Exploring the Trip Chaining Behaviour of Women using Public Transportation in Ibadan, Nigeria.

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Abstract

Women multi-tasking activities impose a powerful influence on their trip pattern. The study examined the trip sequencing and challenges faced by women using public transport in Ibadan Metropolis. Two hundred and three (203) women were served with structured questionnaire in 10 selected bus stops, using purposive sampling. Only 190 correctly filled questionnaires were subsequently analyzed. Both descriptive and inferential statistics were used for data analysis. Findings indicated that over 40% of women made more than four trips per day. More than 50% of the first trip from home ended in children school. 36.5% and 51.2% of the second and third trips ended up at the place of work respectively. Both fifth and six trips were home bound trips as they accounted for 47.9% and 97.5% respectively. Regression analysis indicated that income and marital status had a significant influence on the number of trips made as both explained 57% of all trips made. Long waiting time at bus stops and misbehavior from conductors and operators were the main challenges faced by women. The paper advocates for improved public transport and enforcement of laws to curb crime and insecurity in public transport.

Keywords: Trip chaining, women, public transportation, Ibadan

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Introduction:

The role of women inevitably has a powerful influence on their trip patterns. The productive and reproductive roles of women to a large extent determine their trip patterns and travel behavior. Compared to men, women in urban areas tend to make shorter trips, travel mostly during off-peak and are likely to make trips at varied time (GTZ, 2007). Since women are more likely to be employed as informal workers, their destinations are not necessarily concentrated in the Central Business District (CBD). Similarly, their domestic -related transport activities can be much earlier or later than the typical work trip around which most transportation planning is concentrated. It implies therefore that women's domestic responsibilities and employment activities impinge on their trip characteristics and travel behaviour.

The fact that women engage in multi-tasking activities implies that they will have multiple and varied trips to accomplish. In other word, women are more likely to 'trip chain', meaning that when they travel, they tend to have multiple purposes and multiple destinations within a trip. For example, they might be going to work, but on their way stop at day care, visit a clinic then go on to their work place. This type of combined trip making is not considered in most urban transportation planning. Anvita and Geetam (2006) noted that transportation planning and policy interventions often fail to recognize gender difference in travel needs and access requirements. While research on gender and transportation in developed countries already receive substantial discussion on women trip chaining (Golob, 1986; Hensher and Reyes, 2000; McGuckin et al, 2005; Noland and Thomas, 2007) there are few such parallel work emanating from research in developing countries particularly in Nigeria.

Similarly, in Nigeria, studies on women and transport have focused more on transport burden of rural women and the psychological stress associated with women travelling in public transport (Ipingbemi and Aloba, 2005; Asiyanbola, 2007) with little attention paid to the connection between the multitasking role of women and their travel behaviour. Therefore, this paper seeks to provide baseline information on dimensions of women trip chaining (varied and multipurpose nature of women trips) in Ibadan as this will help to draw the attention of policy makers to the distinct and peculiarity of women's travel pattern; and at the same time add to literature on women trip chaining in developing countries.

Literature Review

A trip chain is a travel involving multiple purposes to single or multiple destinations and begins and ends at home or a similar origin (Strathman and Dueker, 1995; Shiftman, 1998). Trip chaining is an important aspect of travel which has significant impact on changing travel patterns. The study of trip chaining has a long history in the transportation literature. Early studies were based on understanding the geography of urban areas and the linkages between trips (Hanson 1980; Takahashi 1986), and especially how shopping trips are linked. Much of

the literature on trip chaining has focused on how to better model and forecast travel. For example, Kitamura (1985) investigated the possible treatment of interdependent destination choices in a trip chain and found that if the interdependency is not accounted for, estimation results may be biased. Hensher and Reyes (2000) estimated the relationship between mode choice, especially the use of public transport, and trip chaining. They found that as individuals move from a simple tour (such as, home–work–home) to an increasingly more complex tour (e.g., home–school–work–home) the likelihood of using public transport decreases with the increasing number of links in the chain. The result is consistent with Cirillo and Axhausen (2002) and Ye et al. (2006), who found that complex patterns (involving several stops) are preferably performed by car.

