Pupil Pedestrians' Challenges in High-Density Areas of Lagos Metropolis

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Abstract

This research investigated the challenges primary school pupils in high-density areas of Lagos Metropolis encounter while commuting to school. Data were sourced primarily from pupils and guardians/parents on behalf of pupils. The new urbanism theory and walkable city concept were employed to explain the required expectations. A total of 327 pupils were sampled from an estimated 1,416,941 pupils in the Lagos metropolis, using the Cochran sample size formula. The multistage sampling technique was employed, as the subjects of interest were first grouped into categories of school ownership (private and public) and then into the various densities they fell into. Samples were selected randomly, while the collected data were analysed using frequency tables. Activities of commercial motorcyclists were rated most challenging (1.82 Challenge Severity Index [CSI]), while vendor activities on pedestrian bridges were rated least severe (1.45 CSI) out of a possible 3.0. Also considered challenging to pupil pedestrians were bad surface quality of walkways, absence of bollards for protection against vehicles, absence of crosswalks/zebra crossing, lack of pelican signal, walkway obstructions, vendor activities on pedestrian bridges and damages or missing slabs. The study concludes that the challenges encountered by pupil pedestrians were severe, as they were averagely rated 1.82 CSI of a possible 3.0 value. It was recommended that walkway surfaces be maintained periodically, bollards and pelican signals be installed, and damaged slabs being used as walkways be replaced immediately to forestall accidents in areas such as Agarawu-Obadina, Iju-Ishaga and Obawole.

Keywords: Challenges, high-density, pedestrian, pupils, severity

Introduction

The concept of a 'pedestrian' has been explained to include every form of non-motorised transportation, which is not restricted to skateboarding, cycling, wheelchair usage and walking aid (Agunloye, 2011). Walking has been regarded as an affordable form of transportation. This is because motorised means of transportation involve the cost of fuel, repair of damaged parts and change of worn-out parts (Sulmicki, 2016). Walking and cycling are the cleanest forms of transportation, as they tend to attract less pollution. Walking and cycling are modes that can reduce the negative externalities caused by the use of automobiles, such as congestion, particle emission and noise (Van-Eggermond & Erath, 2016).

Travelling by foot is often described as a flexible option. However, it could be considered dangerous when insufficient infrastructure is not provided. A road traffic crash is one of the most common causes of injury to children, especially pedestrians (UNICEF, 2008). Since pedestrians represent an important sector of traffic systems, they must be protected, regardless of socioeconomic status (Draskoczy & Hyden, 2014). This could be why target two of SDG 11 proffers that by 2030, there should be access to safe, accessible and sustainable transport systems for all while improving road safety for children.

When vendors and illegally placed construction materials occupy walkways, travelling is difficult for pedestrians (Tamiru et al., 2018). This challenge compels children and other pedestrians to walk on the carriageway, which is not safe. Poor walkway surface quality, invisible/absent crosswalks, personal security, presence of hawkers, walkway obstructions, narrow walkway widths, damaged slabs, debris and pools of stagnant water were some of the variables assessed in this experimental study. When the above-listed challenges plague a

community, pedestrians are compelled to walk on the carriageway. Improperly designed walkways, cracked surfaces and uncovered utility holes render pedestrian commuting challenging, especially for the physically challenged (Alemgena et al., 2018). Commuting within the Metropolis of Lagos could be said to have its challenges, but how profound are they? Primary school pupils are often seen walking on the carriageways while commuting to or from school, ignorant of the inherent danger. Measures adopted to curb these include walking in groups, being escorted by adults and wearing uniform-like clothes, but the problem persists.

The research question here is how severe are the challenges of pupil pedestrians while commuting to and from school? This study seeks to evaluate the challenges of children pedestrians in high-density areas of the Lagos metropolis.

Literature Review

Pedestrian walkways are not user-friendly, as vendors, utility poles, parked carts and illegal construction materials occupy them. At the same time, crosswalk facilities are neither visible nor enough in quantity at a logical distance (Tamiru et al., 2018). Walkway surface quality/continuity, walkway environmental problems, invisible/non-present crosswalks, supporting facility, personal security, presence of hawkers, walkway obstructions, walkway widths, damaged slabs, debris, pools of stagnant water were some of the variables assessed in the experimental survey titled "Investigation of pedestrian safety – a case study". Pedestrians were usually compelled to walk on the carriageway due to the abovementioned challenges.

