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EXAMINING THE EFFECTIVENESS OF NON-MOTORIZED TRANSPORT INTERVENTIONS ON OUTERING ROAD SAFETY, NAIROBI COUNTY, KENYA

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Abstract
Non-Motorized Transport constitutes an essential element of urban transportation systems, embracing pedestrian walking and cycling as environmentally responsible alternatives to motorized vehicles. As cities across the globe grapple with pressing challenges, including traffic congestion, air pollution, and the imperative for sustainable urban development, NMT has emerged as a practical approach to foster cleaner, health-conscious, and more inclusive transportation solutions. In 2015, Nairobi County introduced Non-Motorized Transport policy as part of its efforts to enhance road safety. This paper sought out to assess the effectiveness of interventions implemented under the NMT Policy on safety along Outering Road, Nairobi Countyguided by the Safe Systems theory developed by Wegman and Elsenaar in the Netherlands. The study adopted cross sectional descriptive survey research design. The study targeted a population of 291 individuals drawn from Nairobi City County Government. The study used stratified random sampling technique to select 169 respondents. The study used a questionnaire and an interview schedule tool to collect data from respondents. Quantitative data was analyzed using descriptive statistics, summarized in percentages and presented in tables, graphs and charts. Qualitative data was analyzed using textual thematic analysis and reported in narrative form. Respondents felt that the NMT policy addressed specific needs for improving pedestrian safety, indicating its perceived effectiveness in enhancing safety and accessibility for pedestrians. The findings indicated that the policy is moderately effective as rated by the study's participants. The study recommends stakeholder understanding and involvement in the development and implementation of the policy, and collaboration among the government agencies involved.

Keywords: *Non-Motorized Transport, urban transportation systems, traffic congestion, air pollution, inclusive transportation solutions, pedestrian safety.*

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INTRODUCTION

Urban mobility in Kenya faces significant challenges, much like many developing nations, particularly concerning the integration and safety of non-motorized transport (NMT). The current transportation infrastructure primarily prioritizes motorized vehicles, often marginalizing the needs and rights of pedestrians and cyclists. This systemic neglect is evident in the limited accessibility available to non-motorized users, who struggle with inadequate infrastructure that fails to accommodate their travel needs. Compounding this issue is the insufficient integration of NMT with other transportation modes, resulting in a fragmented transportation system that undermines the overall efficiency and safety of urban mobility (Mitullah et al., 2017; Ogendiet al., 2013). Moreover, the challenges surrounding NMT are exacerbated by a lack of cohesive urban planning and poor enforcement of traffic laws designed to protect vulnerable road users. The absence of dedicated pedestrian pathways, safe crossings, and adequate cycling lanes leaves non-motorized users exposed to the dangers posed by speeding vehicles and chaotic traffic conditions. Such inadequacies significantly elevate the risk of road traffic accidents and fatalities, particularly in urban areas where pedestrian and cyclist interactions with motor vehicles are common. This persistent oversight reflects a broader trend in urban development that prioritizes vehicular movement over the safety and accessibility of all road users, highlighting the urgent need for comprehensive reforms that address these systemic shortcomings and promote a more inclusive approach to urban mobility in Kenya.

To tackle these pressing concerns, the Nairobi City County Government (NCCG) has initiated a Non-Motorized Transport (NMT) Policy aimed at fostering a safer and more accessible urban environment for pedestrians and cyclists. This policy envisions a dual approach: reducing traffic congestion while promoting sustainable mobility. Central to this vision is the development of dedicated infrastructure, including well-designed sidewalks and pedestrian-friendly crossings, which prioritize walking as the primary mode of transportation. By emphasizing the importance of NMT, the NCCG aims to create a comprehensive network that accommodates the diverse needs of urban residents, ensuring that non-motorized users can navigate the city with safety and ease. Despite these well-intentioned aspirations outlined in the NMT Policy, pedestrian safety remains a critical issue, underscored by alarming statistics that reflect a troubling trend in road safety. Recent reports from the National Transport and Safety Authority (NTSA) indicate a staggering 45% increase in pedestrian fatalities over the past four years (NTSA, 2023). This escalation in accidents and injuries serves as a stark reminder of the urgent need for effective interventions that go beyond policy formulation. It highlights the necessity for the NCCG to not only implement the provisions of the NMT Policy but also to strengthen law enforcement, enhance infrastructure maintenance, and engage in robust public awareness campaigns. Only through a multifaceted approach can the government hope to address the ongoing challenges and significantly improve pedestrian safety in Nairobi's urban landscape.

