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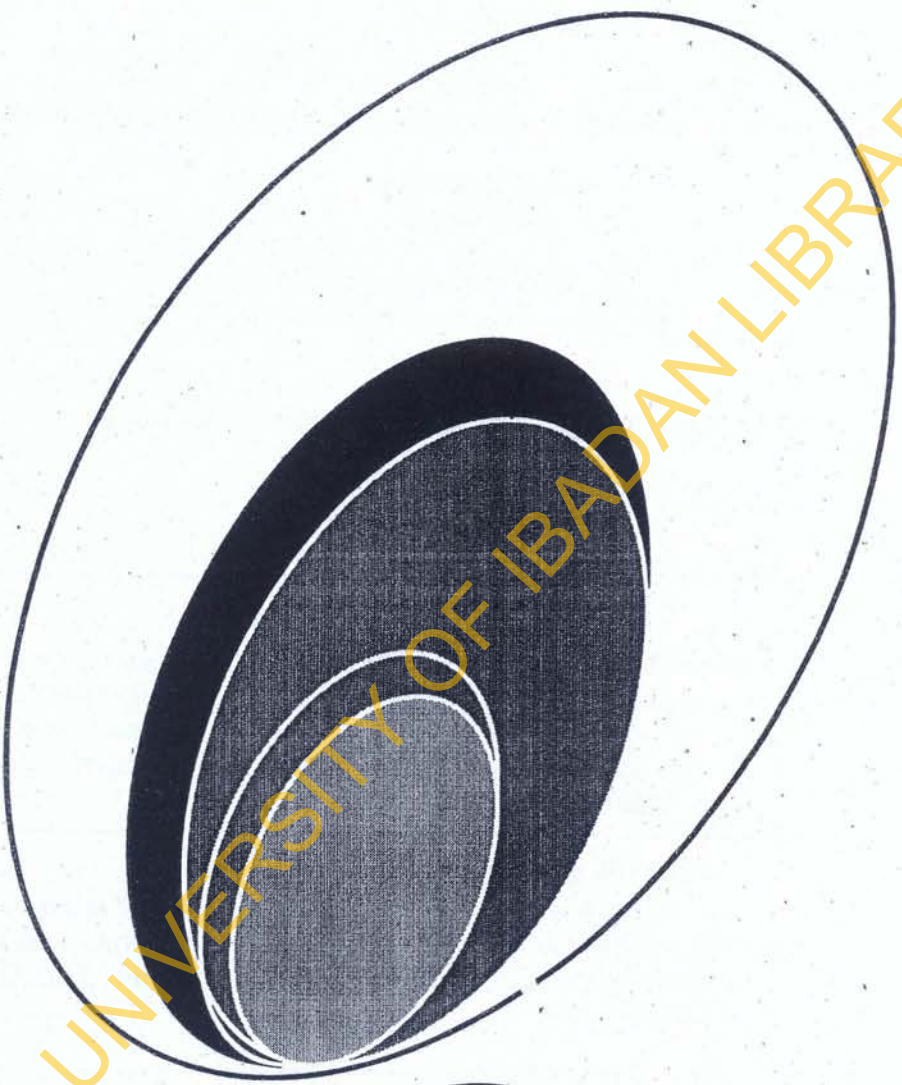

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Contents

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Ibadan
Planning
Journal

The Burden of Hospitalization of Road Crash Victims in a Secondary Health Care Facility in Oyo, Nigeria

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Abstract

The study examined the hospitalization burden of road crash (injured) victims in Oyo town. Primary data were collected through questionnaire administration and In-Depth interview. One-hundred crash victims were involved in the survey. Secondary data were sourced from the General hospital records. Descriptive statistics were used for data analysis. Findings indicated that 65% of road crash victims were males, about 87% of them were less than 50 years old and 85% earned not more than N10,000 per month. The length of stay (LOS) showed that each crash victims spent 39 days on the average in the hospital and incurred a daily expense of N750 throughout the victim stay in the hospital. The consequences included reduced income (18.9%), job loss (8.4%) and abandoned by friends and family members (16.8%) among others. The paper calls for improved pre-hospital trauma care and the establishment of Road Accident Fund in order to ameliorate the burden of road crash victims.

