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Estimating occupational risks associated with roadside automobile vulcanizing trade in a part of southwestern Nigeria

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Abstract

This study investigated occupational risks associated with roadside vulcanizers in Ife Central Local Government Area, Southwestern Nigeria. The objectives of the study included the determination of spatial distribution pattern of vulcanizers, examination of location factors as well as the assessment of risks that vulcanizers were exposed to. High resolution imagery (IKONOS) was downloaded and roads of interest were extracted from the imagery to produce a map of the distribution of vulcanizers. Nearest Neighbour Analysis was carried out to determine the spatial pattern of distribution of vulcanizers in the study are. Factor analysis was carried out to extract most manageable factors of location choice, other descriptive statistics were conducted to determine risks factors that vulcanizers were exposed to in the study area. Results revealed that vulcanizers were distributed in a dispersed pattern in the study area given the Nearest Neighbour Index (NNI) of 3.489. Also, proximity to traffic, distance from home, nearness to motor park, low competition, high traffic volume and opportunity for shelter were extracted factors which contributed a total of 61.314% of variance explained by the variables. However, traffic noise, exposure to weather condition and dust and smoke formed the major risks that vulcanizers were exposed to in the study area. The study concluded that most roadside vulcanizers were exposed to risks and actions be taken to relocate them from roadside to reduce mortality that may arise from unsafe trade location.

1. INTRODUCTION

Researchers across the globe have established the significance of workplace accidents as issues that require great attention from various stakeholders including but not limited to health practitioners, labour organizations both at regional and global scale, employers and workers themselves. This is because, about 2.7 million work-related accidents are being reported annually across the world International Labour Organization (ILO) (2011, 2014). These accidents which account for an approximate 9% of the global burden of mortality have far reaching socio-economic and health implications on millions of families and on global gross domestic product (Mahmood & Gill, 2014; ILO, 2014). Africa, in particular, has been described as beleaguered with unsafe working conditions in industries such as mining, construction, manufacturing and even service and also in the management of children labour, employment, informal economy (Alli, 2008).

Studies have shown that most workplace accidents are caused by unsafe activities and working conditions (Muchemedzi & Charmba, 2006). Also, various studies describing the distribution of injuries, in terms of person, place and workplace characteristics have been carried out (Armell et al. 2002; Biddle & Marsh 2002; Salminn, 2005; Parker et al., 2014). Researches have mostly focused on general industries that cover from manufacturing to construction to public organizations with fewer studies on workplace safety in informal sector, which has been reported

as playing an important role in world economic system especially in terms of global employment (Saleem & Nisa, 2014). For instance, ILO's report shows that Africa has about 85.8 per cent of employment in the informal sector. The proportion is 68.2 per cent in Asia and the Pacific, 68.6 per cent in the Arab States, 40 per cent in the Americas, and just over 25 per cent in Europe and Central Asia (ILO, 2016). Some studies carried out on workplace accident or injuries have been done in manufacturing industries (Brisson et al., 1989; Kaminski, 2001), ports (Hooydonk, 2013), mining (Demba et al., 2013), fishing (Rapisarda et al. 2004) sawmill and forestry (Bode, Giwa, & Oke, 2001; Caruso et al., 2006; Folkard & Lombardi, 2006) industries and some small and medium scale industries across the globe. Most of these studies have highlighted the nature and extent of occupational injuries, extent or degree of exposure, and lack or presence of regulations put in place across various occupational climes. Also, most of these studies have come up with prevention as the most cost effective strategy to decrease disability and the high death toll in the workplace. Despite the burgeoning problem associated with workplace and various efforts at producing scholarly appreciation of such phenomena, few known studies in the country of study area have focused on different groups of automobile technicians (mechanics, welders and painters) (Jinadu, 1982, 1990) and groups engaging in other occupation entirely such as paint industry, stone crushing industry (Awodele, et al, 2014; Aliyu, 2006) no such study has been carried out on occupational risks associated with roadside vulcanizers in the developing countries especially in Nigeria where informal self-employed automobile technicians dominate a sizeable proportion of workforce majority of whom are engaged in jobs classified as hazardous and risky.

It is therefore critical that the risks factor associated with informal trade like vulcanizing are carefully examined. This need becomes all the more necessary when workplace injury-related deaths have been projected to be the second leading cause of death, worldwide, by the year 2020 (Murray & Lopez, 1997). To achieve this, this study set out to assess the spatial distribution of vulcanizers in the study area, examine factors determining the choice of roadside for vulcanizing trade and evaluate risks that roadside vulcanizers are exposed to.

