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PEDESTRIANISM AS AN EFFECTIVE TOOL FOR SUSTAINABLE INTRA-CITY COMMUTING IN CALABAR, SOUTHERN NIGERIA

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Abstract

The promotion of walking has become a global strategy in sustainable urban transportation planning. This is with the aim of reducing the urban commuter's problems that result from the dominance of motorized urban transit, especially in developing countries with an increasing rate of urbanization. This study is carried out in Calabar, Southern Nigeria with the aim of assessing the conditions under which pedestrianism is enhanced. Research questionnaires were administered to household heads in all 22 localities with political delineation (wards) in the city. Respondents were sampled using the stratified sampling technique where every 10^{th} residential house is sampled after the initial listing of houses. Logistic regression analysis was conducted to predict the conditions under which about 382 household heads (about 98% respondent rate) in Calabar could undertake utilitarian walking using factors such as motorized traffic, weather conditions, lack of safety of pedestrians and socio-economic variables as category predictors. A test of the full model against a constant single model was statistically significant, indicating that the predictors, as a set, reliably distinguished utilitarian walking and non-walking (chi square = 60.544, $p < .001$ with df = 17). Nagelkerke's R^2 of .232 indicated a moderately strong relationship between prediction and grouping. Prediction success overall was 70.5% (53.5% for non-walking, and 81.5% for walking). The Wald criterion demonstrated that only pedestrian conflict, lack of safety of pedestrian and the age of the pedestrian made a significant contribution to the prediction in model 1 ($p = .000$). Furthermore, about 99.2% of pedestrians indicated walking distances of not more than 5km while on the other hand, they can afford 0.8km to bus station, 3km to school, 5km for shopping, and about 20km for recreation trips. The study recommended counseling strategies for promoting pedestrianism among which is the development of pedestrian walkways and complementary facilities to enhance pedestrian safety and comfort.

Key words: Pedestrianism, intra-city transport, sustainable commuting, urbanisation.

1. Introduction

Globally, the task of providing accessibility and mobility to all commuters in the city in a sustainable manner remains complex due to the

conflicting modal choices of commuters, different income classes and preferences, safety concerns and the lack of supporting infrastructure for some of these modes. The inability to strike a balance between modes that reduce pollution and those that reduce speed or accidents has also been a concern to transport planners. For instance, increasing the average vehicle speed may lead to low emissions and can also lead to an increased rate of accidents. According to the World Health Organisation (2016) report on road traffic injuries, about 1.25 million people die each year from road traffic related accidents. The report further indicates that over '90% of the world's fatalities on the roads occur in low- and middle-income countries, even though these countries have approximately half of the world's vehicles', while 'half of those dying on the world's roads are "vulnerable road users" such as pedestrians, cyclists and motorcyclists' (WHO, 2016).

Pedestrianism, the practice of walking, is the most important form of intra-urban transport. Almost everyone walks and children and women walk most. Some types of intra-city journeys are more likely to be made on foot. The frequency of such trips is dependent on a number of factors such as motorized traffic conflicts with pedestrians, safety issues, weather conditions and so on. Others such as car ownership and other socio-economic characteristics tend to dominate the willingness to walk in many developing countries. Car owners are often observed to make shorter and fewer trips than non-car owners. However, most urban trips are a multimodal necessity and therefore walking remains a vital component of almost all of such trips. In cities of many developing countries, including Calabar metropolis, walking dominates urban transport for the poor and the socially excluded, who walk most often and furthest in a near-absence of walking infrastructure. Calabar is the capital city of Cross River State, South-South Nigeria. It lies between longitude 8^{o} 19^{l} 30^{ll} and 80 251 3011 east of the Greenwich Meridian and latitude 4^{o} 57^{l} 55^{ll} and 5^{o} 40^{l} 30^{ll} north of the Equator (figure 1). It comprises of Calabar Municipality with 10 wards and Calabar South Local Government Area with 12 wards and occupies an area of about 406 square kilometres. Using a growth rate of 2.58 per cent and a 2006 baseline population of 328,826 (National Population Commission, 2006), the total population is estimated at about 402,843 in 2015. The city is a lowland terrain with highest and lowest points at about 100m and 2m respectively (Okon, et al, 2015).