Introduction

Road traffic crashes are a leading cause of deaths and disability, disproportionately affecting the developing countries (Peden *et al*, 2004). While Sub-Sahara Africa has a fraction of the motor vehicles found in Europe and North America, mortality from road traffic crashes in Africa is among the highest in the world (Ameratunga *et al*, 2006). The economic costs with road traffic injuries in Africa was estimated to be US$ 3.7 billion in 2000, translating to approximately 1-2% of each country's Gross National Product (GNP) (Jacobs *et al*, 2000). In Nigeria, road traffic crashes claimed about 5,000 lives annually with an estimated economic cost of about N65 billion per year (Arosanyin, 2008). On the average, more than 70% of the road crash victims in Nigeria are between the ages of 15-45 years (Ipingbemi, 2008).

Various studies on the trend Jegede (1985); pattern of road accidents Mukoro (1986) and cost implications Arosanyin (2008) of road crashes have been carried out in Nigeria. However, little attention has

been paid to the hospital costs of road crash victims (in-patient). Increased attention is now being focused on the hospital costs of illness of road crash victims. These costs include the costs of treatment and costs of lost productivity on the part of ill persons. Such costs are usually considered at macro –economic levels (Lee and Mills, 1985). However, some authors have suggested the need to look at the household in terms of the implications of the cost of hospitalization on individual members of the household (Mill, 1994 and Sauerborn, 1996). It is in view of this that the paper focuses on the direct costs of hospitalization of in-patient road crash victims at the General Hospital in Oyo town in Nigeria. This introduction is followed by literature review in section two. Section three discusses the methodology while data presentation and discussions are contained in section four. The last section is recommendation and conclusion.

Literature Review

Injuries are a leading cause of global death and disability with road traffic crashes being the greatest contributor (Peden *et al*, 2004). Injuries due to road traffic crashes are predicted to be the second leading cause of lost disability-adjusted life years (DALYs) in developing countries by 2020 (Murray and Lopez, 1996). Disability data are extremely limited in Sub-Sahara Africa, so also are studies on the economic effects of road traffic injuries except for the study in Ghana (Mock *et al*, 2003). Though there have been reports of varying depths on the economic effects of injury in developing countries, such studies have looked largely at health service utilization as a proxy for associated costs (Mock *et al*, 1995; Zwi, 1993), costs of hospitalization (Zwi, 1993) and costs of injuries based on per capita income and loss of life expectancy for fatalities (Arokiasamy and Krischnan, 1994).

In a community based survey carried out in Ghana by Mock *et al* (2003), the economic consequences of injury were investigated in terms of direct costs of treatment, lost wages due to injury and coping strategies used by the family to compensate for the lost of work and money associated with injuries. The money spent on treatment was estimated to be US$31 (N4650) per person in urban areas, 83% of injuries resulted in intra-labour family relocation, about 67% resulted in loss of family income and 5% missed school days. deCodes *et al* (1998) estimated the cost of illness in rural Brazil calculating direct and indirect costs using out of pocket expenses and days lost from work multiplied by wages respectively. They found that the ratio of indirect costs to the direct costs of treatment was 7:1 as against similar study in United States which was estimated to be 2.5:1 (Rice and Makenzie, 1989). Bray *et al* (1985) found in their study of orthopedic injuries sustained in motorcycle crashes in Davis medical centre in California that the cost of hospitalization per patient on the average was US$17.74 (N2661) and each patient was admitted on the average for about 22 days.