2. METHODS

2.1. Study area

The study area is Ife Central Local Government Area in Ile-Ife, Osun State, Southwest of Nigeria (Figure 1). It is located at latitude 7º 27' 30' N and 7º 30' 0' N of the equator and longitude 4º 32' 0' E and 4º 34' 0' E of the Greenwich Meridian. It is bordered by Ife North Local Government Area in the northwest; Ife South Local Government Area in the South; Ife East Local Government Area on the east.

Over the years, Ife Central Local Government has been an important educational center in Nigeria especially with the visible presence of Obafemi Awolowo University, Ile-Ife and Obafemi Awolowo University Teaching Hospital (OAUTH). In addition to these are private institutions of learning. The significance of these institutions is found in their employment generation capabilities which has drawn population to their town of situation. Though there are different modes of mobility in the study area, private ownership of cars is predominant.

Basically, roadside automobile technicians in Ife Central and by extension in most part of Nigeria exist as informal groups found either directly along the roadside or in a garage. The group though usually found together is usually made up of individuals with differing specialization belonging to one form of informal association or the other. Majority of vehicle owners and other patrons of their services patronize them because there are few authorized corporate automobile care service providers who mostly located in major cities and state capitals in the country; their services are on-the-go service and seem affordable and not bureaucratic. They are mostly manual in approach because of their little informal training. In most cases, they use obsolete equipment which make their work laborious and time taking. They are not controlled by any governmental arrangement and their choice of locations is mostly determined by their discretion and payment of some royalties in some cases to the site owner(s).

Increasing relevance of roadside automobile technicians is a fallout of increasing urbanization, increasing level of motorization in the society and government disinterest in enforcing formal organization of some informal activities in the study area.