In numerous ways, walking and other non-motorised transport (NMT) systems such as cycling remain ideal ways to get around in cities. These non-motorized travel means cause neither noise nor air pollution. Unlike the gasoline powered means of transport, the only required energy in these means is that

which is provided directly by the traveller. Pucher and Dijkstra (2000) noted that 'the very generation of that energy offers valuable cardiovascular exercise'. Other advantages of walking and other NMTs include minimum operational space, economical cost of travel to the traveller and the environment alike, enhances the liveability and liveliness of cities, enhances safety in central areas of cities, and fosters social cohesion in urban environment, among others. However, most public discussions on transport problems often focussed on air pollution and its impacts on health. This is perhaps due to the palpable and deleterious effects of air pollution. Sustainable intra-urban transportation is therefore not possible without pedestrianism and other non-motorised options. The critical role of non-motorised transit has been documented (Banister, 2000; Mohan & Tiwari, 1999; Wey & Chiu, 2013; Yazid, Ismail, & Atiq, 2011). Consequently, the need for the supporting infrastructure for these modes of travel, the perception of users and potential for use is what is even more is challenging. This paper highlights critical conditions under which pedestrianism can be enhanced as an effective tool for sustainable intra-city transportation in Calabar and other cities of the sub-region.

2. THE PROBLEM

The inability of the Calabar metropolitan government to meet up with the task of providing accessibility and mobility to all commuters in the city in a sustainable manner has been considered one of the factors for the growing advocacy for pedestrianism and other non- motorized means of transport. However, due to the conflicting modal choices of commuters, different income classes and preferences of pedestrians, safety concerns and the lack of supporting infrastructure for some of the walking mode, this advocacy has been complex but increasingly. More complicated is the overwhelming need for people to reduce spatial inequality and their psychological hold on the use of the automobile especially in Calabar, which according to Stern (2007) makes it difficult to achieve reasonable reductions in transport-related pollutants. There is therefore the growing question of how to influence a change in current patterns of travel behavior without compromising spatial interaction and economic, social and recreational opportunities.

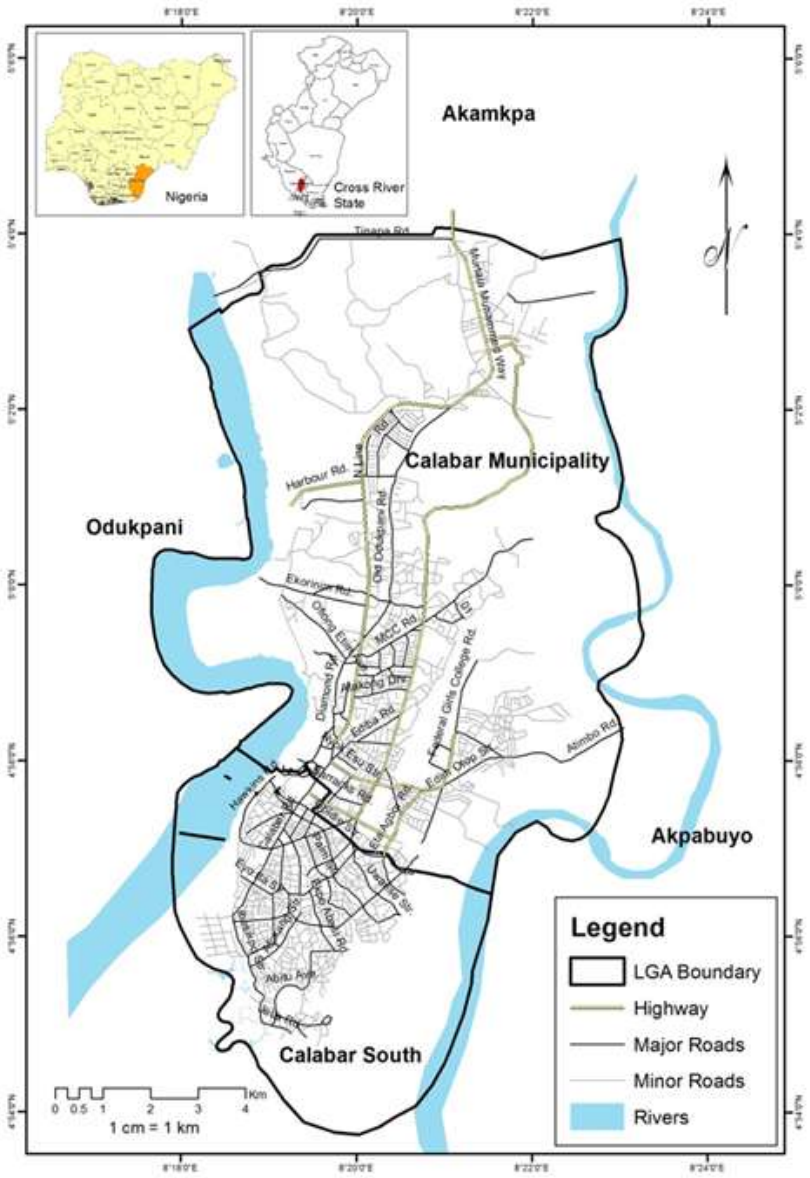

Figure 1. Cross River State showing Calabar metropolis (Calabar Municipal and Calabar South)