Research from various contexts reinforces the potential of Non-Motorized Transport (NMT) interventions to significantly enhance pedestrian safety, particularly in low- and middle-income countries. For instance, studies conducted by Lah et al. (2019) in Mexico City, Patil et al. (2022),

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and Abdi (2021) in Tehran have demonstrated the positive impact of NMT policies in reducing pedestrian risk and heightening safety awareness among road users. These studies suggest that well-implemented NMT initiatives can lead to safer urban environments, fostering a culture of walking and cycling. However, findings from Schepers et al. (2017) and Elvik (2017) caution against potential drawbacks associated with NMT infrastructure. While dedicated bicycle lanes can enhance safety for cyclists, they may inadvertently lead to increased conflicts and accidents involving pedestrians. This highlights the complexity of urban mobility solutions, where improvements in one area can sometimes create challenges in another. Moreover, the role of vehicle speeds emerges as a crucial factor influencing pedestrian safety, independent of the quality of NMT infrastructure. High vehicle speeds can negate the benefits of any safety measures put in place, underscoring the need for comprehensive traffic management strategies that address both infrastructure design and speed regulation. Thus, while NMT policies hold significant promise for enhancing pedestrian safety, their effectiveness must be carefully evaluated within the broader context of urban traffic dynamics and user behavior.

Despite these complexities, the momentum behind the adoption of Non-Motorized Transport (NMT) policies is evident in several African nations, including Kenya and Uganda. Research by Ndungu (2016) underscores the efficacy of NMT policies in promoting pedestrian safety and fostering sustainable transportation practices in Kenya. This growing body of evidence indicates that well-designed infrastructure, when complemented by effective traffic calming measures and robust public education campaigns, can significantly enhance pedestrian safety and encourage more people to choose walking and cycling as viable modes of transport. Notably, studies conducted by Creutzig et al. (2012) and Stigell et al. (2018) illustrate that urban areas implementing NMT policies experience a marked reduction in pedestrian accidents and injuries. This positive trend is primarily attributed to improvements in infrastructure, such as dedicated pedestrian pathways, enhanced crosswalks, and better signage, alongside integrated traffic management strategies that prioritize safety for all road users. These findings highlight the importance of a multifaceted approach to urban mobility that not only focuses on infrastructure development but also emphasizes education and community engagement to raise awareness about safe practices. As such, the successful implementation of NMT policies in Kenya and Uganda serves as a promising model for other developing nations aiming to improve pedestrian safety and promote sustainable urban transportation.

The multifaceted nature of pedestrian safety is further explored by Laurence et al. (2022), who find a positive correlation between NMT measures and a decrease in pedestrian accidents. However, the study's reliance on correlational analyses indicates that while a relationship exists, it does not establish causation, leaving room for other influencing factors such as population density and socioeconomic conditions. Additionally, Distefano and Leonardi (2022) highlight the significance of traffic calming measures in managing urban speed, advocating for a 30 km/h speed limit to enhance road safety and urban quality of life. By focusing on the interplay of infrastructure improvements, traffic management strategies, and community engagement, the research seeks to identify key challenges and potential solutions for enhancing pedestrian safety and accessibility in the urban environment. Despite the positive initiatives laid out in the NCCG

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NMT Policy, the persistent increase in pedestrian fatalities and injuries highlights a critical problem: the existing measures have not sufficiently addressed the systemic issues affecting pedestrian safety. The insights garnered from this study will contribute to the ongoing discourse on sustainable urban mobility, aiming to inform policy adjustments and promote a safer and more integrated transportation system for all road users. As such, the current study intends to examine the effectiveness of interventions implemented under the non-motorized transport policy on safety along Outering road, Nairobi County, Kenya.