Recent studies in Bangladesh in a primary and secondary levels hospital, through direct interview with the patients, showed that the average duration of hospital stay was 5.7 days and each patient incurred US$86 (N12,900) as patient costs (Mashreky *et al* 2010).They suggested the need to develop a road safety programme in the country in order to reduce the hospital burden and minimize the economic and social impact. Similarly, using a community based approach to assess the socio-economic impact of road traffic injury study

in six states and the FCT in Nigeria, Julliard *et al* (2010) found that private physician and hospital were the most common forms of initial treatment sought by road crash victims, while traditional treatment was the second most care sought. Also, 13.5% of the injured victims were unable to return to their work and 67.6% of those who became disabled as result of road crash were unable to perform their daily activities. Average direct costs of treatment for informal and formal treatment were estimated at US$6.65 (N997.5) and US$35.64 (N5,346) respectively. These authors called for appropriate interventions in both health and transport sectors to address road traffic crashes which is a major cause of morbidity and mortality in Nigeria. While this study is very useful, there is the possibility of excluding minor injuries. The authors agreed that the study may have suffered from what they referred to as 'memory decay' phenomenon which may have resulted in under-reporting of less serious injuries. Except for the study by Bray et al (1995) none of these studies assessed the cost of hospitalization of in-patient road crash victims, which is the focus of this study.

Methodology and Morphological Characteristics of the Study Area

The study made use of data from both primary and secondary sources. The primary source of data relied on the use of questionnaire and interview. Pre-tested questionnaire were successfully administered to 100 road crash (injured) victims receiving treatment at the General Hospital, Oyo town. Where the victims were unable to provide adequate and accurate information on a specific question, they were promptly assisted by care givers who are incidentally their relations. Secondary data were collected from the hospital records. Descriptive statistics such as tables of percentages and graphs were used for data presentation.

The study area is Oyo town which had a population of 429, 784 in 2006 (NPC, 2006). Oyo town has two distinctive areas: the old core and the new areas. In the old core are the Palace (Aafin) and the main market centre (Akesan) occupying a focal point at the centre and the main thorough fares focused on them (Tanimowo, 2005). Here, mud walled buildings in large number, and multi-occupied dwelling units predominate. There is no zoning of land uses, all functions are inter-mingled; apart from the centre which displayed the Oba's palace surrounded by the market and the houses of Oba assistants. The new area, consisting of new urban cells, owe much to the European ideas of town planning and have new building techniques and many single family dwellings in low or medium densities. They are located at the outskirts and inhabited mainly by immigrant non-natives, expatriates, middle-class government / commercial and industrial workers. Agriculture is the main stay of the economy of Oyo people.

In terms of transportation, road remains the predominant mode of movement as found in most secondary cities in Nigeria (Tanimowo, 2002). Based on function, five categories of roads have been identified (Tanimowo, 2005). These include access roads, minor roads that link the town with suburb settlements, collector roads that provide a link between the town and the villages and major roads that connect Oyo town with other towns. Apart from these, there are other unclassified roads that criss-cross the town and link other settlements with the city's central business district. There is also a Trunk A road that connects Ibadan to Lagos through Oyo town. The road

networks have limited capacity, substandard and fast deteriorating. Poor condition of roads reduces vehicle speeds, sapping the public transport productivity and increasing the cost of vehicle maintenance. In addition, most of the roads have one lane in each direction; where the roads are wider, one lane is often taken up by pedestrians and parked vehicles. Intersections are spaced closely together and are ill-designed for turning. Terminals such as designated bus stops are scarce and where available are in poor condition with some of them being taken over by commercial activities or destitute. In terms of transport services, substantial number of the residents makes use of public transport such as buses, motorcycle taxi (okada) and motor taxi due to low car ownership which is a characteristics of towns and cities in developing countries. Motorcycle taxi (Okada) is very popular in the town because of its locational flexibility and ability to beat hold up.

Presentation of Results and Discussion

This section discusses the demographic and socio-economic characteristics of road crash victims as well as the costs incurred in the hospital.

Socio-Economic Characteristics of Road Crash Victims in Oyo Town

The socio-economic characteristics of road crashes victims in Table 1 indicated that males were more involved in road crashes than females as they accounted for 65% of the total. This is corroborated by a decade analysis of gender distribution of road crash involvement shown in Figure 1. Men are more involved in road crashes than women because they are mobile and take higher traffic risk. The young male preponderance in this paper agrees with findings reported elsewhere (Naddumba, 2004; Andrews *et al.*, 1999; Okeniyi *et al.*, 2005; Solagberu *et al.*, 2006; Galukande *et al.*, 2009). As high as 68% of road crash victims were between the ages of 16-45 years while only 5% of them were more than 60 years old. Marital status of the respondents showed that 46% of them were married, 43% were single, 7% were separated and 4%. widowed. In terms of educational qualifications, road crash victims without formal education represented 11.3% and those with both primary and secondary education accounted for 69.1%. Only about one-fifth had tertiary education.

