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Towards Sustainable Access to Infrastructures in Ijoko, Ogun State, Nigeria

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Abstract

Transportation entails the movement of persons and goods from one place to the other. The available transportation systems as well as their efficiency and operations are major factors contributing to the achievement of economic growth as well as access to industries and infrastructures and sustainable living conditions in a particular area. The main objective of this study was to examine the convenience, pattern and efficiency of the mobility of residents of Ijoko area of Ogun State, Nigeria. With the aid of a structured questionnaire, the available transport variables were investigated to obtain people's movement trends in the study area. The survey material (questionnaire) was distributed to two hundred and forty (240) households and recovered from two hundred and twenty-seven (227) of them. The distribution of the survey material was based on stratified random sampling, as the target group was identified, divided into smaller units and presented with copies of the questionnaire. The results obtained from the study were analysed and discussed. The study revealed that although the residents of Ijoko were facing great difficulties in accessing their households, offices or businesses, and the roads were hardly motorable, residents were unwilling to leave the area because many of them were house owners (landlords). They preferred to stay at their houses than to experience delay, congestion, unpleasant or uncomfortable rides in the course of their movements in and out of Ijoko. Furthermore, Ijoko residents preferred to limit their movements to only important and compulsory places such as work, hospital, school, market and weekly religious activities. Consequently, sustainable access to infrastructures is a prerequisite to economic growth and sustainable living and can only be achieved in the Ijoko area of Ogun State via the

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reconstruction of Ijoko roads and provision of road furniture such as drainages, walkways, shoulders, kerbs, as well as traffic markings, signs and streetlights.

Keywords: Access, Economy, Industries, Infrastructures, Mobility, Road furniture, Sustainability, Transportation

1. Introduction

Transportation entails the safe, efficient and convenient movement of persons and goods from one place to the other (Handy, 2005). The safety, convenience and efficiency of the available transportation in residential, business or industrial areas determine the adequacy or effectiveness of the transportation system in such areas as well as access to infrastructure (Olawale & Garwe, 2010). The main thrust of transportation planning is on the travel demands of residents and predictions of the movement of people and goods, with significant considerations for land use vis-a-vis the feedbacks obtained due to changes imposed in the areas because of urban developments (Waddell et al*.,* 2007a). The efficiency and ability of the transportation system to cater for traffic demands, contribute to economic growth and provide for ease of access to households and infrastructures is called sustainable transportation (Litman & Burwell, 2006; Adeboje et al*.,* 2013).

Sustainable transportation of people from a particular area entails the safe and convenient movement of residents to other places (Zeemering, 2009). Roads in residential areas should provide adequate linkage between households, industries and other infrastructures. In this regard, effective transportation means enhanced safety, time conservation and growth in the economy, since efficient transportation planning incorporates provision of safe havens for residents to move out and return to their residences without encountering stress or injury (Tonnelat, 2010; Adeboje et al., 2013). However, many Nigerian roads are still in deplorable conditions, a situation that has grave implications for the sustainability of housing development in the country and has caused stressful, accident-prone movements for residents and travellers (Adeboje et al*.,* 2013).

According to Sener et al. (2011) the behavioural pattern of households is characterized by 'choice of location' and 'mobility of residents'. Mobility and choice of location are crucial to other critical components that affect land use and transportation systems (Zhang, 2004; Waddell et al*.,* 2007a). These two factors are key to predetermining the day-to-day activities, decisions and travel patterns of people in a particular area (Kitamura et al*.,* 1996; Clark et al*.,* 2000; Dieleman, 2001). The relationship between the factors of housing, rent, location and ownership of property on the one hand and travel cost on the other plays a big part in the decision to remain in or vacate a particular household (Atkinson, 2000; Fan et al*.,* 2011).