METHODOLOGY

This study employed a cross-sectional descriptive survey research design to evaluate the effectiveness of the Non-Motorized Transport Policy in enhancing pedestrian safety along Outering Road in Nairobi County. This approach provided the advantage of systematically and accurately describing the phenomenon, addressing questions of "what," "where," "when," and "how," and employing a variety of research methodologies (Creswell & Creswell, 2018). It facilitated an understanding of the phenomenon affecting the population of interest at a specific point in time, thereby informing the development of necessary solutions. The design was considered appropriate for this study as it helped in obtaining crucial information regarding various aspects of the nature of the Non-Motorized Transport policy, effectiveness of interventions implemented under the NMT Policy, and the challenges faced in implementing the NMT policy. The study was conducted within Nairobi County, with a specific focus on the Outering road corridor.

The target population for this study comprised individuals and groups playing key roles in the formulation, execution, and enforcement of Non-Motorized Transport policies and road safety measures along the Outering road corridor in Nairobi County. Each group was selected based on their critical roles and contributions to the NMT policy framework and pedestrian safety. This included individuals from the Nairobi City County Government - Roads department, responsible for formulating and executing NMT policies. Their inclusion was crucial as their roles directly impact policy formulation and execution, providing insights into the administrative and procedural aspects of NMT implementation. County Transport and Safety Committee (CTSC) Members, integral to providing advice, making recommendations on road transport and safety, and implementing related policies within the county.The study targeted a population of 291 individuals drawn from Nairobi City County Government (60), Traffic Department operating within the administrative areas of Embakasi, Buru-Buru, and Starehe (145), the National Transport and Safety Authority (66), and the Kenya Urban Roads Authority (20).The study used stratified random sampling technique to select 169 respondents: Nairobi City County Government (35), Traffic Department operating within the administrative areas of Embakasi, Buru-Buru, and Starehe (84), the NTSA (38), and the KURA (12).

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From a target population of 291 individuals, this study employed the formula proposed by Yamane (1967) to select a sample of 169 respondents for participation, ensuring a 95% confidence level. The sample size (n) was determined using the following formula, where N represented the population size, and e represented the margin of error:

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{291}{1+279(.05)^2} = 169$$

The primary data was collected through self-administered questionnaires, interview guides, and structured observation checklists. The researcher employed a structured questionnaire as the primary tool to collect primary data from the respondents. Key informant interviews were conducted with individuals possessing extensive knowledge of pedestrian safety and urban transport issues. The structured observation conducted along the Outering Road corridor was designed to focus on key aspects of pedestrian safety, including pedestrian behaviors, infrastructure conditions, and traffic events in relation to the Non-Motorized Transport policy. Secondary data was collected to complement the primary data in this study. This data included the aggregation and analysis of existing records, specifically national pedestrian fatality and injury statistics, as well as a review of relevant documents from the Kenya Urban Roads Authority and Nairobi City County offices.

The study generated quantitative data through questionnaires and qualitative data through interviews. A mixed-methods approach was used to address the research objectives. During the analytical phase, the interpretation of the data included systematic processing and presentation. Quantitative data from questionnaires was analyzed using statistical methods to identify patterns and relationships. Qualitative data from interviews was analyzed with NVivo software, focusing on thematic categorization and pattern identification. The data from structured observations was systematically reviewed using a structured checklist. This checklist facilitated the documentation and categorization of observed behaviors, conditions, and events. This combined approach ensured that both qualitative and quantitative data were thoroughly analyzed, providing a comprehensive understanding of the research topic.