Occupational characteristics of the respondents showed that artisans and students represented the larger percentage of victims of road crashes both accounting for more than half of the injured victims. Artisans and students were the most injured perhaps because of the rush through heavy traffic to get to their businesses and to the school. Similar observation was noted by Naddumba (2002) in Kampala, Uganda. Solagberu *et al.* (2006) also reported similar observation in Nigeria. Artisans are also involved sometimes in buying and selling which necessitates movement from one place to another while students usually walk to and from school as well as embark on trips for academic purpose. Furthermore, the income of road crash victims showed that more than 65% of them earn less than N5000 monthly with a few (4.1%) earning above N50,000 per month.

Table 1: **Socio-economic Characteristics of Road Crash Victims in Oyo Town**

Variables	Frequency	Percentage
Sex		
Male	65	65
Female	35	35
Age (Years)		
0-15	19	19
16-30	40	40
31-45	28	28
46-60	8	8
Above 60	5	5
Marital Status		
Single	43	43
Married	46	46
Separated	7	7
Widowed(er)	4	4
Education Attainment		
No formal education	11	11.3
Primary education	26	26.8
Secondary education	41	42.3
Tertiary education	19	19.6
Occupation of Respondents		
Farming	8	8
Civil service	10	10
Trading	15	15
Unemployed	2	2
Private sector	14	14
Artisan	23	23
Students	28	28
Monthly Income		
Less than N1000	27	27.5
N1000- 5,000	37	37.8
N5001-10,000	20	20.4
N10,001-50,000	10	10.2
Greater than 50,000	4	4.1

Source: Author's Analysis 2008

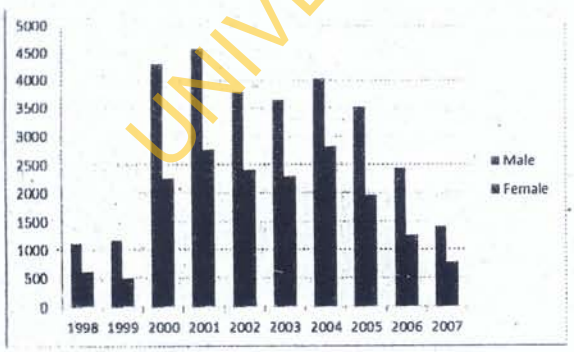

Figure 1: **Gender Distribution of Road Crash Victims Oyo town.**
Source: Oyo General Hospital

Table 2 indicates that motorcycles accounted for more than half of the cases of road crashes, 17% were buses, 13% automobile and 7% were trailers. Generally, the high frequency of involvement of commercial motorcycles in road crashes presents a serious problem for both motorists and pedestrians, and has led to a canvass for a more regulated industry or a total ban on this mode of transportation by the public. With respect to how the victim was transferred to the hospital, 6.6% of the victims were brought to the hospital by the Police/Federal Road Safety Corps (FRSC), 31.8% by the friends and relatives of the victim, 55% by people considered to be 'Good Samaritans' and 6.6% of them were brought in by drivers or bike riders (Figure 2). In a similar study in Kenya, only 2.9% of the crash victims were transported to hospital by ambulance (Peden *et al*, 2004). However, recent study in Kenya found that the percentage had dropped to 1.4% and only 51.9% reached health facilities within 30 minutes of crash (Macharia *et al*, 2009).This shows that inadequate post-crash management of road crash victims may likely be a major problem in road safety in Nigeria and some other African countries.