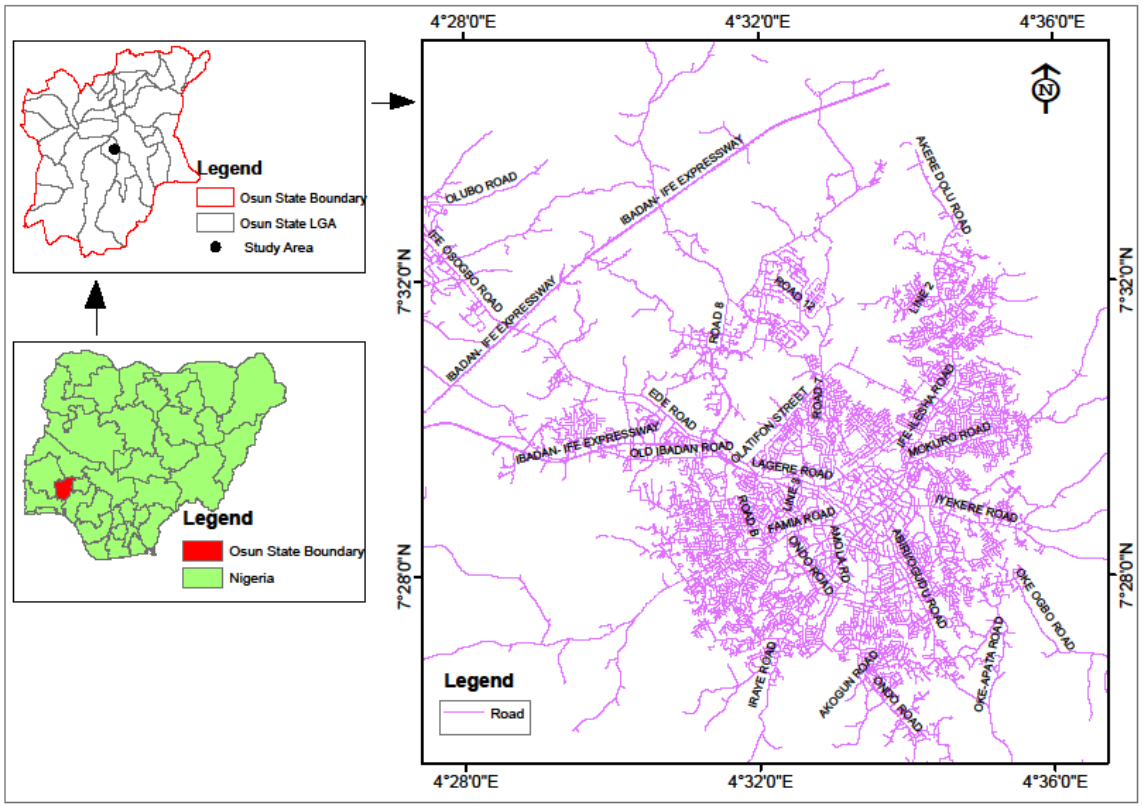

Figure 1. Study area

2.2. Data sources and analysis

Primary and secondary data were used for this study. First, global positioning points of vulcanizers were taken from five major roads in the study area using GPS. The selection of these major roads was based on the busyness of the roads, which form the basis of attraction for locating vulcanizers business along the roads. In all, 113 points were captured, forming the entire sample frame. The significance of point capturing was to determine the spatial location of vulcanizers in the study area. Secondly, 111 questionnaires were distributed to roadside vulcanizers found at their trade posts during the administration exercise. The questionnaire was divided into two sections. The first section contained information on the social-economic characteristics of the technicians. The significance of this section was that the social and economic conditions of an individual are determinants of their level of exposure and vulnerability to some risks (Zakour, 2010; Kaniasty & Norris, 2009). Second section included questions on the respondents' choice of their trade location(s), factors influencing the choice of their locations, their rate and frequency of patronage, their awareness of the dangers of locating their trade by the roadside, whether or not they have experienced any danger in the course of their service, their willingness to relocate away from the location and some other questions addressing their vulnerability. It must be stated clearly that the questionnaire did not undergo rigorous validity test, but we conducted preliminary survey and face validity test for vulcanizers who were completely off the study location and those within the study location to established the genuineness of the questions contained in the questionnaire. The gap between when the time preliminary survey and main questionnaire administration were carried was 13 days.

For secondary data, IKONOS (2014) imagery of the study area was downloaded from Google Earth. Road networks of the study area were extracted, vectorized in ArcGIS 10.4. The essence of this was to create a map showing the distribution of vulcanizers in the study area.

Nearest Neighbour Analysis was performed to determine the spatial pattern of distribution of vulcanizers in the study area. Factor Analysis was carried out using Maximum Likelihood extraction method and the Varimax with Kaiser Normalization approach as factor rotation method. Dedobbeleer and Beland (1991) applied factorial analysis to study safety climate at the construction site. The purpose of factor analysis was to explore factors influencing respondents' decision in their choice of location of their business and to reduce many individual items into a

fewer number of dimensions. Descriptive statistics such as frequency tables and graphs were used to present some of the risks that roadside vulcanizers are exposed to. Also, One-sample Non-parametric test (at α = 0.05) was conducted in Statistical Package for Social Sciences (SPSS) version 20 to determine the level of significance of risk factors that vulcanizers are exposed to.

3. Results

3.1. Distribution patterns of vulcanizers in the study area

Nearest Neighbour Index (NNI) was conducted using geostatistics to determine spatial distribution pattern of vulcanizers in the study area. NNI was calculated based on the average distance from each vulcanizer to its nearest neighbour as given below:

The Nearest Neighbour Index is given as:

$$\mathbf{NNI} = \frac{\boldsymbol{Dobs}}{\mathbf{Dexp}} \quad \text{(Equation 1)}$$

D*obs* is the observed mean distance between each feature and its nearest neighbor. This is given as:

$$\mathbf{D}\boldsymbol{obs} = \frac{\sum_{i=1}^{n} \boldsymbol{di}}{\mathbf{N}} \quad \text{(Equation 2)}$$

and D*exp* is the expected mean distance for the features given in a random pattern. Expected mean distance is expressed as:

$$\mathbf{D}\boldsymbol{exp} = \frac{\mathbf{0.5}}{\sqrt{\mathbf{n/A}}} \quad \text{(Equation 3)}$$

If the ratio is less than 1, the pattern exhibits clustering; if the index is greater than 1, the trend is toward dispersion or competition. The analysis returned five values as shown in Table 1. The result of the nearest neighbour analysis revealed a NNI of 3.498 indicating that spatial distribution of vulcanizers in the study area is dispersed and takes a competitive dimension. In other words, location of vulcanizing business is not due to chance but one that takes on uniform pattern between each other (Figure 2). In addition, Figure 3 shows a representation of the distribution patterns of vulcanizers in the study area. This patterns tend to be linear, and especially along the selected roads in the study area.