The considerably low level of pedestrianism currently in Calabar notwithstanding, the city has an enormous potential for utilitarian intra-city walking. This is as a plethora of pedestrians can often be cited on recreational trips as well as 'road walkers' mostly in early hours of the morning. This is in addition to high pedestrian levels in the central business districts and other emerging areas in the city where high traffic volume also discourages pedestrians and other non-motorized transport users. The absence of or poorly designed pedestrian infrastructure in Calabar remain a major constraint to walking. For example, only a few major arterials such as Murtala Mohammed

Highway, Marian Road, Mary Slessor, IBB Way and a few other roads have a pedestrian-friendly design. Where they exist, they are poorly designed, too narrow, too dangerous to use as there are above deep drainage channels whose concrete slabs are often broken, overtaken by traders for display of wares and for uses other than walking. It is also a common place to see both broken down or functional vehicles parked on pedestrian walkways in Calabar. In addition to the poor physical conditions of pedestrian walkways, the undisciplined nature of drivers in the city compromises the safety of pedestrians and thus remains a discouragement for pedestrianism. The frequency of modal conflicts is high in the city as all manner of trucks, cars, wheel barrows, motorcycles, pedestrians and bicyclists alike compete for space. This is made worse as there seems to be lack of obedience to traffic rules that gives the impression of a lack of respect for pedestrians. The inconsistency of policy direction on pedestrianism has further made matters worse in Calabar. An interview with some pedestrians revealed that the stigma associated with walking or the use of bicycles indicates poverty or a low socio-economic status, which is a serious discouragement for walking.

From the foregoing therefore, the extent to which factors such as safety concerns, lack of or poorly maintained pedestrian lanes, stigma and so on, pedestrianism influence impact in Calabar is not known. This is in addition to the unknown current level of utilitarian pedestrianism. The residents' willingness to adopt pedestrianism as one of their intra-city transport option in Calabar is the major thrust of this paper. As much as the design of our streets does not support walking, the extent or degree of willingness for walking by residents is not known. Other problems include single-use zoning, insufficient public transportation, extreme weather (rain/storm), fear of traffic, poor knowledge of the benefits of non-motorised transport, socio-cultural norms that do not support walking activity for some classes of individuals, poor lighting system for our streets and the lack of street benches, the absence of posted speed limits or weak enforcement of it, and side walk maintenance, among others.

3. LITERATURE REVIEW

Research in transportation, urban design, and planning has emphasized the existing relationship between physical environment factors and individuals' walking and cycling for transport (Fruin, 1971; Saelens, Sallis, & Frank, 2003; Owen, Humpel, Leslie, Bauman, & Sallis, 2004, Okon, Ogba, Olorundami, 2016). The findings from these researches have helped researchers and urban planning authorities to improve their understanding of environmental influences

on physically-oriented means of transport activity. These researches have all indicated the relevance of neighbourhood environment characteristics, including population density, connectivity, and land use mix to walking for transport (Saelens et al, 2003). Furthermore, correlational studies on neighbourhood types and non-motorized transport outcomes suggest that residents from communities with 'higher densities, greater connectivity, and more land use mix have higher rates of walking/cycling for utilitarian purposes than low-density, poorly connected, and single land use neighbourhoods'. In their review, a study of eighteen studies, Owen, et al, (2004) identified certain attributes with a strong association to walking for particular purposes. These include 'Aesthetic attributes, convenience of facilities for walking (sidewalks, trails); accessibility of destinations (stores, park, beach); and perceptions about traffic and busy roads' (Owen, et al, 2004). Ewing et al. (2006) also listed five design qualities such as 'human scale, transparency, tidiness, enclosure, imageability' as having statistical relationship with walkability.

Using the Alfonzo's (2005) model of decisions on active travel, Larco, Steiner, Stockard, & West, (2012) investigated preferences and perceptions on walking based on built environment and physical activity. The results from the multilevel analysis showed more active travel and less driving travel for residents in more pedestrian-friendly areas suburban multifamily housing developments in a medium-sized city and suggested the inclusion of urban form in the model. Gómez et al, (2010) showed how certain built characteristics and perception strongly correlate with willingness to undertake utilitarian walking among older adults living in Bogotá. In contrast with the findings above, Nagel, Carlson, Bosworth, & Michael, (2008) had earlier applied geographic information system in a study of the influence of neighbourhood characteristics on walking activity among older adults in Portland, Oregon. His findings did not indicate any association of built environment with walking behaviour among older adults, but rather suggested that among those who do walk, it is associated with increased levels of activity. A risk assessment of built environment transformations was undertaken to evaluate quantitatively the competing risks and benefits of community design changes in active travel (Nazelle, Rodriguez & Crawford-Brown, 2009). Using a simulation model, built to incorporate methodology from transportation, environmental sciences and exposure analysis, a risk assessment of hypothetical urban transformations was tested. The findings revealed that PM10 inhalation increased by 175% and 45% in the 5% of days with the greatest shifts and the 5% of days with the greatest decreases respectively. The findings suggested a high risk of inhalation of pollutants by pedestrians and cyclists.

