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Automobile Trips to School and Safety Perspectives of Unplanned Lokoja Metropolis in North Central Nigeria

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ABSTRACT



Many studies on transport research did not consider the consequences of high reliance on an automobile trip to schools which frequently resulted in road traffic crashes, traffic delay, and late arrival to school, injuries and sometimes death of victims especially students. As a result, this research examines the consequences of automobile trip to school among secondary school students in the Lokoja metropolis. It aims to investigate the safety of the use of automobile in an unplanned city like Lokoja, with the specific objectives of ascertaining the number of pupils who embark on different automobile trips; the safety measures, and the casualty cases. Three hundred students were selected for questionnaire administration across six selected secondary schools in the city. Data on students' road traffic crashes were obtained from archives. Descriptive and inferential statistics were employed for analyses. Findings reveal that more than 70% of students rely on automobile to travel to schools. Car trips to schools were more among students of private secondary schools. Students in private secondary schools rely more on the use of a school bus. It was also discovered that students were involved more in traffic crashes along major roads. The study concludes on the use of school bus by students instead of relying on private cars.

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1. Introduction

Within the last two decades the number of registered vehicles in Nigeria has increased tremendously from 349, 417 in 1999 to 13, 214, 019 in the year 2017. Motor vehicles increased from 222, 507 to 7, 928, 132 for the same period, while motorcycles increased from 126, 910 to 5, 285, 887 (Federal Road Safety Corps 2017). According to reports in the National Bureau of Statistics (2017), approximately 4,656,725 vehicles are owned by individuals for their day to day transaction, while 6,749,461 vehicles are registered as public

transport services for both passengers and freight transport services in the country. The data suggests that the total number of Nigeria's vehicle per person is 0.06.

This can be interpreted as very low compared to what is obtainable in some of the developed countries of the world where more than 0.70 vehicles are accessible for every person in Finland,

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Italy, the USA, Austria to mention but a few ([World Health, 2015](#)). Incessant increase in the importation of fairly used vehicles in some developing countries such as Nigeria to meet their travel needs such as a trip to work, journey to schools, shopping and recreational activities has created serious bottlenecks for people because of inadequate road networks to accommodate vehicular movement ([Ogunsanya, 2004](#)). High automobile travel demand creates challenges that include traffic delay, road traffic crashes, fatigue and emission of toxic substances into the atmosphere that are harmful to human health ([Kopnina & Williams, 2012](#)).

Until recently, research on children demands for automobile trip to schools was very scanty in the literature compared to work or health care trips. This apparent gap in the field of transport research is unwarranted for any country striving to achieve a sustainable transport policy in the 21st Century. Studies in different parts of the world have shown that trip to school is one of the most important trip generations in any urban centre in the world. This is because it involves the children and their parents that accompany their wards to school ([Baker et al., 2005](#); [Department for Transport, 2014](#)). Detailed information on the journey to school is highly essential because pupils can be trained to travel on their own and also because school trips generate problems such as traffic crashes, emission of toxic substances and fatigue ([Goeverden & Boer, 2013](#)). Studies have also shown that car congestion around schools during the peak times of arrival and departure creates a dangerous environment for children that walk, cycle or use public transport service to and from schools ([Collins & Kearns, 2001](#)) as cited in [Badri \(2013\)](#). Similarly, traffic congestion along routes connecting schools create delay and late arrival to schools ([Timperio et al., 2006](#)) as cited in [Badri \(2013\)](#).