Furthermore, studies have also linked life cycle of household with the frequency and complexity of trip made. Household structure as embodied in nine lifecycle stages has been shown to impact on trip chaining behaviour and the demand for travel (Strathman et al. 1994). For example, as a household moves from "adults with no children" to "adults with children", children's needs have to be met (for example school,sporting activities) resulting in additional chains added onto a previously simple (say home-work-home) trip. Golob (1986) found that the life cycle of a household is the most important variable for determining the sequences of activities in trip chains, followed by age and income. McGuckin et al. (2005) found that gender and life cycle (based on the number of adults and the age of children) most affected trip-chaining behavior. Noland and Thomas (2007), however, find in their multi-variate analysis that estimated coefficient values of age groups and their association with trip complexity (i.e., the number of stops), varies little for those older than 26, but has a slight drop in complexity for those older than 76 years. They also confirm that higher income households have more complex trips and that the presence of young children increases trip complexity.

Trip chaining research has more recently focused on specific population segments, especially on gender differences. Using the 1995 Nationwide Personal Transportation Survey (US), McGuckin and Murakami (1999) found that women, especially with children in the household, are more likely to chain household sustaining trips in tours to and from work. Handy (1996) investigated the non-work travel of women, who generally face greater constraints on travel than men, due to greater time pressures and greater concerns about personal safety. For example, women are expected to take more responsibilities for looking after children and doing household maintenance trips such as grocery shopping, which puts them under greater time pressure.

Also, women travel less distance and engage in series of trips than men. Lyons and Chatterjee (2008) found that in the United Kingdom men substantially commute longer than women because women's domestic responsibilities have to be organized around commuting. Moriarty and Honnery (2005) studied urban travel in all Australian state capital cities and found that women on average travel less often and for shorter distances than

men. In addition to having shorter commutes, women also more often link other trips to their work commutes, for example, to drop off or pick up children at school, day care or recreational activities or to conduct household duties such as shopping (McGuckin and Nakamoto 2005; McGuckin et al. 2005). Women were almost twice as likely to trip chain for shopping, chauffeuring or social activities.

A number of longitudinal studies suggest that trip chains are becoming increasingly complex. McGuckin et al. (2005) found a 9% increase in chained work trips between 1995 and 2001. Levinson and Kumar (1995) found a significant increase in trip chaining during journeys to and from work between 1968 and 1988. Other reports, however, find little or no increase in trip complexity in recent years (Transport Data Centre, 2008). A broad range of household characteristics influencing the complexity of trip chains include age, income, gender, marital status and household structure. Like household characteristics, travel patterns such as origin, destination, purpose, characteristics of public transport use and the number of vehicles per household also influence trip chaining behaviour (Strathman et al., 1994 Strathman and Dueker, 1995; Shiftman, 1998; Krizek, 2003; O'Fallon and Sullivan, 2005; Primerano et al., 2008).

While most of these studies were undertaken in developed countries, little is known about the trip chaining activities of women in developing countries, particularly in Nigeria. This study, therefore, explores the various dimensions of trip chain among women in Ibadan, Nigeria because of the effects it has on their travel behavior and its implications for future transportation planning.