The above-cited research was conducted in Athens, Greece, and the assessed variables were apt. However, the assessed variable was all manual, excluding electronic parameters. The study also did not separate children/pupils pedestrians from adult pedestrians. Hence the findings can be regarded as over-generalised.

Non-continuous walkways, cracked surfaces and non-covered utility holes render pedestrian commuting challenging, especially for the physically challenged in the city of Nekemte, Ethiopia (Alemgena et al., 2018). The study assessed the connectivity of walkways, potential for vehicle conflict, pedestrian volume, a mix of path users and crossing opportunities as variables and the Likert scale was used for analysis. The study further recommended that pedestrian facilities be improved upon periodically to encourage pedestrian safety.

It could be assumed that Ethiopia shares some similarities with Nigeria, considering they are on the same continents and are both rated third-world countries, hence the review of this study. The study's recommendation appears vague, not addressing any specific pedestrian facility or infrastructure. Also worthy of note is that the study concentrated on the condition or adequacy of the pedestrian infrastructure and not the actual challenges of the pedestrians.

Ignorance of the use of road facilities by both pedestrians and motorists in Lagos puts pedestrians at risk of accidents, especially children (Odeleye, 2019). This study was conducted across all the local government areas of Lagos State and assessed road infrastructure in general. It recommended that traffic lessons be taught to both pedestrians and motorists to avert road casualties. Solagberu (2012) also stated that pedestrian accidents often result in death among school children due to challenging road infrastructure.

The above study conducted in Lagos State did not separate adult pedestrians from child/pupil pedestrians. Although it made mention of children, it did not concentrate on pupils. Assessing road infrastructure, in general, might not be ideal because pedestrian infrastructure differs from that of vehicles and other motorised means of transportation. Also, the study did not concentrate on high-density areas.

Numerous studies have been conducted on the challenges of pedestrians, but they neither concentrated on children nor pupil pedestrians. The density area has also been excluded from the scope of research. This study intends to fill those gaps in the literature.

Theoretical Framework:

New Urbanism Theory

This theory was published in 1993 by Stefanos Polyzoides (Rankayat & Tiwari, 2020). It assumes that an ideal city should have walkable neighbourhoods oriented around the five-minute walk, public transit systems, and greater integration

of different types of land uses at the neighbourhood level.

The New Urbanism theory applies to this study because it concentrates on walkable neighbourhoods as its primary objective. Walkable cities, in turn, emphasise the safety concerns that would apply to pupil pedestrians. The theory also addresses citizen participation and social diversity. This further calls on the stakeholders to agitate for a desirable walking environment (especially for the pupils).

Conceptual Framework

Walkable City Concept

The concept of a walkable city, by Turon et al. (2017), has become rather imperative because of the concentration of investment on motorised mobility infrastructure above the non-motorised, thereby relegating other roads/street users. Transportation experts have perceived this as building cities for vehicles and not for human beings. Implementation of the walkable concept has some of the following advantages:

i. improving the level of safety on the street (the higher the number of persons on the street, the safer)
ii. decrease environmental and carbon footprint by reducing air pollution, traffic, noise and urbanisation
iii. Reduce the cost of construction/maintenance on carriageway infrastructure
iv. Improve city aesthetics, which can engender local businesses and tourism as well as encourage investment
v. Improve the health of residents and commuters and
vi. Reduce the disparity in the usage of means of transportation.

Methodology

Data was sourced from primary sources to achieve this research's objective. Primary data was obtained from pupils (mostly in primary 5 and 6) in the presence of their parent/guardian (because of ethical issues) through a structured questionnaire. Only the primary schools within the metropolis were examined, and the list of primary schools was sourced from the State Universal Basic Education Board (SUBEB) for classification into residential density areas through the geographic information system software.

The total number of pupils in both private and public primary schools in the Lagos metropolis was calculated1,416,941 (SUBEB, 2021), and the Cochran sample size formula was used to arrive at 327 samples. The multistage sampling technique was adopted to select samples (pupils), as they were first grouped into private and public schools according to their local government areas. Secondly, the public and private schools were grouped into low, medium and high-density areas of the Lagos metropolis. Thirdly, was the identification and selection of public and private schools in the various density areas of Lagos metropolis—finally, the administration of questionnaires to the pupils after obtaining the consent of the guardians/parents. Frequency tables were used for data analysis.

Results and Discussions

From the 32 variables assessed, some were selected for frequency table analysis; however, all were analysed using the Likert scale.