Residents' access to infrastructures and industry may determine their level of sales or patronage by customers, as well as arrival time at business engagements and the time they return to their residences; as good road networks provide links between locations and aid safe and easy service delivery (Habib & Miller, 2008; Eluru et al*.,* 2009). The location of residences determines the availability and adequacy of good access roads between households and industries or infrastructures for the achievement of economic growth (Chen et al*.,* 2008; Lee et al*.,* 2009). Furthermore, short-term and long-term performances of transportation access to certain locations can be attributed to the mobility of residents (Clark et al*.,* 2003; Prillwitz et al*.,* 2006; Prillwitz et al*.,* 2007), whereas other reasons may be attributed to the behaviour of residents

based on prevailing conditions (Krizek, 2006; Pinjari et al., 2008a; Pinjari et al., 2008b; Waddell et al., 2007b). With a view to providing data on the considerations for sustainable development of residential areas, this study investigates adequacy of mobility and transportation access in Ijoko, Ogun State.

2. Review of Literature

Residents of households may base their decision to stay in a particular location on the cost of living there and the quality of other available alternatives (Jansen et al., 2011). However, residents who are looking for a new place to live may use their current accommodation as the baseline for the minimum requirement for evaluating the quality and location of their new house in order to enjoy safe and sustainable living (Lee et al., 2009; Zondag & Pieters, 2005).

Requirements for accommodation or residence can be physical or personal. The physical (or environmental) factors are the aesthetics or arrangements in the physical environment such as urban design and available transportation infrastructure, while the personal (or societal) factors are the peculiar attributes of households such as personal preferences, income, lifestyles, social issues and individual perceptions (Gebel et al., 2005; Barton, 2009). Recent advances have reiterated the significance of travellers' behaviours on lifestyle and environmental conditions in the urban areas from where travellers originate (Whitmarsh & O'Neill, 2010; Newton & Meyer, 2013).

The poor road condition in Nigeria is a major hindrance to the smooth transition of people from their households to various destinations (Garba, 2013), thus causing delay, increasing arrival time and impacting negatively on the economy (Monaghan, 2008; Binswanger-Mkhize & McCalla, 2010; Olatoyan, 2011). People in the remote areas suffer the most, as the road networks are either nonexistent or in incredibly deplorable conditions (Nwanya, 2014). The demands of residents of many semi-urban and rural areas for availability of sustainable housing and access to good or adequate road networks remain a mirage as infrastructure collapses by the day (Iheme, 2017). Owing to poor road conditions, motorists avoid a significant number of Nigerian routes; as such, residents of such areas tend to resort to walking or motorcycling (Oluwadiya et al., 2009).

Traffic demands in the cosmopolitan city of Lagos have increased drastically and the poor road network has been a huge problem (Fasakin, 2018; Oyeranmi, 2018). This development has led to the emergence of unstructured human settlements or spatial distribution of local residents. Heavy traffic has also led to huge human and building densities, as well as haphazard location of structures and infrastructures, thus leading to road accidents, delay and congestion (Chiroma et al., 2017; Khanal et al., 2017). The regular delay experienced within and around Lagos has forced many Lagos residents to relocate to neighbouring locations like Ibafo, Ifo, Ijoko, Mowe and Sango Otta in Ogun State (Ifatimehin et al., 2010; Camona, 2015; Fasakin, 2018).

Individuals tend to move from one residence to the other and when they do so, they usually move with their family members (Prillwitz et al., 2007). The literature shows that house owners (landlords) are less mobile than tenants (Dieleman, 2001). In many cases, the location of residences determines the efficiency of the transportation system and its ability to contribute to the sustainability of infrastructures, industries and the economy (Scheiner, 2005; Axhausen et al., 2006; Scheiner & Holz-Rau, 2013).

The decision to reside in a particular place is personal and different people have different reasons for the choice of their areas of residence. The location and accessibility of an area are important

determinants of its growth. Improvements in the roads however encourage settlements and promote commercial, industrial, educational and social activities that aid development (Shen et al., 2010; Fuller et al., 2017).