Study Area and Methodology

The study area consists of the five inner local government areas in Ibadan. These include Ibadan North, Ibadan North-East, Ibadan North-West, Ibadan South-East and Ibadan South-West. Secondary and commercial activities are the dominant means of livelihoods in the study area. In terms of transportation, the public transport infrastructure is in dire need of improvement. Most roads are in deplorable condition. The carriageway is dotted with potholes while the shoulders of some roads have been worn away by erosion, making it difficult for vehicles, especially taxi and buses, to pick or drop passengers conveniently. Road furniture such as road markings and traffic signs are lacking on most roads. Where they are available, they are in poor condition due to poor maintenance. Also, most of the sheltered bus stops are in deplorable condition. Some of them have no seats and without roofs. In fact, some of these sheltered bus stops have been taken over by commercial activities and destitute. The spacing and appalling condition of the sheltered bus stops have forced commuters to use unsheltered bus stops where public transport stop to pick and drop them. This type of bus stop is usually located close to major activity area such as schools, junctions, shopping mall, vulganizing and under big tree (probably for shade when it is sunny) among others. It is in the open space without any facility. The unsheltered bus stop is so widespread that it is preferred to sheltered bus stop.

The commonest modes of public transportation in Ibadan are motorcycle, bus and taxis. Motorcycle is by far the fastest and also the most flexible, but also the most dangerous means of getting around the city. Motorcycle is preferred to other modes because of its ability to weave in and out of traffic during grid locks. Tricycle which made its debut in urban passenger transportation in the city recently is gradually gaining prominence. A large percentage of the mini buses popularly called 'danfos' is extremely old and dilapidated. Substantial part of the interior and external facilities of the vehicles is not functional. A mini bus operation usually consists of a driver whose sole responsibility is to move the vehicle from one terminus to the other and a conductor, who gathers passengers and collects fares. Boarding mini buses in Ibadan is very uncomfortable. Passengers alternate between leaning forward and backward, as there is not enough space for everyone to sit in a line. Passengers may need to lap themselves before getting to their destinations. Taxis (and kabukabu)[1] are not different from mini bus in terms of operations and quality. They rarely start the vehicle by ignition. It is done by push and start; or worse still by sparking naked wires. The brake system, radio appliances, air conditioning, padding on seats and door handles are in most cases either not functioning or do not exist at all.

Data were collected by exploring both primary and secondary sources of data collection. Structured questionnaire were used to obtain primary data from the respondents. A total of 203 women, representing 0.025% of the total population of women in the study area were sampled, using purposive sampling. However, only 190 were correctly filled and subsequently analyzed. The questionnaire was administered on women in 10 selected major bus stops simultaneously. The two biggest bus stops in each local government area were identified and selected for the study. The selected bus stops comprises of both sheltered and unsheltered ones. The questionnaire was administered on women commuters at the bus stops. The questionnaire elicited information on their socio-economic characteristics, trip sequence (chain), journey purpose and the challenges faced by women using public transport. This was complemented with interviews to further explore the travel behaviour of women in the city. Secondary data were collected from National Population Commission and Local Government Planning Department. Descriptive analysis such as tables of percentages and graphs were used to present socio-economic characteristics of the respondents while regression analysis showed the relationship between socio-economic parameters of respondents and their trip sequence.

Results and Discussion

The results are presented under three headings; the demographic and socio-economic characteristics of women; their trip pattern and sequence as well as the challenges they faced while using public transport system.

Demographic and Socio-economic Characteristics of the Respondents

The age distribution of women as shown in table 1 indicated that 13.7% of the women were ages between 21-30 years, 32.1% were between 31-40 years, 37.4% were between 41-50 years and 13.7% were between 51-60 years. Women who were age between 61-70 years accounted for 2.6% while those above 70 years constituted 0.5%. With respect to marital status, more than three -quarter of the women were married, 3.7% of them were single while 8.5% were single mothers. Furthermore, occupational status of the respondents indicated that 60.5% of them were engaged in private business most especially trading and 30% worked in the public service. The monthly income distribution indicated that about 40% of the women were living below $2 dollars per day. Similarly, only one -fifth of the women earned $6 (1000) per day.