Table 2: **Types of Vehicle Involved in Road Crash**

Type of vehicle	Frequency	Percentage
Bus	17	17.0
Taxi Cab	3	3.0
Motorcycle	51	51.0
Truck	3	3.0
Trailer	7	7.0
Luxury Bus	6	6.0
Automobile: (cars, pick-up etc)	13	13.0
Total	100	100.0

Source: Author's Analysis 2008

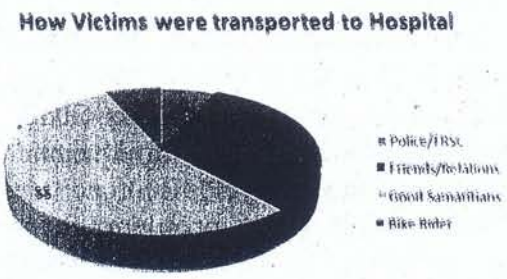

Figure 2: **How Victims were transported to the Hospital**
Source: Author's Analysis 2008

Burden of Hospitalization of Road Crash Victims

In discussing the burden of hospitalization, various issues such as the duration of stay, costs of drugs and admission, as well as other ancillary expenses were taken into consideration. Figure 3 indicates that those who spent between 1 and 2 weeks accounted for 19.9% and 19.1% respectively. 17.5% of road crash victims spent 1 month, 17% spent 2 months while those that stayed between 3-6 months constituted 16.2%. Also, respondents who had spent a whole year were 8.2% of the total and only 3.1% of them stayed more than 1 year.

Further investigations through interview revealed that those who sustained minor injuries such as bruises, burns and cuts had a shorter duration of between 1 and 2 weeks compared with those who sustained major injuries such as compound fracture, head injury, leg injury and internal bleeding who spent a longer period of time in the hospital. The reason for the longer stay of those with high degree of injuries, according to some crash victims, was due to the fact that some of them needed surgical operation and as such required more time for recuperation. On the average, each injured victim spent about 39 days in the hospital.

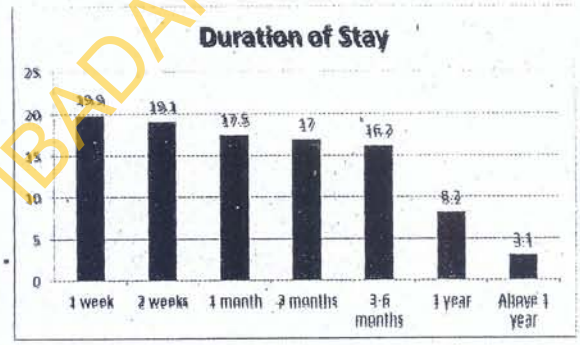

Figure 3: **Duration of Stay in the Hospital**
Source: Author's Analysis 2008

Table 3: **Hospital Expenses of Road Crash Victims**

Expenses on Drugs			Expenses on Admission			Other Expenses		
Amount (N)	**Frequency**	**Percentage**	**Amount (N)**	**Frequency**	**Percentage**	**Amount (N)**	**Frequency**	**Percentage**
< N1000	12	13.3	< N1000	5	5.3	< N1000	3	3.5
1001-5,000	38	42.3	1001-5,000	42	45.2	1001-5,000	52	61.2
5001-10,000	21	23.3	5001-10,000	19	20.4	5001-10,000	14	16.4
10,001-20,000	13	14.5	10,001-20,000	12	12.9	10,001-20,000	10	11.8
20,001-50,000	4	4.4	20,001-50,000	14	15.1	20,001-50,000	5	5.9
50,001-100,000	2	2.2	50,001-100,000	1	1.1	50,001-100,000	1	1.2
Total	90	100	Total	93	100	Total	85	100

Source: Author's Analysis, 2008

Table 3 shows the amount of money spent on drugs, admission and other expenses by road crash victims. On drugs for instance, 13.3% spent less than N1,000, while 2.2% spent above N50,000 on drugs. Also, 42.3% spent between N1,000 – N5,000 followed by those who spent between N5,001 – N10,000 which constituted 23.3% while 14.5% and 4.4% accounted for those who spent between N10,001 – N20,000 and N20,001 – N50,000 respectively. On the average, each crash victim spent about N9,326.11 on drugs for the duration of his/her stay in the hospital.