4. METHODOLOGY

This paper used the descriptive research design approach wherein observation, measurement and description of the behavior of residents to undertake utilitarian walking were investigated. Secondary data sources based on an extensive review of literature from journals, textbooks, monographs, etc., on factors of pedestrianism and other non-motorized transport options formed the background of this study. Primary sources of data, on the other hand, with pre-coded responses explored the perception of residents towards utilitarian walking. This is in addition to the basic socio-demographic data from the surveyed households.

The National Population Commission (NPC, 1990) showed that the Calabar metropolis had a population of 328,878 inhabitants in 1991 (136, 440 inhabitants for Calabar Municipal and 192,438 inhabitants for Calabar South Local Government Area). The total population for the metropolis in the 2006 census was given as 371, 220. However, our projection was carried out based on the 1991 census since the 2006 population figures for localities is yet to be published using the growth rate of 2.54 percent in 1991 (World Bank, 2015). The continued development of the city has led to the projected population 402,843 in 2015. Given the population of the area in 1991, the City had a population density of 2,399 while in 2006, the density was 2,737 inhabitants per sqkm.

Household heads of all selected localities in the 22 wards of the city constitute this study's population. In order to have a good representation for the study population, the multi-stage sampling design was adopted. Existing political council wards with well-defined boundaries in the two local government areas of the city formed initial strata for the collection of data. The second strata involved actual samples of household heads using the stratified sampling technique. This involved the identification of streets that reflect different socio-economic characteristics using physical observation of housing conditions in each ward. An initial listing of these streets was undertaken, followed by the listing of potential houses where samples are to be drawn. From the beginning of each street, every tenth house is listed from both sides of the street if such a house is a residential land use, otherwise the next residential house is listed. This is done in consideration of the total number of samples that each ward is assigned based on 0.095% its projected population for 2015 (Table 1). Therefore, a minimum sample size of 384 questionnaires was acceptable to be administered across the 22 wards of the city based on: Necessary sample size = $(\text{Z-score})^2 * \text{StdDev}*(1-\text{StdDev}) / (\text{margin of error})^2 = ((1.96)^2 \text{ x } .5(.5)) / (.05)^2$ = 384.16 (Smith, 2000). Using a 0.095% of population each locality in each

ward, actual sample of 389 questionnaires were administered. All localities whose population accounted for only one questionnaire were purposively added another tool to give two (see population density map for the study area in figure 2). This is done to achieve a fair representation of all communities even though the study acknowledges the fact that the sample size may not be practically large enough for some sort of conclusion, a fundamental weakness of this research like with many other social researches. Logistic regression analysis was conducted on the dataset to predict a categorical variable (willingness of about 382 household heads, that is, about 98.2% respondent rate, to undertake utilitarian walk trips in the city) from many predictor variables such as motorised traffic, weather conditions, lack of safety of pedestrians and socio-economic variables as category predictor variables including road infrastructure and traffic characteristics. Data was coded and analyzed in SPSS environment. Table 2 shows variable description as used for the analysis.

5. DISCUSSION OF RESULTS

Calabar South and Calabar Municipality respectively constituted 55.2% and 44.8% of respondents, with a gender distribution of 61% and 39% of male and female respectively. Over 46% of respondents are above 36 years of age while the remaining 54% are within 13-35 years of age. This may suggest that the age distribution of respondents could have some influence on the choice of factors that accounts for the willingness to undertake utilitarian walk trips in the study area. For example, out of the 60.6% of respondents indicating conditional willingness to undertake purpose walk trips, 57.9% of them are above less than 36 years of age, 26.7 are 36-50 years while only 15.4% are ^0 years and above. Furthermore, about 99.2% of pedestrian indicated walking distances of not more than 5km while on the other hand, they can afford 0.8km to bus station, 3km to school, 5km for shopping, and about 20km for recreation trips. Civil servants (22%) and traders (13.3%) are more likely to walk than any other socio-economic class. Further analysis of the result does not, however, reveal a strong influence of income level on pedestrianism even though the majority of people in the civil service are low and medium income earners. About 79.8% of the respondents indicated morning hours as the most preferred time for utilitarian walking, 19.1% as evening hours while only 9.1% as afternoon. This indicates the expected influence of weather and/or safety on pedestrianism as can be seen in a later section of this report.

