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Assessment of Road Safety Features around Public Primary Schools in Akure Metropolis

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Abstract: *Children have been identified as particularly vulnerable road users. Although walking as a mode of transportation has health and other benefits, it puts children at risk of road traffic injuries/accidents. This study determined the availability of road safety elements/features in the vicinity of government-owned primary schools in Akure municipality. It assessed, observed, and analyzed the presence of six key road safety features, which are zebra crossing, traffic warden, speed bumps, sidewalks/pedestrian lane, school sign-board, and designated parking spaces, around various public primary schools in Akure. This study was deemed vital due to the recent exponential increase in the number of schools established in diverse neighborhoods in Akure. Concerns about the safety of students attending these schools have recently grown. This is especially as most of these schools are located around major roads or other areas/environments where safety from accidents cannot be guaranteed. According to the findings, 0 out of 36 (0%) public primary schools have zebra crossings, 20 out of 36 (56%) public primary schools have traffic wardens, 27 out of 36 (75%) schools have speed bumps located on the roads leading to them, 28 out of the 36 public primary schools (78%) are located on roads that are free of distresses and 28 out of 36 (78%) schools have reserved parking space. Considering the findings of this project, the government must move quickly to guarantee that basic road safety elements are installed and maintained around all public primary schools in the municipality to ensure the safety of pupils (or children) traveling to or from school.*

Keywords— children, vulnerable, traffic injuries, road safety, primary schools.

1. INTRODUCTION

Each year, the World Health Organization (WHO) estimates that over 260,000 children die and up to ten million are wounded in vehicle accidents. The vast majority of deaths (approximately 93 percent) – take place in low- and middle-income nations [1]. As passengers or pedestrians, children are primarily engaged in road traffic accidents [2]. Defective road environments, such as excessive traffic volumes, inefficient, and unsafe public transportation systems, inappropriate vehicle speed, poor land use and networking, lack of separation of road users, and mixed land use where houses, schools, and commercial outlets are erected, are all factors that increase the susceptibility of children involved in road crashes [1].

Children are particularly vulnerable to pedestrian injury due to their tiny size, which makes it difficult for them to see surrounding traffic and for cars to see them; they are also active, energetic, and prone to rash decisions. Furthermore, until they are roughly 10 years old, they lack the physical and cognitive skills necessary to make safe traffic judgments and choices on their own [3]. Furthermore, children are involved because they live, work, and play on the streets in various nations [1]. The highest rates of child pedestrian injury have been observed in Africa and Asia, which has been related to the fact that many of them walk to school [4, 5].

Walking has been linked to health benefits and is considered part of an active lifestyle [6]. Walking to school, on the other hand, has the disadvantage of exposing children to the risk of pedestrian harm. Over 73 percent of children wounded by road traffic in Tanzania were walking to and from school, according to hospital-based research [7]. In other nations, such as the United States, the proportion of children walking to school has thus decreased, with one-third of parents citing traffic as a barrier to walking to school. Hospital-based study on the pattern and socioeconomic effects of road collisions in South-western Nigeria show that 5.5 percent of road traffic injury victims treated in the hospital were aged 0–15 years [8].

In several nations, interventions to protect kid pedestrians have been introduced. Some of these have centred on changing children's conduct while on the road, while others have centred on changing the traffic environment. In general, educational activities aimed at enhancing children's road safety knowledge and behaviours have been proven to have modest short–term benefits on children's behaviour. As a result, a lot of focus has switched to environmental changes like speed limit signs and stop signs, as well as other traffic calming methods like speed humps, street closures, one-way streets near schools, median barriers, mini-roundabouts, and designated pedestrian crossings [1].

2. RESEARCH METHODOLOGY

2.1 Research Approach

The Research Approach that was adopted for this research work was the Physical Assessment of each school. This Approach was chosen because it provides the opportunity to thoroughly investigate and describe the present

situation as it relates to the primary schools of concern in Akure Metropolis of Ondo State, Nigeria.

2.2 Study Area

The study area is Akure, the capital of Ondo State. Akure is located in the southern part of the forested Yoruba Hills and at the intersection of roads from Ondo, Ilesha, Ado-Ekiti, and Owo with an area of 991km², elevation of 350m, temperatures varying from 28 °C to 31 °C with mean annual relative humidity of about 80%, latitude 7°15'00" N and longitude 5°12'00" E. It is the largest city in Ondo State [10]. The city had a population of 403,000 as at the 2006 population census. As of today, the total population of children in Akure aged from 0-14years old is 204,118 while the total population of people is 476,517 [9].