Furthermore, studies have shown that an increase in average distance from home to school in recent decades has resulted in high reliance on motorised modes of transportation such as car, and public transport services of all forms such as tricycle, motorcycle, taxi, bus and mass transit ([Easton & Ferrari, 2015](#)). The use of automobile, particularly private car, is often associated with air pollution, carbon dioxide emission, traffic congestion, road traffic crashes and other environmental health challenges ([Kopnina & Williams, 2012](#)). Short distance trips to school will promote walking and cycling and this will enhance sustainable transport to school ([Goeverden & Boer, 2013](#); [Kim, 2014](#)). In an assessment of journey to school in the U.S, [Centres for Disease Control and Prevention \(2012\)](#)

reported that children do not get adequate physical activities and this contributes to their health problems. It, therefore, recommended an average of 60 minutes of physical activity per day for each student. In another case, an assessment of mode choice to schools in some of the developed countries, the socio-economic characteristics of the parents such as gender, employment status and level of educational qualifications determined the mode choice of their children to school. Women were more involved in escorting their wards to school ([Kim, 2014](#)). Studies on the mode choice to school in the developing world particularly in Nigeria emphasised that the location of schools relative to the residence of the students are the major determinants of mode choice ([Ipingbemi & Aiworo, 2013](#); [Olawole, 2016](#)). Some of these studies did not consider the health implications of high demand for automobile trip to school. These health implications include children traffic crashes and congestion that have resulted in public concern in some major and emerging cities in the developing world, Nigeria inclusive. According to the [Federal Road Safety Corps \(2017\)](#), the percentage of children injured in road traffic crashes on roads in Nigeria is 6 %, while the percentage of children killed in road traffic crashes is 7% ([Federal Road Safety Corps 2017](#)). In the same report, 39.8% of private vehicles were involved in road traffic crashes, 58.9% were commercial vehicles, while only 1.3% of the vehicles involved in the crashes were government-owned ([Federal Road Safety Corps 2017](#)). It is interesting to note that many of these vehicles were conveying children to school ([Badri, 2013](#)). It is on this note that this study seeks to examine the mode choice of transportation of children to school and the implications of the high demand for automobile trips to school in the emerging city of Lokoja. This will give an avenue to propose a sustainable transport policy for school trips in the emerging city of Lokoja in north-central Nigeria.

2. Study Area

Lokoja metropolis is the study area. The city is located on latitude 7° 45' 27.56" - 7° 51' 04.34" N of the Equator and longitude 6°41' 55.64" - 6°45' 36.58" E of the Prime Meridian by the confluence of Rivers Niger and Benue (see figure 1), with a total land coverage of about 63.82 sq. km. ([Adeoye, 2012](#)). Lokoja built-up area comprises seven localities such as Lokoja Core Area, Adankolo, Lokongoma, Felele, Zango Daji, Army Barracks and Ganaja Village ([National Population, 2007](#)). These smaller localities which were formally separated from one another now merged to become larger Lokoja which constitute a major city in Kogi State ([Olawepo, 2009](#)). Shortly after Lokoja became the

capital of Kogi State in 1991, the city witnessed rapid development as a result of the influx of people from neighbouring towns and villages. Like many other cities in Nigeria, three types of road networks are found in the Lokoja metropolis. These include Trunk A- Federal Roads (highways), Trunk B- State Roads, and Trunk C- Local Government Roads. The Trunk A Roads comprise the federal highways that connect Lokoja to other towns and states of the federation. The Trunk B- State Roads are the intra urban road networks. Many of these roads are poorly designed with non-pedestrian walkways. This has discouraged many pedestrians, particularly children to walk to and from school because of heavy traffic in the city. Many Trunk B roads are narrow, poorly maintained and connect few residential areas., many public transport services such as tricycles, taxis and mass transits are forced to use the federal highways in the city (Adeyinka, 2017). This has led to incessant road traffic congestions and traffic crashes within the metropolis. The last categories of the urban route in Lokoja metropolis are Local Government Roads that link low density residential parts of the city. Many of these roads are earth surfaced with poor transport facilities. Some of the children that live on the outskirts of Lokoja have less access to public transport services to the school. Studies have also shown that the pattern of distribution of secondary schools in Lokoja is not evenly distributed (Adetunji & Aloba, 2018). Virtually all public secondary schools in the city are located in High and Medium density areas of Lokoja. The inability of the government to provide educational facilities for the fast growing population of Lokoja has led to the proliferation of substandard secondary schools at the outskirts of the city. The preference for quality education has forced many parents to allow their wards to cross the city landscape, travelling long distances in order to access educational facilities located outside their localities (Adetunji & Aloba, 2018). Many of these children rely on automobile to and from school.

