1007/s40471-020-00248-z>>.
- Nkosinathi, C. N., Jacob, T. M. and Livhuwani, L. N., 2023. An assessment on factors contributing to road fatalities on R546 Route in Mpumalanga Province: A case of Govan Mbeki Municipal Area. *International Journal of Research in Business and Social Science*, 12(7), pp.685–699. [online] Available at: <<https://doi.org/10.20525/ijrbs.v12i7.2875>>.
- Olagunju, K. Y., 2018. The implementation of the Nigeria road safety strategy and road traffic crashes: An evaluation. *National Institute*, Kuru.
- Onyejekwe, S., Abdulazzez, R., Rabi, N., Hammed, A. and Osunlalu, O., 2024. *Some common infrastructure-related safety deficiencies on Nigerian roads*. [online] Available at: <<https://www.researchgate.net/publication/378364427>>.
- Pandey B, Khadka A, Joshi E, Joshi SK, Parkin J, Pilkington P, Mytton J., 2021. Views of professional stakeholders on readiness for a safe road system in Nepal; an exploratory qualitative study. *Int J Inj Contr Saf Promot.*, 29(2), pp.217–225. [online] Available at: <<https://doi.org/10.1080/17457300.2021.1983845>>.
- Parker, B., Goode, N. and Salmon, P. M., 2015. The driver, the road, the rules ... and the rest? A systems-based approach to young driver road safety. *Accident Analysis and Prevention*, 74, pp.297–305. [online] Available at: <https://doi.org/10.1016/j.aap.2014.01.027>>.
- Ranjbar, M., Kashani, T. A., Besharati, M. M., Bondarabadi, M. A., Zakeri, H., Hosseinzadeh, S., Chambers, G., Mooren, L. and Shuey, R., 2022. Adopting a Safe System Approach to determine safer speed limits: A case study from Iran. *Journal of Road Safety*, 33(1), pp.26–35.
- Razzak, J. A., Bhatti, J., Wright, K., Nyirenda, M., Tahir, M. R. and Hyder, A. A., 2022. Improvement in trauma care for road traffic injuries: An assessment of the effect on mortality in low-income and middle-income countries. *The Lancet*, 400(10348), 3 pp.29–336. [online] Available at: <[https://doi.org/10.1016/S0140-6736\(22\)00887-X](https://doi.org/10.1016/S0140-6736(22)00887-X)>.
- Safarpour, H., Khorasani, D., Soori, H. C., Homion, Z., Bagheri, K. and Mohammadi, R., 2022. The challenges of Vision Zero implementation in Iran: A quantitative study. *Frontiers in Future Transportation*, 3, pp.1–10. [online] Available at: <<https://doi.org/10.3389/ffutr.2022.865011>>.
- Sherafati, F., Homaie, E., Afkar, A., Gholampoor, S. R. and Sirusbakht, S., 2017. Risk factors of road traffic accident-associated mortality in northern Iran: A single center experience

- utilizing Oaxaca-Blinder decomposition. *Bulletin of Emergency and Trauma*, 5(2), pp.116–121.
- Siddiq, M., Gulzar, H., Shah, A. and Munam S., 2021. Low Acceptance of Helmet-Use and Injuries from Motorcycle Accidents in Rawalpindi and Abbottabad, Pakistan. *Special Journal of Public Health, Nutrition, and Dietetics*, 2(1). [online] Available at: <<https://doi.org/10.61915/pnd.720335>>.
- Stigson, H., Kullgren, A. and Andersson, L. E., 2022. Rural road design according to the Safe System Approach. In M. Belin, C. Newstead and H. Stigson (Eds.), *The Vision Zero Handbook*, pp.947–970. Elsevier. [online] Available at: <<https://doi.org/10.1016/B978-0-12-823697-2.00061-6>>.
- Szymanek, A., 2020. System Approach in Road Safety Studies. *Communications - Scientific Letters of the University of Zilina.*, 22(4), pp.201-210. [online] Available at: <<https://doi.org/10.26552/com.C.2020.4.201-210>>.
- Uzondu, C. C., Jamson, S. and Lai, F., 2019. Investigating unsafe behaviours in traffic conflict situations: An observational study in Nigeria. *Journal of Traffic and Transportation Engineering*, 6(1), pp.40–51. [online] Available at: <<https://doi.org/10.1016/j.jtte.2018.06.002>>.
- Wegman, F. and Schepers, P., 2024. Safe System Approach for cyclists in the Netherlands: Towards zero fatalities and serious injuries? *Accident Analysis and Prevention*, 195, 107396. [online] Available at: <<https://doi.org/10.1016/j.aap.2023.107396>>.
- Yunus, S. and Abdulkareem, I. A., 2022. Geospatial analysis of road traffic crashes and emergency response optimization in Kano metropolis, Nigeria. *Research Square*. [online] Available at: <<https://doi.org/10.21203/rs.3.rs-1138619/v2>>.
- Zainafree, L., Syukria, N., Addina, S. and Zakki, M. S., 2022. Risk factors of road traffic accidents in rural and urban areas of Indonesia based on the national survey of year 2018. *Nigerian Postgraduate Medical Journal*, 29(2), pp.82–89>.
- Zhai, G., Xie, K., Yang, D. and Yang, H., 2022. Assessing the safety effectiveness of citywide speed limit reduction: A causal inference approach integrating propensity score matching and spatial difference-in-differences. *Transportation Research Part A: Policy and Practice*, 157, pp.94–106. [online] Available at: <<https://doi.org/10.1016/j.tra.2022.01.004>>.