2.3 Population of the Study

The population of this study includes all public primary schools assembled from Akure-North and Akure-South Local Government Areas (151 public primary schools).

2.4 Sampling Procedure

In order to effectively assess the road safety features around primary schools in Akure metropolis of Ondo state, Slovin's formula and probability sampling (stratified sampling techniques) method was adopted. These enabled the adequate number of samples to be derived.

2.4.1 Sampling Factor

Before the application of the Slovin's formula, a sampling factor (that is, proximity to a major road) was used to reduce the total population to a considerable amount. This was achieved through the use of Google map and physical visitation. All the schools were pre-assessed and those located in remote areas, those not located within the vicinity of a major road, as well as those schools that could not be located or found on google map were all eliminated. This procedure reduced the total number of public primary schools to 39 public schools.

2.4.2 Sample Size Determination

Slovin's formula was used to calculate the sample size necessary to achieve the certain confidence interval while sampling the population.
The Slovin's formula is given as;

$$n = N / (1 + Ne^2) \quad (1)$$

where:
n = Number of samples,
N = Total population and
e = Error tolerance (usually 5%).

Equation 1 was used to calculate the sample size (n) from the available population size (N) while considering a margin of error (e) which gave a sample size of 36 public primary schools

2.4.3 Sample Selection

From the total population of public primary schools (i.e. 39 schools), a sample size of 36 is required according to the derivation from the Slovin's equation. Table 1 shows the selection process for public primary schools using an interval of 12 Schools.

Table 1: Selection process for public primary Schools

S/N	Names of Public Primary Schools	Selection
1	Saint John's C.A.C Primary School Ilaramokin, Akure	✓
2	L.A I Primary School, Akure	✓
3	Ondo State School For The Deaf, Akure	✓
4	Saint Andrews Anglican Primary School Isikan Akure	✓
5	St. Patrick Oke-Aro Annex Primary School, Akure	✓
6	SUBEB Model, Primary School, Akure	✓
7	Salvation Army Primary School Odo-Ikoyi, Akure	✓
8	Saint Peter's Demonstration Primary School, Akure	✓
9	Saint Paul's Anglican Primary School Idi-Agba Titun, Akure	✓
10	Saint Monica's R.C.M Primary School, Akure	✓
11	Saint Michael's R.C.M Primary School Igboliki, Akure	✓
12	Saint Theresa's R.C.M Primary School, Akure	✓
13	Canaaa-Land Community Primary School, Ijoka	X
14	Saint Luke's Anglican Primary School, Idi-Agba Titun, Akure	✓
15	Olukoju Community Primary School, Akure	✓
16	Aratusin Community Primary School Arakale, Akure	✓
17	Iloro Community Primary School, Akure	✓
18	Caring Heart Mega Primary School Irowo, Akure	✓
19	Saint peter's African Church primary School, Akure	✓
20	Fanibi Community Primary School, Akure	✓
21	L.A IV Primary School, Akure	✓
22	Ebenezer African Primary School, Akure	✓
23	Saint Finbarr's R.C.M Primary School, Akure	✓

24	The Apostolic Primary School, Isikan Akure	✓
25	Faith Public Primary School Aule, Akure	✓
26	Medayese Memorial C.A.C Primary School, Akure	X
27	Local Authority Primary School, Eleyewo	✓
28	Afunbiowo Otegbede Primary School, Akure	✓
29	Local Authority Primary School, Aule	✓
30	Local Authority Primary School, Oba-Ile	✓
31	Sacred Heart Primary School, Akure	✓
32	Saint Brendan's R.C.M Primary School, Akure	✓
33	Saint Francis R.C.M Primary School Oke-Paadi, Akure	✓
34	Saint Martin's R.C.M Primary School Oke-Paadi, Akure.	✓
35	Iro Titun Community Primary School, Akure	✓
36	Saint Thomas Anglican Primary School Isikan, Akure	✓
37	Saint Joseph R.C.M Primary School, Akure	✓
38	Gaga Community Primary School, Akure	✓
39	Ayedun Community Primary School, Akure	X

From the selection process carried out in Table 1, 36 public schools were selected from the total (39) public schools as shown in Table 2.