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RESULTS

The Effectiveness of Interventions Implemented Under the NMT Policy

This study sought to assess the effectiveness of interventions implemented under the Nairobi City County Non-Motorized Transport Policy in enhancing pedestrian safety along Outering Road, Nairobi County. The findings are presented in Table 1 below.

Table 1: Effectiveness of specific Interventions implemented under NMT policy

	Very Ineffective	Ineffective	Neutral	Effective	Very Effective
Pedestrian Crossings	46.7%	29.6%	12.5%	9.2%	2.0%
Traffic Calming Measures	27.0%	45.4%	13.2%	13.2%	1.3%
Dedicated Cycling Lanes	56.6%	28.3%	8.6%	3.9%	2.6%
Pedestrian Bridges	3.3%	50.0%	14.5%	27.6%	3.9%
Road Signage and Markings	11.8%	57.2%	13.8%	14.5%	2.6%
Public Awareness Campaigns	27.6%	49.3%	13.8%	5.9%	3.3%
Enforcement of traffic regulations	10.5%	19.7%	41.4%	9.2%	2.6%
Public Transportation Integration	59.9%	16.4%	9.2%	12.5%	2.0%
Improved Street Lighting	38.2%	18.4%	29.6%	9.2%	4.6%
Universal Accessibility	64.5%	10.5%	12.5%	9.2%	3.3%
Enforcement of county Traffic By- Laws	62.5%	13.2%	8.6%	11.2%	4.6%
Regular Maintenance	44.1%	13.8%	27.6%	9.9%	4.6%

According to the findings, 71 (46.7%) of respondents deemed pedestrian crossings as very ineffective, while 45 (29.6%) considered them ineffective. Nineteen (12.5%) had no opinion, 14 (9.2%) viewed pedestrian crossings as effective, and 3 (2.0%) rated them as very effective. Similarly, for traffic calming measures, 41 (27%) found them very ineffective, 69 (45.4%) considered them ineffective, and 20 (13.2%) were neutral. Another 20 (13.2%) regarded the measures as effective, with only 2 (1.3%) believing they were very effective.

The study's findings indicate significant dissatisfaction with the interventions implemented under the Nairobi City County NMT policy, particularly concerning pedestrian crossings and traffic calming measures. A substantial majority of respondents rated pedestrian crossings as either very ineffective (46.7%) or ineffective (29.6%), suggesting a considerable gap between the policy's objectives and public perception.

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Rate of Overall Effectiveness of the NCCG NMT Policy

To gain deeper insights, respondents were asked to provide specific recommendations for enhancing the safety of Outering Road through the implementation of the NMT policy. The detailed findings are illustrated in Figure 1.