Table 1. Average nearest neighbour summary

Parameter	Value (m)
Observed Mean Distance	17887.0882
Expected Mean Distance	5113.2181
Nearest Neighbor Index	3.498206
Z-score	32.060133
p-value	0.000000

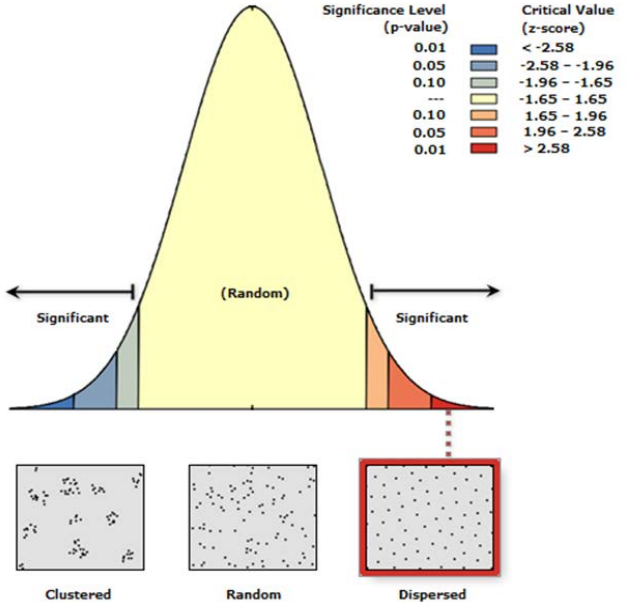

Figure 2. Nearest neighbor curve

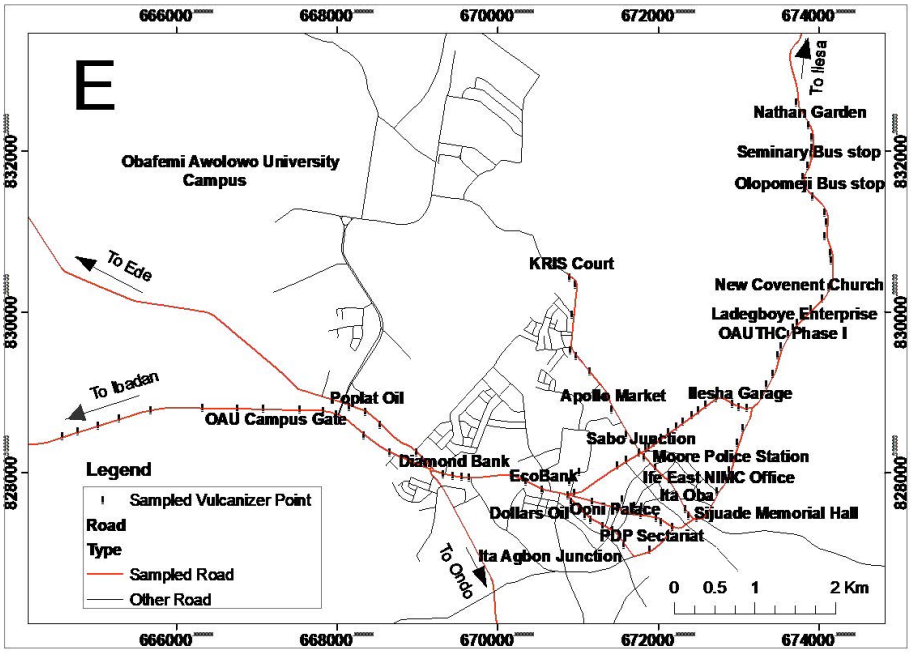

Figure 3. Distribution patterns of vulcanizers in the study area.