Expenses on admission include the admission fee, costs of beddings, food, water and electricity which are charged together either daily, weekly or monthly, depending on the length of stay in the hospital. Table 3 indicated that 5.3% spent less than N1,000, 45.2% spent between N1,001 – N5,000 which is the highest frequency, followed by those who spent between N5,001 – N10,000 which is 20.4% while 12.9%, 15.1% and 1.1% of the hospitalized victims spent between N10,001 – N20,000, N20,001 – N50,000 and above N50,000 respectively. The average amount spent on admission during the period of stay was N13,896.77K.

Furthermore, expenses on tests, x-ray, blood transfusion, surgical operation, anesthesia, among others are categorized as 'others'. These expenses are sometimes repeated severally as the case may be or as required during the course of treatment. 3.5% of the crash victims spent less than N1,000 on these items, 61.2% spent between N1,001 – N5,000, and 16.4% spent between N5,001 – N10,000. Those who spent between N10,001 – N20,000 accounted 11.8% while 5.9% of the respondents spent between N20,001 – N50,000. Only 1.2% of the crash victims spent more than N50,000 on these items. On the average each victim spent about N7,655.65K on these items. On the average, the overall hospital expenses for each victim for his/her duration in hospital was N30,878.53 ($205.6). This amounted to over N750 ($5) per day for the period of stay in the hospital for each crash victim.

The average expenses of crash victims of $205.6 are higher than similar studies carried out in developing countries. For instance, Mock et al (2003) found $31 in Ghana while Mahsreky *et al* (2010) found $86 in Bangladesh. However, the average cost per patient of $205.6 is lower than the $300 and $369 found by researchers in different studies in Uganda (Galukande et al, 2009; Kigera et al 2010). Furthermore, the daily expenses of N750 amounts to N22,500 per month. Only about 15% of the respondents earn up to this amount in a month (see table 1). It is not surprising therefore, that parents, guardians and relations bear substantial costs of treatment as shown in table 4.

Table 4: **The bearer of the treatment**

Bearer of the Payment	Frequency	Percentage
Self	16	16.0
Parents/Guardian	60	60.0
Relations	11	11.0
Religious Organization	12	12.0
The Owner of the vehicle	1	1.0
Total	100	100

Source: Author's Analysis 2008

Table 4 shows that 16% of the respondents paid the cost of treatment by themselves, 60% are paid for by their parents/guardian. The crash victims in this category are mostly students or apprentices who depended on their parents/guardian for their needs. 11% of the victims had their expenses paid by their relations, 12% were bailed out by religious organizations and 1% had their expenses paid by the vehicle

owner. Moreover, substantial number of the 16% who personally paid for their treatment was from the working class and may have sourced the money from personal savings, borrowing, loan or through asset pawning. The implication of this is that the economic burden of road traffic crashes on the victim is very devastating because it drains the financial savings of the victims and ultimately leaves them poorer.

The consequences of crash on crash victims are very severe. Figure 4 indicates that 22.1% of the crash victims said that their businesses or jobs crumbled because they were not around to supervise the businesses personally. Also, 8.4% lost their jobs due to prolonged stay in the hospital. In the same vein, those who had emotional and psychological trauma accounted for 23.3% of the total. Further investigations showed that people in this category always had nightmares and disrupted sleep. About 10% of the crash victims were abandoned by friends and colleagues.