Table 1: Socioeconomic Characteristics of Respondents

Age of Respondents	No	%
18-30	26	13.7
31-40	61	32.1
41-50	71	37.4
51-60	26	13.7
61-70	5	2.6
>70	1	0.5
Marital status		
Single	7	3.7
Married	143	75.3
Separated	6	3.1
Widow	9	4.7
Divorced	9	4.7
Single mother	16	8.5
Occupational status		
Unemployed	10	5.3
Civil servant	57	30
Students	8	4.2
Private business	115	60.5
Monthly income (#)		
below 10,000	75	39.5
10,000-20,000	40	21
21,000-30,000	35	18.4
31,000-40,000	18	9.5
41,000 and above	22	11.6

Source: Author's Field Survey; 2012.

Women Trip Pattern and Sequence

The trip pattern of women indicated that 39.4% of them made four trips per day while 34.5% made five trips on daily basis. Those with two trips per day accounted for 12.3% and only 7.4% made six trips per day as shown in table 2. The typical pattern of such movement is again shown below (see table 2). For instance, those with two trips leave home for work then back home. Women, who engaged in six trips, leave home for children school, from where they go to work then to market. From market they pick up their children in the school. Visit a friend before returning home.

Table 2: Trip Sequence

No. of trips make daily	No	%
2	25	12.3
4	80	39.4
5	70	34.5
6	15	7.4
No response	13	6.4
Pattern of Trip Sequence	A typical pattern of trip made by women	
2	H-----------W----------H	
4	H------S--------W--------S--------H	
5	H--------S--------W---------M------------S---------H	
6	H----------S----------W---------M------S---------F-----------H	

Source: Author's Field Survey, 2012.
Note: H (Home), W (Work), S (School), M (Market), F (Friend's place).

Furthermore, trip sequence showed that more than 50% of the 1st trip from home ended up in the schools as shown in figure 1. 17% went to their place of work, 8% to place of worship, 7% to bank and 5% of the women went to their friend's place. Those that went to the hospital accounted for 5% while party and saloon constituted 2.0% each, and 1.0% went to the market. This indicates that women do make varied trips. About 65% of women made use of commercial motorcycle (popularly called Okada) for their first trip. The use of taxi accounted for 19.4% while bus carried 15.6% of the women in their first trip. The use of motorcycle in this trip is very high because of the ability of this mode of transport to access nooks and crannies of the city, and thereby meets up with early morning appointments especially school appointment.

Furthermore, 36.5% of the second trip ended at work compared to 51.2% for third trip as shown in table 3. The main mode of public transport for second and third trips was bus accounting for 51.4% and 57.3% respectively.

The use of taxi became more prominent in the third trip constituting 24.4%. It can be deduced from the foregoing that if women had choice they will prefer the use of bus to commercial motorcycle because of its poor safety records.
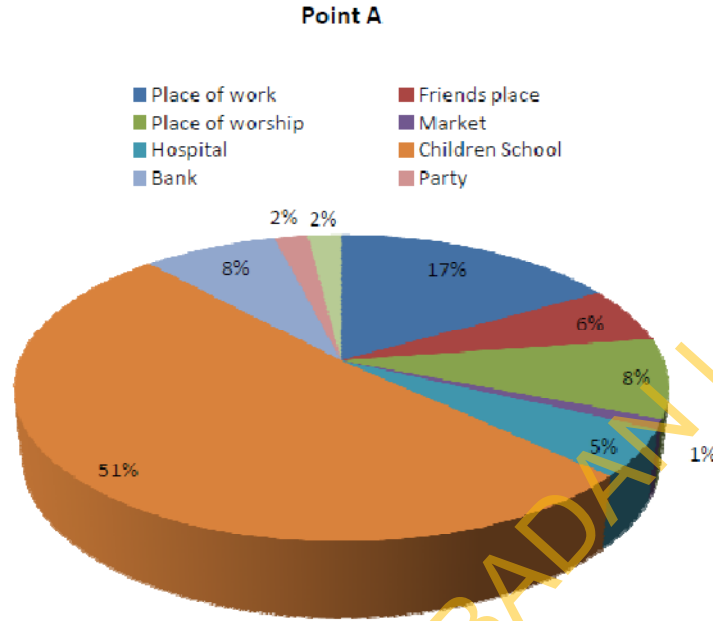

Fig 1: Trip from Home to Point A
Source: Author's Field Work; 2012.