Source: National Population Commission, Nigeria (1991)

Table 1. Projected population of Calabar metropolis (1991-2015)

Ward	Localities	1991 Population	2006 Population (projected)	2015 Population (projected)	0.095% sample
1	Ediba Akim Qua Town	20,803	22,903	24,303	23
	Akim Qua Town	35,288	36,788	38,088	36
2	Ediba Big Qua Town	1,913	2,313	3,113	3
	Otop-Abasi Police Brk.	2,300	3,700	4,300	4
	Akim Barrack	2,184	3,584	4,384	4
3	Esuk Utak	1,141	2,341	3,141	3
	Obot Okoho	276	876	1,376	2
	Ekaobo	151	650	1,150	2
4	Ikot Ekaedem	2,747	3,847	4,747	5
	Awakada	150	559	1,059	2
5	Ekorinim	610	1,110	1,610	2
	Essien Town	6,421	7,821	8,621	8
6	Ishie Town	14,213	15,713	16,913	16
	Ikot Ishie	5,825	6,921	7,721	7
7	Ikot Effa	2,309	3,701	4,501	4
	Ikot Effiong Eyamba	364	952	1,452	2
	IIkot Ekpa	2,784	3,884	4,584	4
8	Ikot Ansa	13,006	14,506	15,806	15
	Ikot Nkebre	467	1,057	1,757	2
	Eburutu Barrack	10,235	11,736	13,036	12
9	Ikot Effang	2,586	3,986	4,786	5
	Ikot Eneobong	1,717	2,917	3,717	4
10	Ikot Onim	7,872	9,872	10,672	10
	Bacoco	489	1,189	1,689	2
	Abenyo Ikot Omin	554	1,452	1,952	2
11	Calabar	125,084	126,584	128,084	122
12	Achibong	2,902	3,982	4,782	5
13	Efut Owanse	21,769	23,369	24,459	23
14	Duke Town	2,972	3,892	4,592	4
15	Cobham Town	5,307	6,986	7,686	7
16	Mbukpa	15,197	16,797	18,197	17
17	Henshaw Town	3,576	4,976	5,876	6
18	Anantigha	12,655	13,955	15,255	14
19	Obufa Esuk	2,338	3,838	4,738	5
20	Uwangha Nka	164	502	1,105	2
21	Ineudo Ndits Okobo	202	702	1,252	2
22	Ine Udo	137	637	1,237	2
	Ine Akan Ufana	128	128	1,092	2
	Total	**328,826**	**371,220**	**402,843**	**384**