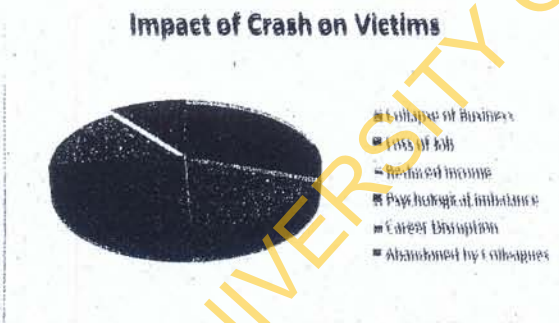

Figure 4: **Impact of Crash on Victims**
Source: Author's Analysis 2008

Recommendations and Conclusion

Road crashes are debilitating to both socio-economic and human resources development of any country. At household level, road crashes place a severe financial strains on families, who often have to absorb the direct medical, and rehabilitation costs as well as indirect costs created by a victim's inability to continue earning. Based on these findings, it is very imperative that government put into consideration measures for enhancing pre-hospital care through the use of appropriate equipment (emergency vehicles) and personnel, since just 6.6% of the crash victims were transported to the hospital by traffic agencies. Substantial percentage of the injured victims was transferred to the hospital by sympathizers, bystanders and friends (Good Samaritans) with little or no formal training in first aid.

It is also important that government establishes Road Safety Fund to offset some of the hospital expenses of road crash victims as found in some countries such as Australia, New Zealand, South Africa, Ghana and Namibia. For instance, in South Africa, the Road Accident Fund (RAF) pays compensation for losses suffered due to bodily injuries sustained or death of a person on the road to the tune of R25, 000 (N500,000) (South Africa, RAF, 2009). Government can source part of this fund from levy on petroleum (e.g $1 per 1 litre of petrol sold). Other sources are from dedicated fund by oil companies, certain percentages from vehicle registration, licensing and fines. Similarly, government should put in place measures that can assist road crash victims after discharge since many of them would have lost their jobs and businesses, abandoned by friends/families or have their career disrupted. This could take the form of skill acquisition, start- up capital and payment of school fees for students.

In conclusion, it must be noted from the foregoing that the burden of hospitalization of road crash victims is very enormous. Therefore, it is imperative that government should put in place pragmatic measures that will assist road crash victims to defray hospital costs and also help in rehabilitating them after discharge from hospital.

References

Ameratunga, S., Hijar, M. and R., Norton (2006) 'Road Traffic Injuries: Confronting disparities to address a global-health problem' *Lancet*, 367: 1533-1540.

Andrews, C.N., Kobusingye, O.C. and R, Lett (1999) 'Road Traffic Accident injuries in Kampala' *East African Medical Journal*, 76, 189-194.

Arosanyin, G.T. (2008) 'Costing Road Accidents in Nigeria and the Need for Further Research', In Hassan, A., Adeyemo A, Isah H.J and G.T Arosanyin (ed) Perspectives on Nation Building and Development in Nigeria: Environmental and Economic Issues, Concepts Publications, Lagos Pp 140-163.

Arokiasamy, J.T and R., Krishnan (1994) 'Some epidemiological aspects and economic costs of injuries in Malaysia' Asia Pacific of Journal Public Health, 7, 16-20.

Bray, T., Timmerman, L., Yen, L., and Madison, M. (1985) 'Costs of Orthopedic Injuries Sustained in Motorcycle Accidents' JAMA, Vol 254 No 17 pp 2452-2453.

deCodes, J., Baker, T.D., and D. Schuman (1988) ' The hidden costs of illness in Developing Countries' *Resources Human Capital Development* 5, 127-145.

Galukande, M., Jombwe, J. , Fualal, J.and A., Gakwaya (2009) 'Boda-boda injuries health problem and burden of disease in Uganda: A Tertiary hospital survey' *East and Central Africa Journal of Surgery* Vol 14 (2): 33-37.

Ipingbemi, O (2008) 'Spatial analysis and socio-economic burden of road crashes in southwestern Nigeria' *International Journal of Safety Promotion and Injury Control* Vol 15 (2): 99-108.

Jacobs, G Aeron-Thomas A, and A Astrop (2000) Estimating Global Road Fatalities.

TRL Report 445. Crowthome: TRL

Jegede, J. F. (1985). 'Spatio-Temporal Analysis of Road Crashes in Oyo State' *Accident Analysis and Prevention* Vol. 20 (3): pp 227-243.

Kigera, J., Nguku, L., and E.K. Naddumba (2010) ' Impact of BodaBoda Motorcycles on the budget for clinical services at Mulago Hospital, Kampala' *East and Central African Journal of Surgery* Vol 15 No 1 pp 57-61.