Table 2: Selected Public Primary schools

S/N	Names of selected Public Primary Schools
1	Saint John's C.A.C Primary School Ilaramokin, Akure (along Ilara-Iro road Ilaramokin)
2	L.A I Primary School, Akure (Along Stadium road)
3	Ondo State School for The Deaf, Akure (Along Stadium road)
4	Saint Andrews Anglican Primary School Isikan Akure (Along Arakale Road, Isikan)
5	St. Patrick Oke-Aro Annex Primary School, Akure (Along Oke-Aro street, Isikan)
6	SUBEB Model, Primary School, Akure (Along Alobi street, Bayduk)
7	Salvation Army Primary School Odo-Ikoyi, Akure (Along Odo-Ikoyi street, Akure-South)
8	Saint Peter's Demonstration Primary School, Akure (Along Oyemekun road)
9	Saint Paul's Anglican Primary School Idi-Agba Titun, Akure
10	Saint Monica's R.C.M Primary School, Akure (Along Arakale road, Oke-Aro street)
11	Saint Michael's R.C.M Primary School Igboliki, Akure
12	Saint Theresa's R.C.M Primary School, Akure (Along Oyemekun road)
13	Saint Luke's Anglican Primary School, Idi-Agba Titun, Akure
14	Olukoju Community Primary School, Akure (Along Ogo-Oluwa street, Oke-Aro)
15	Aratusin Community Primary School Arakale, Akure
16	Iloro Community Primary School, Akure (Along Owe-okala street, Oke-Aro)
17	Caring Heart Mega Primary School Irowo, Akure (Along Hospital road)
18	Saint peter's African Church primary School, Akure (Along Alafiatayo street, Oba Adesida road)
19	Fanibi Community Primary School, Akure (Along Fanibi road, Leo Hospital junction)
20	L.A IV Primary School, Akure (Along Stadium road)
21	Ebenezer African Primary School, Akure (Along Alafiatayo street, Oba Adesida road)
22	Saint Finbarr's R.C.M Primary School, Akure (Along Oyemekun road)
23	The Apostolic Primary School, Isikan Akure (Along Arakale Road)
24	Faith Public Primary School Aule, Akure (Along Aule community road)
25	Local Authority Primary School, Eleyewo (Along Akure Airport road)
26	Afunbiowo Otegbede Primary School, Akure (Along Otegbede Asolo crescent)
27	Local Authority Primary School, Aule
28	Local Authority Primary School, Oba-Ile (Along Oba-Ile road)
29	Sacred Heart Primary School, Akure (Along Cathedral junction Oja-Oba)
30	Saint Brendan's R.C.M Primary School, Akure (Along Cathedral junction, Oja-Oba)
31	Saint Francis R.C.M Primary School Oke-Paadi, Akure
32	Saint Martin's R.C.M Primary School Oke-Paadi, Akure.
33	Iro-Titun Community Primary School, Akure (Along Ayiloye street, Iro-Titun)
34	Saint Thomas Anglican Primary School Isikan, Akure
35	Saint Joseph R.C.M Primary School, Akure (Along Oke-aro street, Arakale road)
36	Gaga Community Primary School, Akure (Along Adeniyi street, Oke-Aro)

2.5 Data Collection Procedure

The selected school buildings (and the surrounding environments) were physically assessed/examined, with particular attention/focus on the presence (or absence) of basic road safety features. Observations/results gathered were analysed to pave way for proper conclusions and recommendations to parents, school authorities, governments and other stakeholders. Specifically, an observational study was carried out. Meticulous observation of the environment around the schools was carried out in search of road safety features and the findings were documented on a semi structured observational checklist.

This assessment/study specifically looked out for the following;

a) location of the school –on a major or minor road;
b) presence of traffic calming devices (road bumps and zebra crossing);
c) presence of a warden assisting children to cross the road;
d) designated parking space for cars coming into the school;
e) presence of school sign-boards or signs indicating the presence of a school;
f) condition of the road (presence of potholes/cracks); and
g) presence of a pedestrian pavement/sidewalk.

3. RESULTS AND DISCUSSION

Tables 3 is a detailed representations of the assessments carried out on 36 public primary schools in Akure metropolis in terms of the presence (or absence) of road safety features. .

3.1 Zebra Crossing

When considering Zebra crossing, which is a crosswalk marked by a series of broad white stripes to indicate a crossing point at which pedestrians have the right of way, findings are quite disturbing. The white marked zebra crossing in particular implies that a driver has to stop especially when pedestrians are seen crossing the road. This current study reveals that all the roads around the public schools considered have no zebra crossing. This is quite understandable considering that some of the schools are not located on major roads. Sadly, or rather unfortunately, the ones around tarred or major roads have no zebra crossing sign. The probability of accidents involving pupils of those primary schools is quite high.

3.2 Traffic Warden

Traffic wardens in Nigeria are often individuals employed to discharge functions normally undertaken by the police in connection with the control and regulation of, or the enforcement of the law relating to, road traffic and that in that connection act under the direction of the police. This really means that, the presence of traffic wardens would go a long way in ensuring safety of pedestrians (especially children) around the roads. Findings from this current study reveals that the presence of traffic warden on roads around public primary schools in the study area is felt only around 20 out of the 36 schools studied. Although this is above average, pupils who attend those schools without traffic wardens are at high risk of traffic accident.