Table 3: Composition of Second and Third Trips

Second Trip	Freq	%	Mode	Freq	%	Third Trip	Freq	%	Mode	Freq	%
Work	54	36.5	Bus	76	51.4	Work	42	51.2	Bus	47	57.3
Friend	20	13.5	Taxi	27	18.2	Friend	4	4.8	Taxi	20	24.4
Worship	32	21.6	M/C	45	30.4	House	12	14.6	M/C	15	18.3
Market	12	8.1	Total	148	100	Market	4	4.8	Total	82	100
Hospital	4	2.7				School	4	4.8			
Bank	18	12.1				Party	4	4.8			
Saloon	8	5.4				Saloon	12	14.6			
Total	148	100				Total	82	100			

Source: Author's Field Survey, 2012.
Note- M/C: Motorcycle

The fourth trip is more dispersed than both the second and third trips with 16% of the trip ended up in the market and at home respectively, 12% in place of worship and 11% went to pick their children in the school (see fig 2). This is a return trip back home because none of this trip ended in the place of work. Those that went to saloon and party accounted for 8% each, 7.0% went to visit their friend and 5.0% of the women went to their shop. While those who went to the bank and hospital constituted 4.0% and 2.0% respectively.
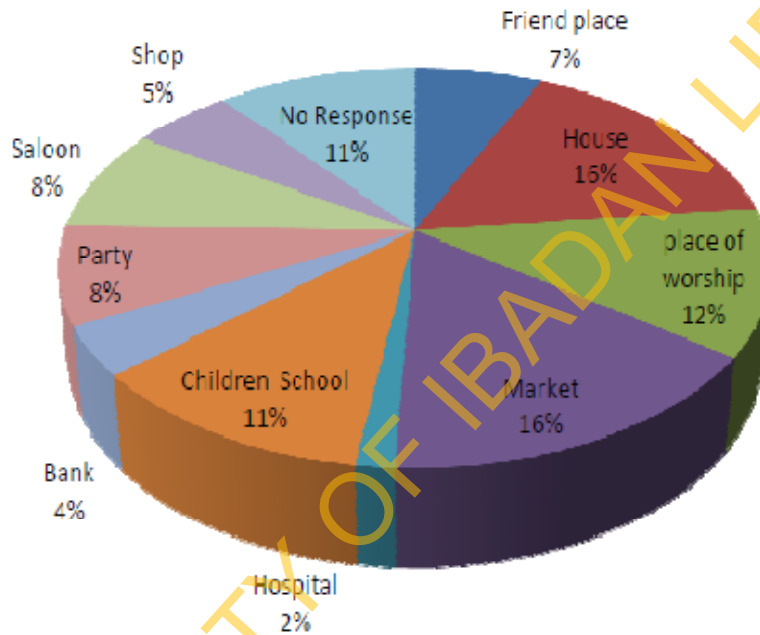

Figure 2: Composition of fourth Trip.
Source: Author's Field Work; 2012.

The fifth and sixth trips are home bound as shown in table 4. For instance, 47.9% and 97.5% of the fifth and six trips ended up at home respectively. For the fifth trip, 16.2% of the women went to the market, 11.5% to saloon and 8.1% to place of worship. The use of bus as a mode of public transport increased from 57% in the third trip to 22.8% in the sixth trip while the use of motorcycle increased from 48.6% in the fifth trip to 58.2% in the sixth trip. One thing is obvious from the foregoing; women make use of motorcycle more in their first and last trips.

Table 4: Composition of Fifth and sixth Trips

Fifth Trip	Freq	%	Mode	Freq	%	Sixth Trip	Freq	%	Mode	Freq	%
Home	71	47.9	Bus	33	22.3	Home	77	97.5	Bus	18	22.8
Market	24	16.2	Taxi	43	29.0	market	2	2.5	Taxi	15	18.9
Worship	12	8.1	M/C	72	48.6		79	100	M/C	46	58.2
School	7	4.7		148	100						
Bank	2	1.3									
Party	4	2.7									
Shop	6	4.0									
Saloon	17	11.5									
Friend	5	3.4									
Total	148	100									

Source: Author's Field Survey, 2012.