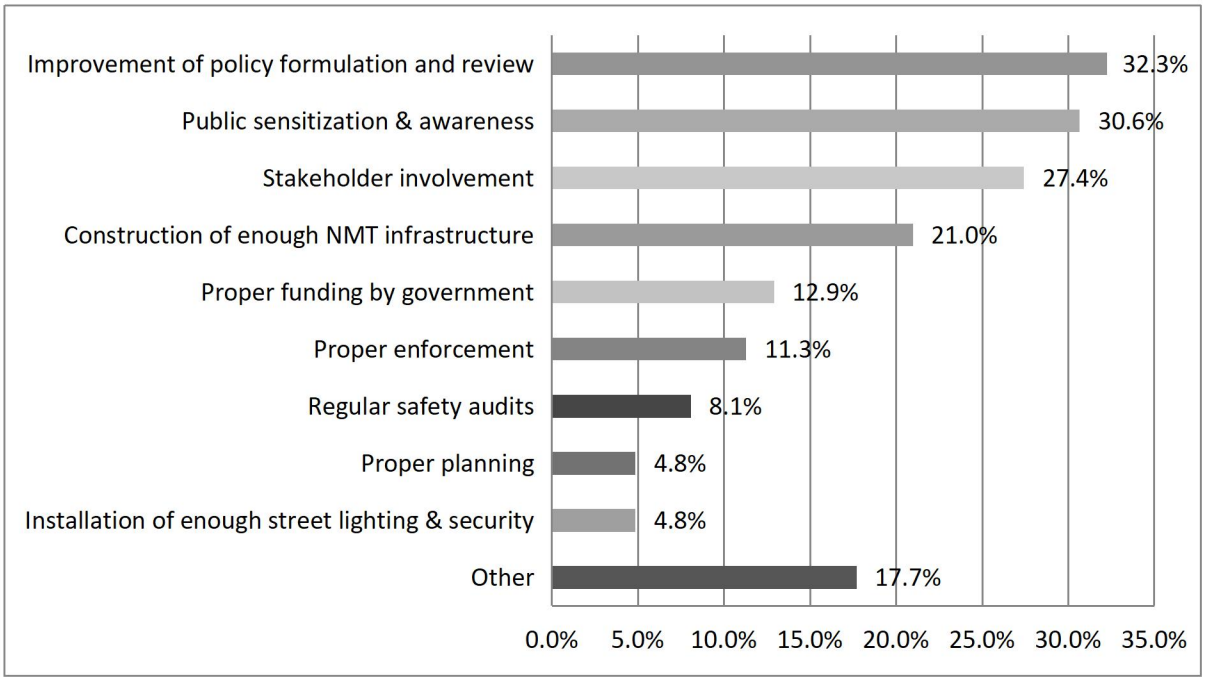

Figure 1: Suggestions for improving the NCCG NMT Policy

Many respondents recommended improving the policy through a comprehensive review, with 32.3% supporting this approach. Public sensitization and awareness efforts were favoured by 30.6%, emphasizing the need for greater community education on NMT infrastructure. The involvement of stakeholders was endorsed by 27.4%, reflecting the importance of including diverse perspectives in policy development.

The respondents to the study highlighted several key areas for improving the implementation of Non-Motorized Transport (NMT) infrastructure. These suggestions included Enhancing and expanding NMT infrastructure was advocated by 21% of respondents. Other suggestions included securing adequate government funding (12.9%), strengthening enforcement mechanisms (11.3%), conducting regular safety audits (8.1%), and improving planning and installation of street lighting and security measures (4.8%).

Expanding on these points, the interviewees provided valuable insights that align with and deepen these suggestions. One of the key informants emphasized the importance of targeted and sustained awareness campaigns to educate the public about the benefits of NMT infrastructure. They noted that such efforts would help foster a culture of respect for pedestrians and cyclists,

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ultimately creating a safer and more supportive environment for all road users (KIF, [22/2/2024]). This perspective reinforces the respondents' call for strengthened enforcement mechanisms, suggesting that public education could be a crucial step in encouraging compliance with traffic laws.

Building on the theme of policy improvement, a key informant from the Road Safety Audit Department, NTSA, pointed out the need to review the NMT policy, initially developed in 2015. They highlighted that nearly a decade has passed since its inception, and the policy now appears outdated, lacking in its ability to address recent developments in road safety management.

> We really need to gather input from all relevant stakeholders to make sure the revised policy is effective and addresses current challenges. An inclusive approach will help make the policy more relevant and impactful (KIF, [09/4/2024]).

This observation is directly connected to the respondents' recommendation for conducting regular safety audits, as a revised policy informed by up-to-date data could guide more effective implementation of safety measures.

During an interview, a member of the NCCG Transport Safety Committee discussed the practical challenges facing pedestrian infrastructure. They noted that the current placement of footbridges leads to inefficient usage because they are too far apart, prompting pedestrians to cross at undesignated areas.

> This behavior is a direct result of the long distances they have to walk to reach the footbridges. Therefore, reducing these distances and enforcing pedestrian regulations is crucial for improving safety and accessibility (KIF, [05/2/2024]).