To ameliorate the cultural, economic and social problems associated with housing and accessibility to transportation means, urban planning and implementation of modern master plans must be done (Punter, 2007). Effective implementation of properly designed land use documents for areas will assist in the development or improvement of transportation infrastructures (Ahiablame et al., 2012; Barbosa et al., 2012). The major indicators of transportation adequacy are proximity to locations of public transportation and nearness of one transportation station to the other (Badoe & Miller, 2000; Holzer et al., 2003; Ibrahim, 2017).

In most cases an individual who leaves their residence will visit more than one place before returning home (Morley, 2002), since people usually engage in multiple activities requiring multiple movement paths (Damm, 1979). Individuals usually consider their travel plans and the available time or amount of time to spend on travel (Mokhtarian & Salomon, 2001). Time of travel can be estimated or planned ahead with time allocation for the required travel distance, hence the arrival time can be determined when the departure time and travel distance are known (Wu et al., 2004; Ando & Taniguchi, 2006). However, the calculated time may only be theoretical or can be a mere academic exercise unless the adequacy, convenience and safety of the road(s) can be guaranteed (Salomon & Perkins, 1989; Strayer et al., 2003).

Urban agglomerations occur when good houses and roads are available in a particular area; as such, social, economic, educational and religious activities move to such areas (Rosenthal & Strange, 2004; Logan & Molotch, 2007; Storper & Scott, 2009; Johnson, 2013). It is therefore necessary to maintain the road network in residential areas in order to enhance smooth movement of residents (Naumov et al., 2006; Alam & Rabbani, 2007; Southworth & Ben-Joesph, 2013).

3. Study Area and Methodology

The research was carried out in Ijoko, a town in Ifo Local Government of Ogun State, Nigeria. It is situated between the northern part of Lagos State and Abeokuta South in Ogun State, on the border between Ogun and Lagos States. A commercial town, Ifo is an overshoot of the congested Lagos megacity. Ifo was originally an Owu (of Egba descent) settlement that accommodated many other people, especially from the Lagos metropolis. Ijoko itself is connected to the neighbouring town of Idi-Iroko. For logistic reasons the study population was limited to residents of Ijoko.

The sampling frame was limited to 150 houses within the community and to the age brackets of 18 to 70 years. This target group consisted of travellers who were moving for different reasons, such as work, schooling and recreation, among others. The houses were selected purposively, while a sampling size of 240 respondents was extracted from the sampling frame. This was done through the simple random technique.

4. Sampling and Sample Size

Sampling is key to preventing loss of the characteristics of a population in the attempt to reduce the target population. Cochran's method of sample size determination was employed. Cochran's (1977) formula for sampling is shown in equation 1 as follows:

$$n_o = \frac{Z^2 pq}{e^2} \quad (1)$$

where

n_o = the sample size

Z^2 = the abscissa of the normal curve that cuts off area a at the tails (1 - a is considered as the desired level of confidence, which is, for example, 1.96 for 95%), thus giving the desired precision level or exactness. The actual value for Z can be found in statistical tables having the area under the normal curve

p = the estimated proportion of an attribute that is present in the population

q = 1-p.

e = the desired precision level

For this study, 95% is taken as the confidence level; therefore z = 1.96

p = 0.3 q = 1 - 0.3 e = 0.06

$$n_o = \frac{n_o=(1.96)^2\ (0.3)\ (1\text{-}0.3)}{0.06^2} \qquad n_o = \frac{(3.8416)\ (0.3)\ (0.7)}{(0.0036)} \qquad = \quad n_o = \frac{(0.8067)}{(0.0036)}$$

$$n_o = 224.08$$

Primary data were collected for the study with the aid of a structured questionnaire and by soliciting information from selected households (respondents). The questionnaire was designed to capture data on the ease of transportation in Ijoko. Out of the 240 copies of the questionnaire handed out to respondents, 227 (i.e., 94.58%) were retrieved and analysed. The remaining 13 could not be retrieved due to the complexity of the work of the respondents and other logistic constraints. Collected data were subjected to descriptive analysis. The sample size was 224 and it had a 95% confidence level. The total distributed 240 copies of the questionnaire was thus greater than the sample size of 224 and the total recovered was 227, which was also greater than the obtained sample size. Therefore, the numbers of materials distributed and analyzed for the research were considered adequate.