3.2. Factors determining the choice of vulcanizing trade location by the roadside

Factor analysis was used as a data reduction method in this study to reduce 14 variables selected as factors determining the choice of roadside by vulcanizers to more manageable underlying factors. The maximum likelihood extraction method was used to extract the most manageable variables while the varimax rotation method was chosen based on the assumption of factors independence. Table 2 provided valuable information concerning factors necessary to adequately describe the factors influencing vulcanizers decision regarding location choice. Going by the "rule of thumb" of retaining factors with eigenvalues greater than one, six factors were extracted. These included proximity to traffic (1.973), distance from home (1.561), nearness to motor park (1.511), low competition (1.363), high traffic volume (1.145) and opportunity for shelter

(1.031). Percentage of variance explained were given for proximity to traffic (14.090%), distance from home (11.148%), nearness to motor park (10.796%), Low competition (9.736%), High traffic volume (8.177%) and opportunity for shelter (7.367%). However, rotation sums of square loadings gave an optimized factor structure in a way that equalized the relative importance of the extracted factors. In this regard, proximity to traffic has a variance of 8.217%, distance from home (8.170%), nearness to motor park (8.039%), low competition (7.732%), high traffic volume (5.692%) and opportunity for shelter (4.438%).

Table 2. Variance explained by each component

Factor	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
Proximity to traffic	1.973	14.090	14.090	1.150	8.217	8.217
Distance from home	1.561	11.148	25.238	1.144	8.170	16.386
Nearness to motor park	1.511	10.796	36.034	1.125	8.039	24.425
Low competition	1.363	9.736	45.770	1.083	7.732	32.158
High traffic volume	1.145	8.177	53.947	.797	5.692	37.849
Opportunity for shelter	1.031	7.367	61.314	.621	4.438	42.288
Very good open space	.978	6.988	68.302			
No other location	.881	6.291	74.594			
Nearness to materials	.768	5.483	80.076			
Personal preference	.692	4.944	85.021			
Nearness to other technicians	.666	4.754	89.775			
Presence of filling station	.571	4.078	93.853			
Nearness to city centre	.469	3.349	97.201			
Others	.392	2.799	100.000			

Extraction Method: Maximum Likelihood.
Rotation Method: varimax with Kaizer Normalization

3.3. Socioeconomic characteristics of respondents

This section provides information on sociodemographic characteristics of vulcanizers, From the questionnaire distributed to 111 out of 113 vulcanizers in all the major roads in the study area, results of the analysis revealed that majority of the vulcanizers sampled were between 31 and 50 years old. Also, educational attainment for the majority of the vulcanizers was not beyond secondary education. Further, more than half of the vulcanizers have spent at least 10 years on this profession. However, in terms of average income per day, very few of the sampled vulcanizers earned above ₦4000 per day, with most of them being patronized by motorcyclists more than any other type of patrons in the study area (Table 3).

Table 3. Sociodemographic characteristics of respondents

Variable		Frequency	% Frequency
Age:	18-30	4	3.6
	31-40	37	33.3
	41-50	51	46.0
	>50	19	17.1
Education:			
	Primary	28	25.2
	Secondary	67	60.4
	Post-secondary	01	0.9
	No formal education	15	13.5
Number of years:			
in business	1-5	23	20.7
	6-10	19	17.1
	11-15	38	34.2
	16-20	9	8.0
	>20	22	20.0
Average income:			
	0-1999	31	27.9
	2000-3999	64	57.7
	4000-5999	16	14.4
Major patrons:			
	Motorcyclists	99	89.2
	Private car owners	61	55.0
	Commercial bus drivers	60	54.1
	Trucks and other heavy vehicles	16	14.4

3.4. Responses on location information and risk exposure

This section provides information on factors of location choice, knowledge of risks associated with such location, the experience of collision and other risks that roadside vulcanizers are exposed to in the study area. Results revealed that multiple flow/high traffic volume was the most important driving factor of location choice among vulcanizers, the majority of who located by the roadside. In terms of knowledge of risks associated with the location of their business by the roadside, 50 (45%) accepted they were aware of the associated danger while 61(55.0%) said they were not aware. Further analysis using Pearson Chi-square method at $\alpha = 0.05$, with a $\chi 2$ value of 3.800 and *p*-value of 0.284 revealed that no significant association between level of education and knowledge of location risks. In spite of the risks associated with the location, some vulcanizers would not leave the location for fear of losing customers, the difficulty of relocation, as well as increasing distance from home. Because of location by the roadside, some of the vulcanizers have experienced collision at one time or the other. Such collision was due to drivers' recklessness, impatience on the part of drivers, over speeding, wrong overtaking by drivers, carelessness on the part of vulcanizers. In spite of the dangerous location and attendant risks associated with vulcanizing trade, the majority of the vulcanizers would not use any means to protect themselves while attending to customers. Personal interaction with those that claimed to protect themselves revealed that most of them only rolled tyres on one side of the road to provide obstructive stoppage for any coming vehicle or motorcycle—an act that has the tendency to heighten collision risk around the vulcanizers' trade location. However, further analysis revealed no association between level of education and use of protective guard by vulcanizers ($\chi^2 = 2.631$; p-value of 0.452 at $\alpha = 0.05$).