Respondent's Response on the Severity of Bad Surface Quality of Walkway

The severity of the respondents' ratings indicated that the surface quality of the roads in the densely populated areas of Lagos Metropolis is poor, as shown in Table 1. This result confirms the findings of Alemgena et al. (2018) regarding the surface quality and potential hazards of walkways. It also negates the provisions of the walkable city concept. This could be dangerous for pupils. The roads/streets of the high-density areas of Lagos metropolis commute to and from school daily.

Table 1: Respondents' Response on the Surface Quality of Walkway

S/N	Severity of bad surface quality of walkway	High-density area	
		Freq.	%
1	Not severe (1)	122	37.3
2	Severe (2)	163	49.8
3	Strongly severe (3)	42	12.8
	Total	**327**	**100.0**

Respondent's Response to Activities of Commercial Motorcyclists

Table 2 reveals that the activities of the commercial motorcyclist were deemed challenging, as it was

rated severe by the respondents. Motorcycles were also seen encroaching walkways during questionnaire administration. This situation renders the street less walkable. Hence it compromises the provisions of the new urbanism theory.

Table 2: Respondents' response on activities of commercial motorcyclists

S/N	Severity of activities of commercial motorcyclists	High-density area	
		Freq.	**%**
1	Not severe (1)	94	28.7
2	Severe (2)	159	48.6
3	Strongly severe (3)	74	22.6
	Total	**327**	**100.0**

Respondent's Response on the Severity of Absence of Bollards

The absence of bollards was rated severe by the respondents. The bollards help to prevent the intrusion of motorised means of transportation (vehicles, tricycles and motorcycles) from the walkways. This also negates the concept of walkability, as it compromises safety. Table 3 clearly shows that the absence of bollards is an issue that requires attention. Evidence of this was observed as vehicles were partially parked on some walkways.

Table 3: Respondents' Response on the Severity of Absence of Bollards

S/N	Severity of absence of bollards	High-density area	
		Freq.	**%**
1	Not severe (1)	91	27.8
2	Severe (2)	184	56.3
3	Strongly severe (3)	52	15.9
	Total	**327**	**100.0**

Respondents' response on the severity of the absence of crosswalk/zebra crossing

The absence of crosswalks/zebra crossings was rated severe by respondents, as found in Table 4. To achieve a walkable city and as propounded in the New Urbanism Theory, crosswalks should be provided at mid-blocks and intersections to facilitate easy movement of pedestrians. In some instances where present, the crosswalk had faded. This result also corroborates Tamiru *et al*. (2018) on the absent or faded walkways.

Table 4: Respondents' Response to the Absence of Crosswalk/Zebra Crossing

S/N	Severity of absence of crosswalk/zebra crossing	High-density area	
		Freq	*%*
1	Not severe (1)	91	27.8
2	Severe (2)	167	51.1
3	Strongly severe (3)	69	21.1
	Total	**327**	**100.0**

Respondent's Response on the Severity of Absence of Pelican Signal

The respondent rated the absence of a pelican signal as severe (Table 7). Only a few were found around high-density areas of the metropolis, and they were not in good condition. The presence of a pelican signal indicates the time in seconds, which gives hope to the pedestrians regarding the time to cross the road. The manual and electronic traffic management mechanisms must be adequate for a city to be adjudicated walkable. The absence of a pelican signal in the high-density areas of the Lagos metropolis negates the provisions of the walkable city concept and renders commuting on foot less pleasurable.

Table 5: Respondents' Response on the Severity of Absence of Pelican Signal

S/N	Severity of absence of pelican signal	High-density area	
		Freq.	**%**
1	Not severe (1)	103	31.5
2	Severe (2)	168	51.4
3	Strongly severe (3)	56	17.1
	Total	**327**	**100.0**

Respondent's Response to Walkway Obstructions

The majority of the respondents rated the walkway obstructions as severe. It was also observed that the vendor's stall occupied some portions of the walkway. To achieve the new urbanism idea, walkways within the high-density areas of Lagos metropolis must be attended to. This result shows that the high-density areas of Lagos Metropolis negate the ideas of the new urbanism theory and the walkable city concept.