Similarly, a Roads Engineer from KURA highlighted the need to integrate the Nairobi City County NMT policy with other urban planning documents. They argued that this integration would ensure that the policy aligns with the evolving needs of urban development.

> We really need to integrate the Nairobi City County NMT policy with other urban planning documents to ensure everything works seamlessly together. Plus, it's high time we reviewed the policy to tackle today's challenges and align it with current urban development needs (KIF, [25/02/2024]).

The quantitative data reflects the mixed perceptions of the Nairobi City County NMT policy's effectiveness. With a mean rating of 4.97, respondents generally viewed the policy positively in terms of its impact on safety along Outering Road. However, the standard deviation of 1.27 indicates variability in these perceptions, highlighting that while many believe the policy has a significant impact, there is still room for improvement. These insights from the respondents and interviewees collectively point to the need for a holistic approach that includes policy updates,

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enhanced infrastructure planning, robust enforcement, and sustained public education to maximize the benefits of NMT interventions.

DISCUSSION

The significant dissatisfaction reported by respondents reflects scepticism regarding the interventions, likely due to shortcomings in the design, placement, or maintenance of pedestrian crossings. These deficiencies appear to undermine the intended safety and accessibility benefits. Similarly, traffic calming measures were criticized, with 41 (27%) rating them as very ineffective and 69 (45.4%) as ineffective. This substantial level of negative feedback indicates that these measures may not be effectively reducing traffic speeds or improving road safety. The small proportion of positive evaluations, with only 20 (13.2%) rating them as effective and 2 (1.3%) as very effective, further underscores the perceived inadequacy of these measures. These findings suggest that the interventions under the NMT policy may be insufficient. This dissatisfaction aligns with findings from studies in urban transport systems, which indicate that poorly planned or inadequately maintained infrastructure often fails to meet safety and accessibility goals, thereby reducing public confidence in such measures (Litman, 2019).

The evaluation of traffic calming measures reveals significant dissatisfaction, with 41 (27%) of respondents rating them as very ineffective and 69 (45.4%) as ineffective. This pronounced negative feedback suggests that these measures may not be effectively achieving their intended objectives of reducing traffic speeds and enhancing road safety. The small proportion of respondents who rated these measures as effective (20 or 13.2%) or very effective (2 or 1.3%) further underscores the perceived inadequacy of these interventions. Previous research by Ewing and Dumbaugh (2009) has shown that the success of traffic calming strategies depends significantly on their adaptability to local traffic conditions and proper enforcement. This pattern of dissatisfaction indicates potential deficiencies in the design, implementation, or enforcement of the traffic calming measures. Possible issues might include inadequate adaptation to local traffic conditions, insufficient regulatory enforcement, or poor integration with existing infrastructure. The minimal positive feedback suggests that, while some respondents perceive limited benefits, these are not substantial enough to validate the overall efficacy of the measures.

Regarding the NMT intervention of dedicated cycling lanes, 86 (56.6%) of respondents rated them as very ineffective, 43 (28.3%) viewed them as ineffective, 13 (8.6%) were neutral, 6 (3.9%) considered them effective, and 4 (2.6%) rated them as very effective. This finding is consistent with research conducted by Pucher et al. (2010), which reported that poorly designed cycling infrastructure could discourage bicycle use and even compromise cyclist safety. The lack of adequate cycling facilities forces cyclists onto pedestrian paths, heightening the risk of accidents and conflicts between road users, thereby diminishing the overall effectiveness of the NMT policy. These findings indicate significant dissatisfaction among respondents, suggesting that the cycling lanes may not be effectively meeting their objectives of enhancing cycling safety and promoting bicycle use. This substantial dissatisfaction has critical implications for overall pedestrian safety. Ineffective cycling infrastructure may force cyclists onto pedestrian pathways, increasing the risk of conflicts and accidents between cyclists and pedestrians. These issues

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highlight the need for a comprehensive reassessment and improvement of cycling facilities to ensure they contribute positively to the overall safety and functionality of the transportation system for all users.