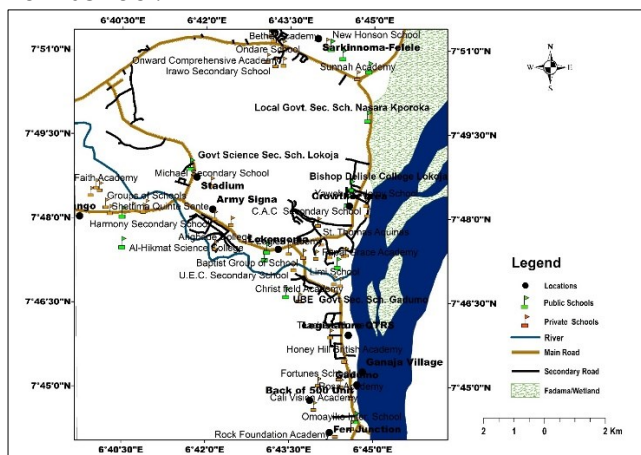


Figure 1. Distribution of Schools and Road Networks in Lokoja

Adapted From: (Adetunji & Aloba, 2018)

3. Materials and Methods

Primary and secondary data were utilised for this study. Three sets of primary data were required for the study. The first category of data was based on socio-economic characteristics of secondary school children and their travel patterns such as mode choice of transportation, distance travelled and type of school attended. The second set of data focusing on parents' decisions on school attended by their wards and the number of children attending school in their family. The last group of data was based on children traffic crashes. Three public and private secondary schools with students' enrolment of more than 1000 population were purposively selected for the study. A structured questionnaire that was divided into two sections (parent decision on school choice for their wards and children mode preference to school) was designed to elicit information on mode trips to school. In each of the schools selected, an average of 40 children/students was selected using a table of random numbers across the junior and senior secondary schools in the city. The administration of the questionnaire to the students was done with the assistance of the principals of the selected schools. The questionnaires were given to the students and were taken home to be completed and returned the next day. Data on children (students) road traffic crashes were obtained from the archive of the Federal Medical Centre (2017) in Lokoja metropolis. Descriptive and inferential statistics were employed to analyse the data.

4. Results and Discussion

The principal mode of transport to secondary schools in Lokoja is by foot particularly when a short distance is involved. Table 1 reveals that 29.9% of secondary school students walk to schools in the city. This is at variance with the study carried out in Mission Hill School by Kim (2014), where 15% of children engaged in walking to school (Kim, 2014). The use of private cars for school trip was ranked second (23.7%) of the modal split in Lokoja. Approximately 16.6% and 17.1% of the sampled students rely on tricycle and motorcycle for trip to schools respectively. The result of this analysis reveals that more than 70% of the sampled students rely on automobile for their journey to school. The use of school bus for school trip is ranked lowest (12.8%) among the children/students in Lokoja metropolis. This is contrary to the findings in a study of mode choice of transportation to schools in Abu Dhabi, the capital of the United Arab Emirate. In the findings, Badri (2013) reported that 45% of children travel to school by car, while 38.1% rely on school buses. However, the use of school bus for the journey to

school in some of the advanced countries has been considered to be safer than the use of private cars to school (The Car Crash Detective, 2018).

Table 1: Mode of choice to secondary schools in Lokoja

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
Walk	63	23.1	29.9	29.9
School bus	27	9.9	12.8	42.7
Tricycle	35	12.8	16.6	59.2
Motor cycle	36	13.2	17.1	76.3
Car	50	18.3	23.7	100.0
Total	211	77.3	100.0	
Missing				
System	62	22.7		
Total	273	100.0		

The mode choice of transportation of children to school varies according to the type of school attended. Private secondary school children rely more on car trip to school compared to public secondary school children. Table 2 reveal that 32 % of private secondary school children depend on car trip to school while 16% of public school children rely on car trip. Further analysis shows that more than 30% of public secondary school children walk to school in contrast to 27.7% of private secondary school children. Similarly, the use of school bus for school trip is more pronounced among the children of private secondary schools (15%) in comparison with public secondary school children (10.3%).