Note- M/C: Motorcycle

Table 5 shows cross tabulation between trip sequence and age, marital status as well as monthly income. Regarding the age of the respondents, 65% of women in age bracket 20-30 years made two sequence of trip compared to 32.8% in age bracket 31-40 years and 39.3% of women aged between 41-50 years. Women between ages of 31-60 years made more trips than any other age group. For instance, these women made 6 trips per day. Also, the number of trips made increases with age at initial stage but later decrease as women are becoming advance in age. For example, the number of women who made 4 trips increased from 15% for those in age bracket 20-30 years to 34.5% for 31-40 years old women and then to 52.6% for women in the age bracket 41-50 years. The percentage dropped to 42.9% for those in age group of 51-60 years and none for 61-70 years old women. This is consistent with previous findings in developed countries where age has been found to have significant influence on trip chaining (Mckuckin et al, 2005; Noland and Thomas, 2007).

Furthermore, the status of women has implications on the sequence of trips made. About 86% of singles made two trips per day compared with 41.9% of married, 83.3% of the separated and 50% of single mothers who made four sequence of trips per day. Only single mothers, married and divorced made six trips in a day. For married women who made six trips per day this may not be unconnected with their domestic and productive roles. The large percentage of divorced and single mother women involved in six trips per day is not clear but may result from the need to associate with other people due to loneliness. Some of them may need to visit friends and

family members as well as place of worship in search of comfort and succor. Similarly, high income women made more trips. In other words, the higher the income, all things being equal, the higher the sequence of trips made. For instance, only 20% women with monthly income bracket of less than N10,000 made four trips per day compared with 29.4% for those in income group of between N10,000-20,000, 41.9% for those between N20,000-30,000 and 57.1% for those with monthly income of more than N40,000. In addition, no woman earning N20,000 or less per month made more than four sequence of trips in a day compared with their counterparts with higher monthly income who made five or six sequence of trips per day. This was rightly observed by Noland and Thomas (2007) as they found that higher income increased trip generation and complexity.

Table 5: Trip Sequence by Age, marital status and monthly income

Characteristics	Trip Sequence			
	2	4	5	6
Age of respondents				
20-30 yrs	13 (65)	3 (15)	4 (20)	-
31-40 yrs	21 (32.8)	24 (34.5)	14 (21.9)	5 (7.8)
41-50 yrs	24 (31.6)	40 (52.6)	4 (5.3)	8 (10.5)
51-60 yrs	11 (39.3)	12 (42.9)	3 (10.7)	2 (7.1)
61-70 yrs	1 (100)	-	-	-
Marital status				
Single	6 (85.7)	1 (14.3)	-	-
Married	54 (37.8)	60 (41.9)	22 (15.4)	7 (4.9)
Separated	1 (16.7)	5 (83.3)	-	-
Widowed	3 (33.3)	6 (66.7)	-	-
Divorced	-	-	2 (22.2)	7 (77.8)
Single mother	6 (37.4)	8 (50.0)	1 (6.3)	1 (6.3)
Monthly income				
< N10,000	10 (66.7)	3 (20)	2 (13.3)	-
10,000-20,000	11 (64.7)	5 (29.4)	1 (5.9)	-
20,000-30,000	13 (30.2)	18 (41.9)	5 (11.6)	7 (16.3)
30,000-40,000	24 (33.8)	29 (40.8)	12 (16.9)	6 (8.5)
>40,000	12 (28.6)	24 (57.1)	4 (9.5)	2 (4.8)

Source: Author's Field Survey, 2012.