Another intervention assessed by respondents was pedestrian bridges. The findings reveal that 76 (50.0%) of respondents perceived pedestrian bridges as generally ineffective, while 50 (27.6%) regarded them as effective. Additionally, 22 (14.5%) were uncertain about their efficacy, and a small proportion viewed pedestrian bridges as either very effective (5 or 3.3%) or very ineffective (6 or 3.9%). This distribution of opinions indicates notable variation in perceptions regarding the effectiveness of pedestrian bridges, suggesting that their impact may not be uniformly experienced by all users. The assessment of pedestrian bridges shows a significant negative perception among respondents, with 50.0% rating them as generally ineffective. This widespread negative perception implies that these bridges may not be fulfilling their intended role of enhancing pedestrian safety and accessibility.

Conversely, 27.6% of respondents found pedestrian bridges effective, indicating that while some perceive the significance of these structures, such positive observations are not universally shared. This disparity suggests that the effectiveness of pedestrian bridges may vary significantly depending on factors such as location, design, and integration with surrounding infrastructure. Variations in perceived effectiveness could be influenced by the specific needs and contexts of different areas, highlighting that while pedestrian bridges may offer significant advantages in certain locations, their overall impact may be inconsistent.Similarly, the public awareness campaigns were found to be ineffective due to unclear messaging, limited reach, and a failure to address the specific concerns and behaviors of the target audience. The relatively small percentage (17.1%) of respondents who found these campaigns effective suggests that, while some perceived a level of efficacy, the overall impact was limited. This discrepancy highlights a significant gap between the policy's objectives and its practical outcomes. To enhance the effectiveness of the NMT policy, a thorough reassessment and improvement of these strategies are needed to better align with the needs of road users. Studies by Hamed et al. (2017) have highlighted that the effectiveness of pedestrian bridges largely depends on factors such as accessibility, location, and integration with existing infrastructure. Variations in perceptions could be linked to these factors, indicating that while some areas benefit from these bridges, others do not.

Moreover, 64.5% of research participants considered universal accessibility under the NMT policy to be very ineffective; 10.5% also thought it was ineffective, 12.5% had no opinion, 9.2% viewed it as effective, and 3.3% thought it was very effective. Regarding the enforcement of county traffic by-laws, 75.7% of respondents found the intervention ineffective, 8.6% were unsure, and 15.8% believed it was effective. Lastly, 57.9% of participants felt that regular maintenance was ineffective under the NMT policy, while 27.6% were neutral and 14.5% considered it effective. The findings indicate a negative perception among respondents regarding several NMT policy interventions, particularly in universal accessibility, enforcement of county traffic by-laws, and regular maintenance of NMT infrastructure.Similarly, 75.7% of respondents considered the enforcement of county traffic by-laws to be ineffective, indicating significant

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challenges within the regulatory framework. This perception of ineffectiveness is attributed to inconsistent enforcement practices, potential corruption, and insufficient public awareness and compliance with traffic regulations. The overwhelming perception of ineffectiveness suggests that the current enforcement mechanisms lack the necessary robustness and consistency to achieve the desired outcomes of the NMT policy, thereby undermining its effectiveness in promoting safer and more orderly road usage.

Furthermore, the finding that 57.9% of respondents viewed the regular maintenance of NMT infrastructure as ineffective highlights significant challenges in maintaining these facilities. Respondents identified inadequate funding and ineffective management practices as primary causes of this negative perception. This suggests that maintenance resources are neither sufficiently prioritized nor effectively allocated, compromising the infrastructure's long-term usability and safety.