Table 2: Mode Choice of Transportation to Different Type of School in Lokoja

Mode Choice		Type of school attended by your children				Total
		Private secondary school		Public secondary school		
		No	%	No	%	
Mode of choice to school	Walk	28	27.7	35	32.7	63
	School bus	15	14.9	11	10.3	26
	Tricycle	17	16.8	18	16.8	35
	Motor cycle	9	8.9	26	24.3	35
	Car	32	31.7	17	15.9	49
Total		101	100.0	107	100.0	208

The decisions of parents to allow their ward to walk to school varies with: (1) No. of students attending school in the family, $F= 8.985, <P.00$; (2) Distance of Residence to School, $F=7.376 <P.01$; (3) Route connected to the location of the school attended by the student, $F=8.699 < P.00$; (4) Type of School attended by students, $F= 1.960 < P.17$ (see Table 3). In many communities in Africa where many families are polygamous, there is a tendency for children to walk to school particularly where many students are of school age. Also, children whose schools are located in their neighbourhoods may likely walk to school in contrast to children with schools outside their localities. The route leading to the location of a school attended by the children also determines to a large extent whether the children walk or rely on automobile to school. The provision and availability of pedestrian walkways

and location of schools away from heavy traffic may encourage parents to allow their wards to walk to schools rather than rely on automobile for trip to schools.

Table 3: Variables that Determine whether Children Walk to School in Lokoja

		ANOVA				
		Sum of Squares	Df	Mean Square	F	Sig.
No of students attending school in the family	Between Groups	4.410	1	4.410	8.985	.003
	Within Groups	48.100	98	.491		
	Total	52.510	99			
Type of school attended by your children	Between Groups	.490	1	.490	1.960	.165
	Within Groups	24.500	98	.250		
	Total	24.990	99			
Distance of your residence to school	Between Groups	4.255	1	4.255	7.376	.008
	Within Groups	54.234	94	.577		
	Total	58.490	95			
Route connected to the location of the school attended by your children	Between Groups	5.813	1	5.813	8.699	.004
	Within Groups	62.145	93	.668		
	Total	67.958	94			
Sex of the student	Between Groups	.423	1	.423	1.687	.197
	Within Groups	24.538	98	.250		
	Total	24.960	99			

It is pertinent to note that many parents prefer their wards to travel to school by automobile as a result of the consideration of many factors. For instance, Table 4 indicates that 42.5% of parents considered convenience as the most priority for their wards to travel using automobiles. More than 50% of parents

considered safety as an important factor for allowing their wards to travel by automobile to school because many secondary schools in Lokoja are located on major roads where traffic is heavy during peak periods.

Table 4: Parent Preference on Automobile Trips to School

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Convenience	99	36.3	42.5	42.5
	Safety	120	44.0	51.5	94.0
	Weather condition	14	5.1	6.0	100.0
	Total	233	85.3	100.0	
Missing	System	40	14.7		
Total		273	100.0		

Studies have shown that high demand for automobile trip to school has serious implications on student's health in terms of air pollution around the school premises, traffic congestion and road traffic crashes that result in injuries and deaths of children who are the leaders of tomorrow (Goeverden & Boer, 2013; Kim, 2014). In the last twelve months, thousands of children who are of school age have been involved in road traffic crashes in Nigeria. Table 5 indicates that 1765 children were injured in road traffic crashes in 2017 in Nigeria. Kaduna State has the highest number

(225) of children injured in road traffic crashes. This is closely followed by Kano State with a total number of 142 children. Akwa Ibom and the Cross River States recorded the lowest number of children injured in road traffic crashes with 2 and 5 respectively. Kaduna State recorded the highest number of children that died in road traffic crashes. Bauchi State was ranked second in terms of children who lost their lives in road traffic crashes in 2017 in Nigeria.