3.3 Pedestrian Walkway

Particularly few public primary schools (8 out of 36) have pedestrian walkways or sidewalks on roads in which these schools are located, thus there is need for considerable improvement here.

3.4 Speed Bumps

The number of public primary schools with speed bumps (27 out of 36) which is 78% is above average, but necessary improvements must be made by those schools located along roads without speed bumps so as to ensure the safety of their pupils.

3.5 School Signboards

Concerning the presence of school signboard, 36 out of 36 public primary schools (100%) have school signboard. Although the major reason why most of them have signboards is to publicise them and improve their Return-On-Investment (ROI), these signboards also inform vehicles (or drivers) of the presence of schools around that vicinity. This in turn will enable the drivers to drive carefully in order to protect the pedestrians. Once the drivers maintain some level of carefulness while on the road, and also reduces on the speed of driving, then the possibility of accidents occurring on such roads is greatly reduced.

3.6 Potholes/Cracks

Only a few of the schools are located along roads with potholes and cracks (8 out 36) which is 22% of the total population assessed. This is considerably a high number due to the fact that safety of pupils that attend these schools are at a higher risk when compared to schools located on roads without potholes and cracks.

3.7 Designated Parking Space

With respect to the assessed public schools, 27 out of 36 have parking spaces which is a larger percentage (78%). Whether these parking spaces are adequate or not is a different issue on its own. However, it must be said that the presence of parking spaces around these schools implies that parents and teachers would be able to park well off the road, thereby leaving the road free for other drivers to clearly drive. Indiscriminate parking of vehicles along the roads where schools are located can heighten the probability of accidents/crashes involving primary school pupils.

Table 3 shows a summary of road safety features around public primary schools in Akure.

Table 3: Summary of road safety features around public primary schools in Akure.

Road Safety Features	Public Primary Schools (out of 36)
Zebra Crossing	0
Traffic Warden	20
Speed Bumps	27
Side Walk	8
School Sign-Board	36
Potholes/Cracks	8

Designated Parking Lots	28

Table 3 shows that none of the schools has zebra crossings. This may be due to the fact that most drivers disregard the zebra crossings and so school proprietors do not see the need to provide such. However, the provision of zebra crossings should be prioritized in all schools and public awareness should be drawn to the reasons why they are needed.

Only 20 schools have traffic wardens operating on the surrounding roads. This is not satisfactory as the presence of theses wardens have been known to prevent injuries and fatalities to school children. Hence, traffic wardens should be assigned to those schools hitherto without such.

28 schools out of the 36 schools sampled have designated parking lots. These are places where the school children can safely alight and board their parent's vehicles in the morning when they reach school or in the afternoon when they leave school. The absence of such lots exposes the children to dangers on the road such as reckless drivers and reversing vehicles.

Only 8 schools have pedestrian sidewalks on the roads leading to them. These feature acts as additional protection for the children as they are guided from vehicles maneuvering to enter or leave the vicinity of the school. It is therefore important to provide these feature to ensure that the children receive all the protection that they need.

27 schools have speed bumps which essentially are features for slowing down traffic to a considerable speed. This helps to reduce the occurrence of accidents in the vicinity of the schools. Hence, the children are further protected from over speeding drivers.

4. CONCLUSION

Primary school pupils are more vulnerable on the road than adults. This makes road safety in areas with primary schools a sensitive subject. Children lack traffic participation experience, and occasionally their behaviour in traffic circumstances is unpredictable. The findings of this study reveal that, there are grossly insufficient road safety standards/measures around public elementary schools in Akure metropolis. More specifically, the major contributing factors for road traffic accidents at the study areas are, excessive speed, inefficiency of drivers skill, failures of not giving priority to pedestrians, drivers not respecting right hand rule, pedestrians not respecting traffic rules, drivers not respecting other road users, inadequate pedestrian awareness on traffic safety problems, poor roads, unavailability of sufficient walkways, narrowness of lanes, lack of speed limit and even bad vehicle condition. All of these factors places children (especially primary school pupils) under unnecessary danger of car accidents and ensuing injuries.

Furthermore, children are not only physically and mentally immature to handle road traffic situations, they are also unable to advocate for child-friendly road designs and have to rely on adults to do this for them. When compared to the costs of causing road traffic injuries to pupils/children and the general public, basic and reasonably priced road-safety measures or features such as road bumps, zebra crossings, and road signs are necessary/required to ensure road safety around schools.

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