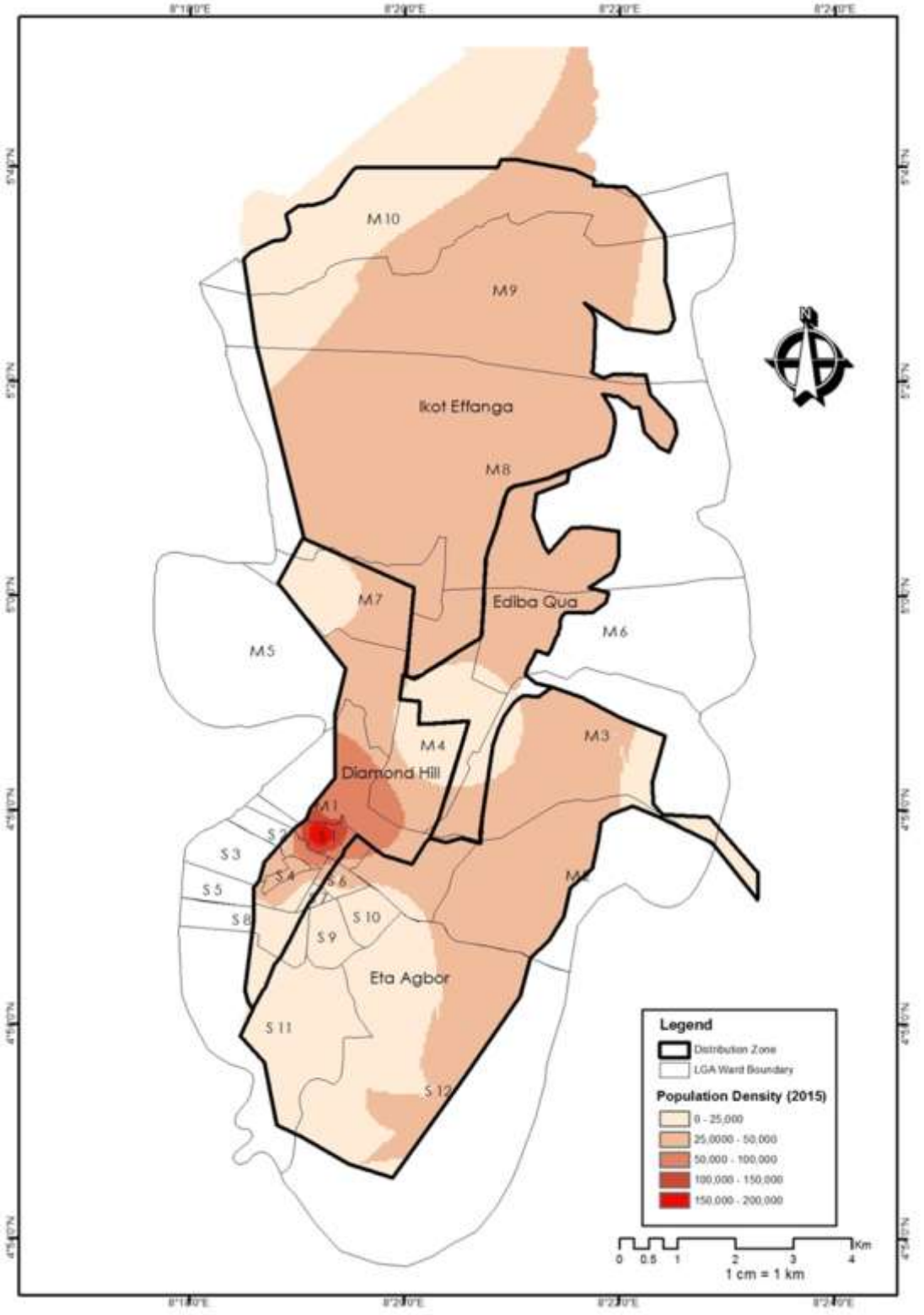

Figure 2. 2015 Population density of Calabar Metropolis
Source: Author's field work, 2016

Table 2. Variables description

Variable	Variable description
Dependent variable	Willingness to undertake utilitarian walk trips in the city (dichotomous variable with 0 = No and 1 = Yes)
Participant's personal characteristics	Gender (1=Male; 2=Female) Age (1= 13-17; 2 = 18-35; 3 = 36-50; 4 = 51-65; 5 = >66) Education (1 = No formal education; 2 = SSCE/WACE; 3 = OND/NCE; 4 = Bachelor; 5 = Post Graduate) Occupation (Student = 1; Civil/Public Servant = 2; Trader = 3: Armed Forces = 4; Other = 5) Income (1=50-100,000; 2=101-300,000; 3=301-500,000; 4=500,000+) Location (1=Calabar municipality; 2=Calabar South LGA) Walking distance (1= <5; 2=10-15km; 3=16-29km; 4=30-40km) Walking trip (1= <5; 2=5-10; 3= >10)
Independent variables	Poor street illumination Potholes and rough road surfaces Weather conditions Lack of regards for pedestrians Motorized modal conflict Motorized traffic Pedestrian paths Pedestrian conflicts Culture and stigma Lack of raised shoulder of lanes (where there exist) Lack of safety Lack of signalization
	All independent variables have binary coding: 1='yes', 0= 'no'.

Moreover, work/school-related trips accounts for 53.7%, while shopping, recreation/exercise and other (not specified) accounted for 14.7%, 26.5% and 5.1% of all respondents in the study area. Respondents were asked to indicate by what percentage they are willing to walk weekly on different road categories. From their responses, it was observed that, 62.9 per cent of the respondents are willing to walk on sidewalks, 15.1 per cent for minor roads, 13.8 per cent on collector streets, 4.9 per cent on major roads and 3.4 per cent on adjoining highways. The implication of this finding where a greater number of respondents choose sidewalk and minor roads could not be unconnected with safety concerns from the intense motorized traffic volume and associated high accident rate on the highway which usually scared pedestrians. This corroborates Sugiyama et al (2011) that sidewalks and minor roads usually

experienced NMT congestion during peak hours because of modal conflict on high ways. Similarly, this result corroborated the earlier findings of Lindsey, Hoff, Hankey & Wang (2012) that bicyclists and pedestrians count increased on sidewalk, collector streets and minor roads in Minnesota City.