Table 5: Number of Children involved in Road Traffic Crashes on State Basis in 2017

State	Number of Children Injured on Road Traffic Crashes	Children Killed
Abia	11	0
Adamawa	12	2
Akwa Ibom	2	4
Anambra	16	8
Bauchi	128	23
Bayelsa	4	4
Benue	49	12
Borno	6	4
Cross River	5	0
Delta	15	7
Ebonyi	21	11
Edo	56	19
Ekiti	11	1
Enugu	61	6
FCT	102	9
Gombe	46	6
Imo	19	3
Jigawa	66	12
Kaduna	225	53
Kano	142	18
Katsina	114	11
Kebbi	19	2
Kogi	62	18
Kwara	34	10
Lagos	22	5
Nasarawa	106	10
Niger	82	20
Ogun	67	7
Ondo	52	20
Osun	88	15
Oyo	84	8
Plateau	48	8
Total	1765	

Source: Federal Road Safety Corps (2017)

The situation in which children are involved in road traffic crashes in the Lokoja metropolis is not at variance with what occurs in other states of Nigeria. For instance, Table 6 reveals that 136 children were involved in road traffic crashes in Lokoja in 2011. As high as 28 children were involved in road traffic crashes in December 2011. This

period coincided with the festive period when the flow of vehicular traffic is heaviest in the city. The number of children involved in road traffic crashes reduced from 136 in 2011 to 87 in 2012. Table 6 indicates that 14 children were involved in road traffic crashes in January, August and December 2012 respectively.

Table 6: Children Traffic Crashes for 2011 and 2012

MONTHS	2011	2012
JANUARY	7	14
FEBRUARY	3	7
MARCH	12	4
APRIL	7	5
MAY	6	01
JUNE	13	8
JULY	16	9
AUGUST	22	14
SEPTEMBER	1	6
OCTOBER	9	1
NOVEMBER	12	4
DECEMBER	28	14
TOTAL	136	87

Source: Extracted from the Archive of FRSC, Lokoja Kogi State, 2012

At a more disaggregate level, the number of children of school age involved in road traffic crashes are more pronounced along Lokoja-Kabba Junction route and Lokoja- Ganaja-Anyigba road(See Table 7).

Table 7: Children Involved in Road Traffic Crashes across Different Routes Segments in Lokoja Metropolis 2011-212

LOCATION	ROAD CRASHES ALONG DIFFERENT ROUTES						No.of Crashes	Months
	Lokoja-Koton-Karffe-Abuja		Lokoja-Ajaokuta		Lokoja-Zariagi – Okene			
	2011	2012	2011	2012	2011	2012		
Felele	2	-	-	-	-	1	3	January
Koton-Karffe	3	2	-	-	-	4	9	February
Lokoja	3	-	-	-	-	2	5	March
-	-	-	-	-	-	1	1	April
Zariagi	-	-	-	-	4	-	4	May
Natako-Zariagi Felele	6	-	-	-	2	3	11	June
Kabba Junction	-	-	-	-	4	2	6	July
Lokoja(Salem University)	12	-	3	-	-	4	19	August
Zariagi	-	-	-	-	7	5	12	September
	-	-	-	-	3	1	4	October
Zariagi	-	-	1	-	1	6	8	November
Kabba Junction	2	-	-	-	15	2	19	December
Total(%)	28		4		36	31	101	

The accident conditions of children involved in road traffic crash at different routes in Lokoja as shown in Table 8 varies from minor to severe. Many of the children reportedly died in road traffic

crashes. More than 60% of accidents occurred along the federal or major roads, particularly along Lokoja- Kabba route and Lokoja- Abuja route in the city.