5. Results and Discussions

5.1 Demography and Socioeconomic Considerations

The demographic and socioeconomic analysis of the studied group (as presented in Table 1) shows that 43.17% of the respondents were male while 56.83% were female. The age classification of the studied group indicates that 24.67% of the respondents were between the ages of 18 and 33 years, 56.83% were between ages 34 and 49 years, 12.33% were between ages 50 and 65 years and 6.17% of respondents were in the range of 66 years and above. This study therefore corroborates a finding in the literature (Abraham & Hunt, 1997; Clark et al., 2003) stating that young adults in their 20's and 30's are the most mobile group in the population because of their youthfulness.

Information on marital status indicates that 18.06% of the respondents were single, 70.04% were married, 4.85% were divorced and 6.17% belonged to other marital groupings such as complicated, complex and undecided, among others. The educational background of the respondents shows that 9.69% of them had primary school education, 26.87% were secondary

school leavers, 58.15% were tertiary school leavers while 5.29% belonged to other categories, such as uneducated and early school dropouts, among others. The occupational status of the respondents reveals that 21.59% of the respondents were civil servants, 29.52% were artisans, 26.87% were traders, 15.42% were studying at one level or the other and 6.61% comprised other occupational categories. Since 70.04% of the respondents were married and more than 50% of the respondents had tertiary educations, this implied that the respondents were mature enough and responsible to make conscious and informed decisions and give reliable information on the true position of things in the study area.

Table 1: Sociodemographics of Respondents

1	**Gender**		**Frequency**	**Percentage**
		Male	98	43.17
		Female	129	56.83
			227	**100**
2	Age	18 – 33	56	24.67
		34 – 49	129	56.83
		50 – 65	28	12.33
		66 – above	14	6.17
			227	**100**
3	Marital Status	Single	41	18.06
		Married	159	70.04
		Divorced	11	4.85
		Others	16	7.05
			227	**100**
4	Educational Background	Primary	22	9.69
		Secondary	61	26.87
		Tertiary	132	58.15
		Others	12	5.29
			227	**100**
5	Occupation	Civil Servants	49	21.59
		Artisans	67	29.52
		Traders	61	26.87
		Students	35	15.42
		Others	15	6.61
			227	**100**

5.2 Road Transportation Mode of Households

The road transport available in the study area is presented in Figure 1. The figure shows that 1% of the respondents used bicycles as their mode of transportation, 66% used motorcycles, 29% used private cars and 4% used public vehicles. These statistics suggest that the majority (about two-thirds) of respondents depended on commercial motorcycles (popularly called "Okada) for movement from their households to various destinations. This fact may be attributed to the non-motorable condition of the road network in the study area and the dominance of low-income

residents, given that the percentage of people using private cars (29%) is very low and not up to half of those using motorcycles (66%).

The economic condition of the people in the study area in particular and the nation at large, as well as the deplorable condition of the roads as reported, may be responsible for the choice of motorcycles over private vehicles. But it may also be the case that motorcycling is the preferred choice because riders can more easily penetrate the traffic gridlock (Olagunju, 2015).

The results obtained in this study compare favourably with those obtained by Oluwadiya et al. (2009) and Olubomehin (2012) who state that many people in different areas of Nigeria use motorcycles instead of public or private vehicles because of the flexible payment scheme or in some cases because of their low cost. However, the studies also note, residents who commute by motorcycles are more prone to accidents and fatal injuries than those who travel in vehicles. Similarly, Golob and Hensher (2007) found that Sydney residents used personal cars for their trips because they had control over travel speed and could avert the problems associated with travelling by public transportation means such as the bus and the train.