Note: all figures in bracket are in percentages

The trip sequence and socio-economic characteristics of the respondents were further investigated through the use of regression analysis as depicted in table 6. There is a positive and significant relationship between sequence of trips made and socio-economic characteristics of women especially income and marital status. As

more income is received, more trips are made. Similarly, when a woman moves from being a spinster to motherhood, more trips are also made. Socio-economic characteristics of the respondents explained about 57% of the trips made.

Table 6: Regression Analysis

Model Summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.752[a]	0.56	0.43	.887	0.56	3.831	3	184	.011

a. Predictors: (Constant), Monthly income, Marital status, Age of Respondents

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	1.255	.280		4.491	.000
	Age of Respondents	-.030	.076	-.029	-.402	.688
	Marital status	.133	.050	.193	2.672	.008
	Monthly income	.112	.056	.146	1.995	.047

a. Dependent Variable: trip sequence

Women's Barrier to the Use of Public Transport

The challenges faced by women using public transport are multi-faceted due to the diverse nature of their trips. Long waiting time at the bus stop was considered as the most important constraint to the use of public transport as it accounted for about 34% of the problems (see table 7). 31.1% of the women claimed that insult from both operators and conductors constituted another problem confronting them when they use public transport. This issue was further investigated through personal interviews with some women. They noted that because women in

most cases carry luggage (loads), or are sometime pregnant, or have children with them, they are slow in boarding or alighting from public transport which draws indignation from either the conductor or operator. Women (18.9%) also complained about the insecurity associated with boarding public transport. This ranges from stealing, pick-pocketing, bag snatching, to outright kidnapping which have been documented elsewhere (Lynch and Atkins, 1998; Smith, 2008). Women, compared to men, are more vulnerable to crime because of distractions from other issues such as the loads they carry or their children either on board or at the bus stops. Furthermore, the boarding floor of most of the buses is very high which makes women to struggle while boarding and alighting. Similarly, for those of them who make use of motorcycles, they sometimes find it difficult to climb because of the nature of their dresses (tight, local attires).

Table 7 : Challenges Faced by Women in using Public Transport

Challenges of Public Transport	No	%
Boarding height	26	13.7
Insecurity	36	18.9
Insult from conductors / operators	59	31.1
Long waiting time	64	33.7
Male supremacy	5	2.6

Source: Author's Field Survey, 2012.

Recommendations and Conclusion

It is obvious from the foregoing that women make sequence of trips in order to meet their daily needs. These trips cut across different endeavors; work, school, bank, saloon among others. Their main modes of transport were bus and commercial motorcycles. Socio-economic characteristics of women had influence of the sequence of trips made. In view of this, there is need to improve the quality of public transport in the city, particularly the bus system and operation of commercial motorcycles in order to ameliorate the transport challenges faced by women in their daily commuting. Government should provide enabling environment through reduction of taxes and levies on public transport. Similarly, government must adhere strictly to, and enforce operational standards for public transport in the metropolis. Government must also liaise with all the unions of commercial transport operators to inform their members to comply with rules and regulations guiding commercial transport operations in the metropolis in order to ensure the safety of passengers, particularly women.

Government can also introduce female- only bus system as being practiced in India to ease the transport difficulty faced by women. The buses would be meant specifically for women and this is expected to reduce

waiting time at the bus stops. Unions' leaders should mete out sanctions against drivers and/or conductors reported to have insulted women off or on board. Government must ensure adequate security measures for public transport in the metropolis. Women on their own part should be very careful in boarding public transport, especially in the night. For example, commercial motorcycles should be avoided in the night because of the high level of association between this mode and crime. Similarly, women should steer clear of male- only or male-dominated passenger bus and taxi. If these suggestions are taken seriously, it will ease the transport difficulties faced by women in the discharge of their responsibilities.

Endnote:

1. Kabukabu- they are usually small taxi that provide service in then urban centers with little or no formalization of its operations. In most cases they are not licensed to operate, don't pay Union fees or other charges and avoid the use of motor parks in order not to be apprehended by taxi Union.

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