According to the findings, enhancing and expanding NMT infrastructure was identified as a critical measure, reflecting the recognition of the need for substantial physical upgrades to address current deficiencies and accommodate increasing user demands. Adequate government funding was also highlighted as essential, pointing to concerns about resource limitations that may hinder the policy's effectiveness. Strengthening enforcement mechanisms and conducting regular safety audits were noted as necessary to ensure adherence to regulations and to continuously monitor and improve infrastructure safety. Lastly, while less frequently mentioned, improvements in the planning and installation of street lighting and security measures address important aspects of infrastructure functionality and overall safety. These recommendations collectively advocate for a comprehensive approach to policy enhancement, emphasizing the need for both structural improvements and procedural revisions to optimize overall effectiveness and safety. Additionally, key informants underscored the importance of improving the NMT policy to enhance pedestrian safety. For instance, a key informant from the Directorate of City Inspectorate emphasized:

The remarks from key informants highlight crucial considerations for improving the Nairobi City County NMT policy. Integrating the NMT policy with broader urban planning documents is essential to ensure a cohesive approach that aligns with overall urban development strategies. A comprehensive review of the policy, initially developed in 2015, is necessary to address current challenges and incorporate recent advancements in road safety management. Public awareness campaigns are vital for educating the community about the benefits of NMT infrastructure, fostering a culture of respect for pedestrians and cyclists, and creating a safer environment for all road users. Additionally, the strategic placement of footbridges and the effective enforcement of pedestrian regulations require careful attention to reduce unsafe crossing behaviors and enhance accessibility.

The dissatisfaction with traffic regulation enforcement and the perception of ineffective public transportation integration are also consistent with previous research findings. For instance, studies by Oviedo and Titheridge (2016) have emphasized the challenges faced by urban transport systems in developing countries, particularly due to insufficient regulatory frameworks,

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lack of enforcement, and limited integration of transport modes. The high levels of dissatisfaction reported by respondents in this study suggest that these systemic issues continue to undermine the effectiveness of the NMT policy interventions. Similarly, issues with street lighting and regular maintenance reflect challenges identified by Bogotá's urban safety studies, which emphasize the importance of strategic placement, consistent maintenance, and investment in high-risk areas to improve pedestrian safety (Cervero & Sarmiento, 2018). The perception of inadequate lighting as reported by respondents indicates that the current measures may not be effectively targeted to areas where they are most needed, diminishing their potential impact on road safety.

CONCLUSION

From the study findings, it is evident that the NMT policy's effectiveness in enhancing pedestrian safety along the Outer Ring Road is moderate. The policy has achieved some success by improving infrastructure, such as installing pedestrian crossings, footbridges, and dedicated cyclist lanes, which have contributed to a partial reduction in pedestrian risk and increased safety awareness. To enhance the policy's effectiveness, addressing these challenges is essential. This involves improving enforcement measures, ensuring regular maintenance of infrastructure, and increasing security at vulnerable footbridges. A coordinated approach that includes all relevant stakeholders is crucial for enhancing pedestrian safety. Road safety agencies should focus on designing and implementing infrastructure that prioritizes safety, such as well-placed pedestrian crossings, cyclist lanes, effective traffic signals, and advanced transportation systems. Law enforcement agencies should enforce traffic regulations through tools like speed cameras and increased patrols, while also maintaining a secure environment for road users. Additionally, the National Transport and Safety Authority and educational institutions should promote road safety through targeted public awareness campaigns and educational programs.

Based on the study's findings and conclusions, the following recommendations are proposed to address the key thematic areas. The Nairobi City County Government should undertake: Traffic police officers and Nairobi City County Government traffic marshals should intensify traffic law enforcement by deploying speed cameras, increasing patrols, and implementing stricter measures against reckless driving.Ensuring a secure environment involves prosecuting dangerous driving behaviours such as over-speeding. Concurrently, the National Transport and Safety Authority should focus on creating and executing targeted public education campaigns to raise awareness about road regulations and safe practices. These campaigns should utilize educational programs in schools and media channels to foster a safety-oriented driving culture and reduce road traffic accidents.

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