Julliard, C., Labinjo, M., Kobusingye, O., and A. Hyder (2010) ' Socioeconomic impact of road traffic injuries in West Africa: exploratory data from Nigeria' *Injury Prevention*, 16, 389-392.

Lee, K. and A. Mills (1985) The Economics of Health in Developing Countries. Oxford: Oxford University Press.

Macharia, W.M., Njeru, E.K., Muli-Musiime, F. and V. Nantulya (2009) 'Severe road traffic injuries in Kenya, quality of care and access' *African Health Sciences*, 9 (2): 118-124.

Mashreky, S.R., Rahman, A., Khan, A., Faruque, M., Svanstrom , L. and Rahman, F (2010) ' Hospital burden of road traffic injury: Major concern in primary and secondary hospital levels in Bangladesh' *Public Health*, 124, 185-189.

Mills, A (1994) 'The economic costs of Malaria for Households: A case study of Nepal' *Health policy* 29, 209-227.

Mock, C.N., Adzotor, E., Denno, E., Conklin, E and R., Rivara (1995)' Admissions of injury at a rural hospital in Ghana: Implications for prevention in the developing world' *American Journal of Public Health* Vol 85, 7 pp 927-931.

Mock, C.N., Gloyd, S., Adjei, S., Acheampong, F., and Oscar, G. (2003) ' Economic consequences of injury and resulting family coping strategies in Ghana' *Accident Analysis and Prevention* 35, 81-90.

Mukoro, A.V.(1986) " Road Transport Accident in Kaduna state 1975-1985: Interpretation and Analysis" Nigerian Cities" In Asalor J. O.; Onibere, E. A. and G.O Ovuworie (ed) (1986). Paper resented at 1st International Conference on *Road traffic Accidents in Developing Countries*. Ikeja, Lagos: Joja Educational Research and Publishers. pp 177-186.

Murray, C., and A. Lopez (1996) The global burden of disease. Volume 1. Cambridge, MA: Harvard University Press.

Naddumba, E.K. (2004) A cross sectional retrospective study of boda boda injuries at Mulago Hospital in Kampala, Uganda. *East and Central African Journal of Surgery*, 9, 44-47.

National Population Commission (NPC) (2006) 2006 Provisional National Census. NPC: Abuja.

Okeniyi, J.A., Oluwadiya, K.S., Ogunlesi, T.A., Oyedeji, O.A., Oyelami, O.A., Oyedeji, G.A. and Oginni, L.M. (2005) 'Motorcycle injury: an emerging menace to child health in Nigeria' *The Internet Journal of Pediatrics and Neonatology* 5 (1).

Peden, M., Scurfield, R., Sleet, D., Hyder, A.A. *et al* (2004) *World Report on Road Traffic Injury Prevention.* Geneva: WHO.

Rice, D.P., and E.J. Mackenzie (1989) 'Costs on injury in the United States: A Report to congress, Institute for Health and aging, University of California and Injury Prevention Centre: The Johns Hopkins University, San Francisco.

Solagberu, B.A., Ofoegbu, C.K.P., Nasir, A.A., Ogundipe, O.K., Adekanye, A.O. and Abdur- Rahman, L.O. (2006) Motorcycle injuries in a developing country and the vulnerability of riders, passengers, and pedestrians. *Injury Prevention* 12, 266-268.

Sauerborn, R., Adams, A., and Hien, M. (1996) Household strategies to cope with the economic costs of illness' *Social Science Medicine*, 43, 291-301.

South Africa Road Accident Fund (SARAF) (2009).(www.raf.co.za/index.htm, accessed February 5, 2011).

Tanimowo, N.B. (2002): Transport Development In Oyo Region, *A Monograph*, Urban and Regional Planning Department, Lautech, Ogbomosho, Nigeria.

Tanimowo, N.B. (2005): Traffic and Transportation in Oyo: A medium sized Nigerian City, *A monograph*, Urban and Regional Planning Department, LAUTECH, Ogbomosho, Nigeria.

Zwi, A (1993) ' The public health burden of injury in developing countries' Tropical Diseases Bulletin 90, R5-R45.