Binary logistic regression analysis was employed to predict the probability that a household head in Calabar metropolis would be willing to undertake utilitarian walking. A test of intercept only model, without any explanatory predictor variables produced the null model with 66.7% overall percentage. However, with an inclusion of explanatory factors, its overall percentage improved to 68.8% in the model 1, 75.3% with an inclusion of categorical variables in model 2 and 78.2% with an inclusion of interaction variables in model 3. This suggests that our approach to prediction is 66.7%, 75.3% and 78.2% correct in models 1, 2 and 3 respectively. The Wald chi-square test in the intercept only model that tests the null hypothesis that the constant which equals 0 is rejected because the p-value (.000) is smaller than the critical p-value of .05 (or .01). Hence, we conclude that the constant is not 0. Usually, this finding is not of interest to researchers. In all three models, the constant is a statistically significant predictor of the respective outcome ($p < .001$). Our chi-square is highly significant in model 1 compared with the intercept only model or baseline model (chi-square=72.940, df=11, $p<.001$), therefore our new model is significantly better. Since the Sig. values are $p < .001$, it thus indicates that the accuracy of the models improves when we add our explanatory variables. This is true for model 2 compared to model 1 (chi-square=50.550, df=12, $p<.001$), and model 3 compared to model 2 (chi-square=43.779, df=42, $p<.001$). Our final model is a significantly better fit than the null model. The variation in the outcome is explained by Nagelkerke's R2 model and thus suggests that the model explains roughly 24.2%, 38.4% and 49.4% respectively for models 1, 2 and 3 of the variation in the outcome. The Hosmer & Lemeshow Test for all models accounts for goodness of fit that suggests the models are good fits to the data as p=1.0 (>.05), p=0.73 (>.05), and p=0.99 (>.05) in models 1, 2 and 3 respectively (Table 3).

Table 3 provides the regression coefficient (B), the Wald statistic (to test the statistical significance) and the all-important Odds Ratio (Exp (B)) for each variable category. A look at the results for the predictor variables show motorised traffic as having a highly significant overall effect on the decision to walk (Wald=1.57, df=1, p>.000). The b coefficients for all predictor variables are significant and positive, indicating that increasing affluence is associated with increased odds of achieving utilitarian trip making in Calabar. Similarly, the Exp(B) (the Odd Ratio) reveal to us that lack of raised shoulders on

pedestrian walkways is 93 times more likely than pedestrian conflict, lack of safety, generally poor road surfaces (as variables least likely to influence the choice of walking in the study area. The overall effect of age is most significant and positive (Wald=24.03, df=4, p<.000) in predicting walkability, indicating that young people are most likely to walk in Calabar than old people. The OR in model 2 tells us that they are 38.45 times more likely to walk than those in higher age groups (1.06 times). Furthermore, the effect of gender is also significant and positive (Wald=1.11, df=1, p>.000, indicating that females are more likely to walk than males. The OR of 1.33 (or 33%) tells us they are 1.33 times or 33% more likely to walk than males. Education also accounts for a highly significant and positive overall effect (Wald=4.86, df=4, p>.000). In other words, the OR tells us that NCE/OND certificate holders are 0.56 times more likely to predict walkability than those with no formal education. In terms of annual income, there is a highly significant overall effect of annual income (Wald=1.71, df=3, p>.000) in predicting walkability in Calabar. Accordingly, from OR in model 2 shows that income group N500,00 and above are 1.71 times more likely to walk than in the study area.

Table 3. Reporting the results of Binary Logistic Regression

	Mod1			Mod2			Mod3		
Variable	**B**	**SE**	**OR**	**B**	**SE**	**OR**	**B**	**SE**	**OR**
Constant	36.57	3.47	7.66	34.97	3.38	1.54	37.02	3.35	1.19
Predictors									
Motorised traffic	-.97	.77	.38	-.72	.87	.49	-.71	.89	.49
Motorised conflicts	-.74	2.74	.48	-2.23	2.60	.11	-1.82	2.67	.16
Pedestrian conflicts	-20.29	7.48	.00	-19.17	7.35	.00	-19.32	7.91	.00
Lack of ped. regards	17.04	2.21	2.51	15.95	2.23	8.46	1.97	2.22	7.15
Culture & stigma	19.84	1.34	4.13	18.64	1.32	1.20	-7.23	2.18	.00
Weather conditions	.71	.78	2.04	.72	.94	2.06	.75	.98	2.11
Lack of raised pedlane	4.76	4.54	116.84	4.53	3.79	93.01	6.14	1.22	463.53
Poor road surfaces	-21.31	6.92	.00	-21.15	6.36	.00	-8.12	6.52	.00
Lack of safety	-19.08	9.09	.00	-18.40	9.12	.00	7.04	2.22	1.14
Poor illumination	.70	.39	2.02	.15	.35	1.16	.09	.59	1.10
Lack of signalisation	-16.68	5.57	.00	-13.49	4.90	.00	-15.31	6.09	.00
Gender									
Female				.28	.27	1.33	-.50	1.21	.61
Base=Male									
Age									
18-35years				3.65	1.24	38.45	20.81	1.12	1.09
36-50years				1.55	.61	4.69	.62	1.15	1.86
51-65years				1.06	.59	2.90	.37	1.12	1.44
66>years				.06	.57	1.06	-.79	1.12	.46
Base=13-17years									
Education									