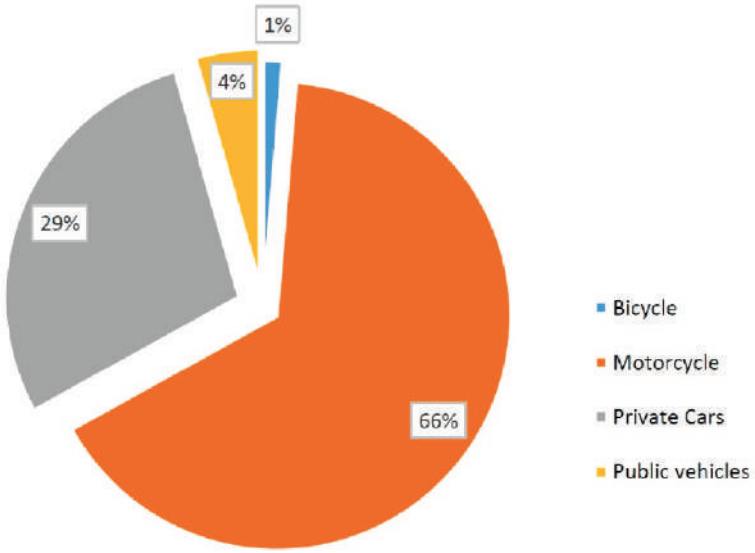

Figure 1: Road Transportation Modes in Study Area

5.3 Reasons for Movement of Households

Figure 2 shows the reasons for households' movements from their individual residences. Only 6.17% of households (14) moved out of their houses basically for health-related issues, 6.61% (15) moved out for social activities, 28.19% (64) moved out for business purposes, 33.04% moved out for work-related activities, while 25.99% moved out to take their children to school. These results therefore show that the largest percentage of people go out for work-related activities. In that regard, the study results are similar to Lee et al. (2009), who show that the movement of people out of their households is dependent on the accessibility of their households and that the ease of access between the households and work locations is an important movement-deciding factor for workers whose households are not in the same area as their workplace. It may thus be safely stated that good accessibility to workplace from workers' households contributes to the mobility of households and choice of location of households.

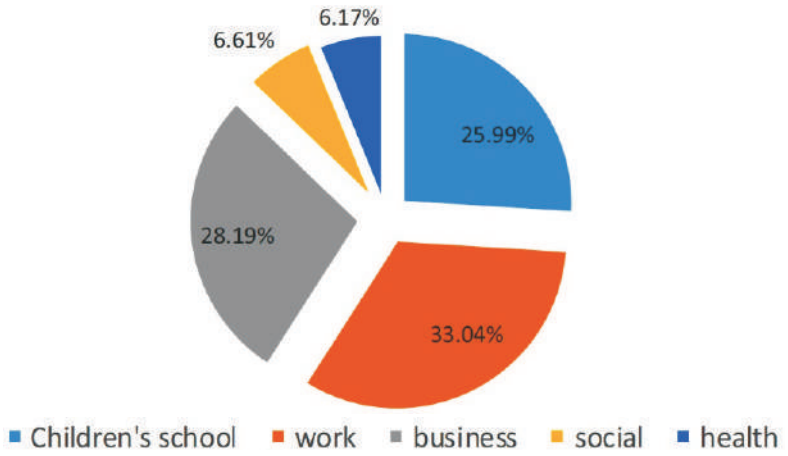

Figure 2: Reasons for House hold Movements

5.4 Factors Affecting Household Trips

Figure 3 presents the barriers preventing households from unhindered or smooth movement in the study area. The figure shows that only 7% of households are constrained by travel cost, which Brown and Moore (1970) claimed to be the major impediment to movement. The present study further revealed that 12% of households are constrained by inadequate transportation facilities, 28% by the poor condition of road networks, 10% by lack of personal cars, 9% by poor public transport, 11% by the security situation of the area, 4% by health-related issues, 13% by inaccessibility of alternative transportation modes and 6% by travel time.