Table 6: Respondents' Response On Walkway Obstructions

S/N	Severity of walkway obstructions	High-density area	
		Freq.	%
1	Not severe (1)	107	32.7
2	Severe (2)	151	46.2
3	Strongly severe (3)	69	21.1
	Total	**327**	**100.0**

Respondent's Response to Damaged Slabs

Most of the respondents rated the challenge of "damaged slabs" as severe. Qualitative data revealed that the damaged or missing slabs pose more significant threats to the pupil pedestrians, especially during the rainy season when the roads are flooded. This result corroborates Alemgena et al. (2018) on the condition of pedestrian infrastructure in Africa.

Table 7: Respondents' Response to Damaged Slabs

S/N	Severity of damaged slabs	High-density area	
		Freq	%
1	Not severe (1)	107	32.7
2	Severe (2)	147	45.0
3	Strongly severe (3)	73	22.3
	Total	**327**	**100.0**

Respondent's Response to Vendor Activities on Pedestrian Bridge

In places where pedestrian bridges were present, vendor activities occupied some significant portion. This could be an answer to the question of pupils crossing dual carriage roads in places like Sabo, Yaba. Findings in Table 8 reveal a situation where the municipality's installed infrastructure is being abused. In conclusion, the activities of vendors on pedestrian bridges negate the provisions of the new urbanism theory and the walkable city concepts.

Table 8: Respondents' Response to Vendor Activities on Pedestrian Bridge

S/N	The severity of vendor activities on the pedestrian bridge	High-density area	
		Freq.	%
1	Not severe (1)	112	34.3
2	Severe (2)	162	49.5
3	Strongly severe (3)	53	16.2
	Total	**327**	**100.0**

Interpretation of severity of challenges of pupil pedestrians in the study area

The severity of challenges of pupils' pedestrians was rated as 1.76 CSI (Challenge Severity Index) for the surface quality of the walkway, 1.45 for vendor activities on the pedestrian bridge, 1.94 CSI for activities of a commercial motorcyclist, 1.88 CSI for the absence of bollards, 1.93 CSI for the absence of a crosswalk, 1.86 CSI for the absence of pelican signal, 1.88 CSI for walkway obstructions, 1.91 CSI for narrow walkway, 1.89 CSI for damaged slabs and 1.89 CSI for obstructions on the walkway. The study found that the least rated index of the severity of pedestrian challenges is vendors' activities on a pedestrian bridge with 1.45 CSI. In contrast, the highest rated index of the severity of pedestrian challenge is the activities of commercial motorcycles with 1.94CSI, on a scale of three (3) points. This result negates the provision of the new urbanism theory and the walkable city concept.

Table 9: Likert Scale Outputs of Severity of the Challenges of Pupils' Pedestrians in the Study Area

S/N	VARIABLES	HIGH-DENSITY AREA				
		1	2	3	SWV	CSI
1	The bad surface quality of the walkway	122	163	42	574	1.76
2	Vendor activities on the pedestrian bridge	112	102	53	475	1.45
3	Activities of commercial motorcyclists	94	159	74	634	1.94
4	Absence of bollards	91	184	52	615	1.88
5	Absence of crosswalk	91	167	69	632	1.93
6	Absence of pelican signal	103	168	56	607	1.86
7	Walkway obstructions	107	151	69	616	1.88
8	Damaged slabs	107	147	73	620	1.89
TOTAL					4,773	14.59
AVERAGE CSI						1.82

Summary of Findings and Conclusion

Challenges of pupils pedestrians are severe, as can be deduced from the above tables. The most severe challenge they encounter is the activities of the commercial motorcyclists and dispatch riders on the walkway, and the least are commercial vendor activities on pedestrian bridges (which had a low rating because of the absence of the bridge in most neighbourhoods).

Recommendation

To improve the pupils' pedestrian travel experience, road engineers and specialists should consider the absence or present condition of these facilities to achieve safety for the pupils. The eight discussed challenges are to be taken seriously and granted immediate attention to improve the commuting experience of primary school pupils in the Lagos metropolis.

The surface of the walkways should be maintained periodically to prevent total damage or the presence of stagnant pools of water. The damaged slabs should be replaced or repaired early enough for safety. There should be zero tolerance for vendor activities (buying and selling) on the walkways, and the walkways should also be free of obstructions. This requires that vehicles should be prohibited from parking on the walkways; the walkways should also be free of debris. A task force team should be set up with the mandate of curbing the activities of commercial motorcyclists on walkways. Crosswalks should be provided, as this would ease road-crossing activities of pupil pedestrians. Lastly, bollards and pelican signals should be installed and periodically maintained.

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