SSCE/WAEC	-1.29	.73	.28	-20.78	4.02	.00
OND/NCE	-.63	.70	.53	-1.20	1.32	.30
Bachelor	-1.05	.66	.35	-1.03	.80	.36
Post grad	-.58	.61	.56	-.58	.65	.56
Base=No formal edu.						
Annual income						
101-300	.44	.71	1.55	-20.61	4.02	.00
301-500	.49	.47	1.63	-.40	1.53	.67
500>	.54	.42	1.71	1.10	.89	2.99
Base=50-100						
Interaction						
Age * Gender						
Age(1)*Gender(1)				-.33	1.97	.72
Education*AnuIncom						
Edu(1)*AnuIncom(1)				61.56	6.04	5.42
Age*Edu*Gen*AnIncom						
Age(1)*Edu(1)*Gen(1)In				-20.11	3.08	.00

6. CONCLUSIONS AND RECOMMENDATIONS

This study has attempted to investigate the factors for pedestrianism in Calabar. The global shift from motorised intra-city transport to non-motorised environmentally friendly options is well acknowledged in the literature. However, this increasing interest and focus on pedestrianism is not consistent with effective planning of related-infrastructure in many developing countries. This may be one of the reasons why most urban transport literature is more focused on motorised transport. The study has revealed that socio-economic characteristics (age, occupation, gender and annual income) are strong predictors of the willingness of residents to walk. The quality of pedestrian-related infrastructure and motorised traffic characteristics are also significant variables for predicting pedestrianism in the study area. The study has quantified a wide-range of items with relative influence on possible utilitarian walking behavior. Our interest in this research has not been only in the association between the predictor variables and socio-demographic characteristics, but also how the relationship changes as we account for other explanatory variables (covariates like gender, annual income, age and educational qualification) and interaction effects. It is therefore appropriate to report that the analysis was carried out to estimate three models. Model 1 shows the simple association between stated factors of pedestrianism and conditional willingness to walk. Model 2 shows what happens when we added the covariates such as socio-demography characteristics to the model. Model 3 on the other hand shows the significant interaction that exists between predictor variables and socio-

economic characteristics on conditional willingness to adopt walking for utilitarian trips.

A high Odd Ratio of 116.8 for lack of raised street shoulder suggest the safety concerns of pedestrians in the city and therefore has identified the need for separate pedestrian lanes as a deliberate planning strategy for pedestrianism in the city. Other recommendations include traffic calming in residential neighborhoods, smart urban design oriented to people rather than cars, car policy with some measure of restrictions, pedestrian transport education especially directed at young people in schools (possible inclusion in school curriculum) and strict enforcement of traffic regulations that protect pedestrians. The findings of this research also provide sources of evidence related to specific infrastructures and environment that planners can look out as motivating factors for walkability. Whereas a comprehensive and holistic approach to promoting walkability in Calabar is likely to prove most effective, this research has provided ample evidence on a specific area to focus efforts in order to enhance the willingness to walk in the city. The study reveals factors relating to built-environment such as separate pedestrian lanes devoid of potholes, paths' illumination, and so on influences willingness to adopt utilitarian walking in the city. The fact that socioeconomic factors also strongly predict walkability reveals the existing cultural orientation that utilitarian walking is incidental of poverty. This is can be investigated further to see the relationship between the perception of existing norms and the choice of intra-city transport. An enabling legislature and state government policy on walkability may not necessarily depend on physical walking activities to develop associated infrastructure, but rather the results of this survey can be used as a baseline to commission studies of larger scope to a certain the level of willingness of residents to adopt utilitarian walking. Therefore, as valid as the idea that walkability must be a condition for investment in urban walking infrastructure is, the changing level of taste and safety consciousness rather makes it untenable. A deliberate attempt must therefore be made to include in urban infrastructure design designated pedestrian paths to motivate residents to walk in the city. The advantages of utilitarian walking justify such investment. In view of the significance of weather in predicting walkability (OR of 2.0) in the city, the planting of trees in major roads where they do not exist may become another motivation for walking. Additionally, street benches are strongly recommended for the city. This can enhance the quality of the urban landscape.

Further studies are recommended with different approaches and larger sample sizes that may seek to include other variables and thus examine the satisfaction level of pedestrians in the city. There is a huge possibility for

overwhelming conversion from motorised transport to utilitarian walking in Calabar if the enabling environment is created. The findings of our research further support the policy shift in intra city transport infrastructure planning in Calabar and many other cities where there is an inadequacy of pedestrian infrastructure.

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