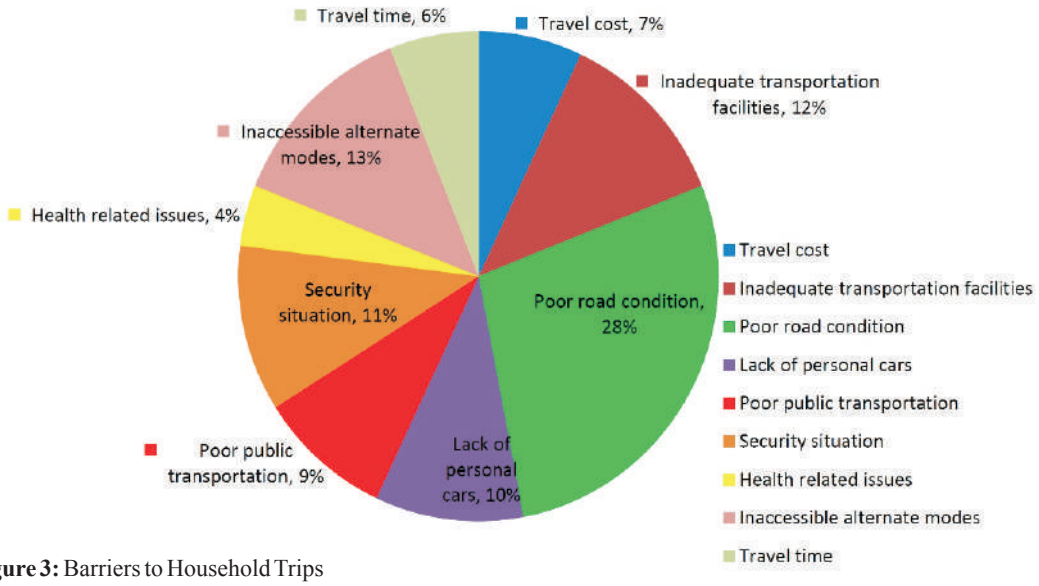

Figure 3: Barriers to Household Trips

5.5 Movement Patterns of Households

Table 2 shows the daily exit and entry timing of Ijoko households. The responses show that 56.82% of household members leave home between 5:00 a.m. and 7:00 a.m., 29.52% between 7:00 a.m. and 9:00 a.m. and 13.66% not earlier than 9:00 a.m. Table 2 further reveals that 14.10%

of households return home from outings between 4:00 p.m. and 6:00 p.m., 38.77% between 6:00 p.m. and 8:00 p.m. and 47.13% after 8:00 p.m. The implication is that the majority (56.82%) leave their residences between 5:00 a.m. and 7:00 a.m., while 47.13% of households return home after 8:00 p.m. These statistics suggest that the need to avoid heavy traffic is responsible for residents' leaving home very early in the morning and returning late in the evening.

Table 2: Households Exit and Entry Time

		Time of the day	Frequency	Percentage (%)
1	Exit Time from Home	5-7 am	129	56.82
		7-9 am	67	29.52
		9 am and above	31	13.66
			227	**100**
2	Time of household to return back Home	4-6pm	32	14.10
		6-8pm	88	38.77
		8pm and above	107	47.13
			183	**100**

5.6 Impediments to Free Movement of Households on the Roads

The study found that 47% of respondents relied on walking as a means of transportation. Despite the high proportion of walking respondents, there were factors limiting walking alone in the study area, such as visual problem (8.7%), fear of being kidnapped (15.3%), road condition (22.9%) and ritual killings (20%). Thus, the study differed from Masoumi (2013) which found out that social problems as well as lack of safety and security had little influence on walking activity in the study areas. Others factors were distance covered from bus stop to home (28.7%) and robbery by hooligans (4.4%). The present work also differs from studies conducted by Neel-Schaffer (2011) and Soltanzadeh and Masoumi (2014), who investigated Mobile County in Alabama and found that residents of a typical American county find lack of physical facilities to be the most important barrier that prevents them from walking/biking.