Table 8: Reported Cases of Children Involved in Road Traffic Crashes at Federal Medical Centre Lokoja, Lokoja, Kogi State

File	Sex	Age	Accident Location	Part Involved in bruises	Condition of patient	Days in Hospital	Survival
790564 28/11/15	M	15	NTA Roundabout Lokoja	Facial bruises on motorcycle	Minor accident on motorcycle	3 days	Survive and discharged
790429 13/12/15	M	16	Head on collision of two buses at Kabba junction	Humerus fracture	Severe accident brought in unconscious	1 month	Later referred
790422 18/12/15	F	17	Head on collision of two buses Kabba Junction	Right upper limb fracture	Severe accident	2 months	Survival discharge follow-up
790565 5/11/15	M	13	Truck and car Peugeot collision at Felele Lokoja	Upper Lip and shoulder laceration	Severe accident	17 days	Discharge
790563 5/11/15	M	13	Frontal scalp avulsion and clip dislocation Ajaokuta Lokoja Road	Frontal scalp avulsion and Hip dislocation	Brought in unconscious	1 month	Referred conscious
790575 3/1/16	M	6	-	Avulsion of right Hip & Tendon involvement	Not Severe Conscious	2 hours	Discharged for outpatient treatment
790979 8/2/16	M	14	Lokoja - Abuja Road	Pelvic fracture	Severe unconscious	6 hours	Referred to the university of Abuja Teaching Hospital
791235 16/2/16	F	5	NTA Roundabout Lokoja	Facial bruises on both arms	Minor accident	4 hours	Discharged as outpatient
791293 18/3/16	F	2 ½	Ajaokuta – Lokoja Road	Motorcycle Bilateral per orbital swelling	On motorcycle	7 days	Discharged later
872781 6/9/16	F	1 year 4 months	Ganaja Junction	Motorcycle Right-hand fraction	Severe	3 months	Discharged as orthopaedic case
872944 6/9/16	F	7	Kabawa Area Lokoja	Bleeding from mouth	Minor accident on motorcycle	3 hours	Discharged
7907891	M	12	Abuja-Lokoja	Head Injury	Unconscious	6 days	Died
7907992 2/3/6	F	13	Koto- Karffe road	Oral bleeding Head on collision of two buses	Minor	1 day	Discharged

797192 27/3/16	M	15	Ajaokuta - Lokoja Road	Collision of bus and Motorcycle bleeding from Nose and Ear	Severe accident	7 days	Discharged and referred
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Source: Unpublished Cases of Children Involved in Road Traffic Crashes extracted from Archive of Accident and Emergency Sections at Federal Medical Centre Lokoja

5. Conclusion and Planning Implications

The study examined the characteristics of automobile trip to school in Lokoja, an emerging city in north central Nigeria. At the introductory part of the study, the paper discussed the trend of automobile demand in Nigeria and the pattern of children traffic crashes as a result of high demand for automobile trip to school. The methodological section utilised both primary and secondary data to elicit information on the mode preference of children to school in Lokoja. Also, data relating to road traffic crashes of children were obtained from archive sources. Descriptive and inferential statistics were used to analyse the data. Several issues were highlighted. One is that the town planners did not envisage the population explosion of the city in years ahead. But as the years went by, the population almost quadrupled at an alarming rate, making it very difficult for a new plan to be formulated. With this increase came also the increase of automobiles, tricycles, motorcycles, etc. Thus road crash was a resultant effect. Evidence from the literature showed how developed economies like USA, Italy and Austria etc managed their population increase, especially as it concern students trip to school. The results of the research reveal that more than 70% of children rely on automobile (tricycle, motorcycle, school bus and car) for their school trips. The resultant effects of this are high traffic crashes by children on both intra and inter-city

roads in the Lokoja metropolis. Many children involved in road traffic crashes in the last few years have sustained minor and serious injuries, while many have lost their lives in the course of their trips to school in the city. The study made far reaching recommendations. First, the study recommends the need to encourage the use of school buses in Lokoja and similar other cities in Nigeria to minimise a large number of vehicular movement on roads as this may likely reduce casualties among school children as a result of road traffic crashes. This recommendation could be backed by legislation. Similarly, the study also recommends that there is a need to improve road transport infrastructure through the provision of pedestrian walkways to encourage children to engage in active walking to schools rather than relying on automobile trips to schools. And finally, security operatives who have been furnished with different routes that students use to school be tasked to ensure that safety measures are adhered to strictly, curb crashes in this emerging city, Lokoja in North Central Nigeria.

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Conflict of interests

The author declares no conflict of interest.

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