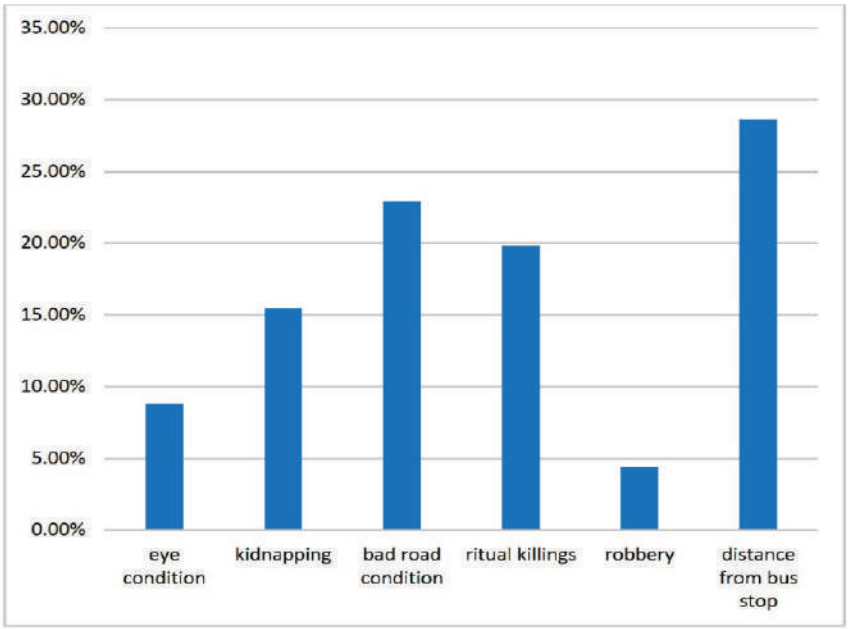

Figure 4: Impediments against walking alone in the study area

6. Conclusion

About 66% of Ijoko residents move from their residents to various destinations by motorcycle because of the poor condition of the roads in the study area and the perceived low living conditions of households. About 62% of households leave their various houses for business and work purposes, while about 26% of households move out of their houses to take their children to school. Based on their interview responses, households were constrained to move from their houses to their various destinations due to poor roads (28%), inaccessible alternative modes (13%), inadequate transport facilities (12%), security situation (11%), lack of personal cars (10%), poor transport facility (9%), travel cost (7%), travel time (6%) and health issues (4%).

The movement of households shows that 56.82% leave their houses between 5:00 a.m. and 7:00 a.m., 29.52% between 7:00 a.m. and 9:00 a.m. and 13.66% after 9:00 a.m. The households' return details show that 14.10% return to their houses between 4:00 a.m. and 6:00 p.m., 38.77% between 6:00 a.m. and 8:00 p.m. and 47.13% by 8:00 p.m. Respondents' fear of walking alone on the roads, especially at night, was caused by the distance between their home and the nearby bus stop (33.3%), bad road condition (22.9%), fear of being victims of ritual killing (20%), fear of being kidnapped (15.3%) and visual problem (8.7%).

7. Recommendations

Based on the findings of this study on sustainable access to infrastructures in Ijoko, Ogun State, the following recommendations are made:

(i) Sustainable development is a product of adequate road network but Ijoko roads are in bad condition; therefore, the government should embark on road rehabilitation.

(ii) Residents of the study area can integrate non-motorized transportation into their movement by reasonably utilizing walking and cycling. They should also ensure proper maintenance of the roads after reconstruction.

(iii) Government should deploy traffic enforcement officers for the control and direction of traffic, especially at the extended peak periods between 5:00 a.m. and 9:00 a.m. and between 4:00 p.m. and 8:00 p.m.

(iv) Alternative routes should be provided. There should also be streetlights to aid the elderly and visually challenged when it is dark.

(v) Government should provide adequate security on Ijoko roads, especially at night, to deter ritualists, kidnappers and highway robbers.

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