Apart from collision risk that vulcanizers were exposed to, other risks exposed to were reported in their order of experience (Table 4). Further analysis using the nonparametric one-sample test at significance level ($\alpha = 0.05$) revealed factors such as traffic noise, noise from pumping machine, a tyre burst, exposure to weather condition and robbery attack as significant risk exposed to.

However, responses on relocation revealed that some of these vulcanizers had been warned of relocation from the roadside especially in government's preparation for road reconstruction and expansion but were undaunted by the warnings especially seeing that government on its part was not prepared and for the thought of not getting more lucrative location than their present locations (Table 4).

Table 4. Location information

Variable		Frequency	% Frequency	Sig. at (α= 0.05)
Choice of location:				
	Proximity to traffic	70	63.1	
	Distance from home	16	14.4	
	Nearness to motor park	10	9.0	
	Low competition	17	15.3	
	Multiple flow/high traffic volume			
	Opportunity for shelter	80	72.1	
	Good open space	13	11.7	
	No other location	51	45.9	
	Nearness to source of materials	05	4.5	
	Personal preference	06	5.4	
	Nearness to other technicians	39	35.1	
	Presence of filling station	13	11.7	
	Nearness to city centre	17	15.3	
	Others	36	32.4	
		04	3.6	
Knowledge of location risk:	Yes			
	No	50	45.0	
Experience of collision at site:		61	55.0	
	Yes			
Protective guard:	No	35	31.5	
		76	68.5	
	Yes			
Number of times of collision:	No	44	39.6	
		67	60.4	
	Once			
Severity of collision:	Twice	19	54.29	
	More than twice	7	20.00	
		9	25.71	
	Very severe			
Members collision:	Mild	4	11.43	
	Not severe	12	34.28	
		19	34.29	
Risks other than collision:	Yes			
	No	78	70.3	
		33	29.7	
	Traffic noise			
	Dust and smoke	98	88.3	.001*
	Noise from pump	64	57.7	.129
	Tyre burst	34	30.6	.001*
	Expose to weather conditions	32	28.8	.001*
	Robbery attack	92	82.9	.001*
		15	13.5	.001*

* Significant at α= 0.05

4. Discussion

This study was carried out to assess the vulnerability of roadside vulcanizers to location-based risks. The objectives were to the examined spatial distribution pattern of vulcanizers in the study area, evaluate factors of location decision as well as to assess risks that roadside vulcanizers are exposed to. 113 vulcanizes were found along the major roads of the study area out of which 111 were interacted with through questionnaire administration and personal observation.

Generally, the location of vulcanizing trade along the road in the study area may not be a global standard for the location of such small scale business type, but it still follows the economic argument that geography, especially of site and location as well as accessibility is considered a decisive factor in different fields of business performance. This is more emphasized by Weber (1929) who hypothesized that geography impacted on the business result when located close to other economic agents and with ease of access to external resources.

Results of the analyses revealed that the majority of the vulcanizers did not have formal education beyond the secondary school level. Though no question was asked whether those that had secondary education actually finished through or dropped out, this is alluding to findings that concentration of high population in informal services is from the group with low level of education and other special formal skills (Taha, 2000; Chattopadhyay, 2005). In terms of choice

of location of their business by the roadside, multiple flows of traffic and proximity to traffic dominated factors of consideration in the choice selection, it was clear that all other factors though with insignificant preference still have to bear with the knowledge of the environment where respondents were residing. Thus, there varied responses about the choice of location were premised on the relationship between individual vulcanizers and location points. This finding was in line with those findings that have highlighted the importance of individual's multi-faceted relationships with the community where their businesses are located (Reynolds & White, 1997; Jack & Anderson, 2002) and with those studies which emphasized the need of business services to be geographically close to their clients for necessary transaction to take place (Aslesen & Jakobsen, 2007; Duranton & Puga, 2005).

Further, findings on the average income of a vulcanizer in the study area which revealed high average gross income of between ₦2000 and ₦3000 was in consonance with part of the definition of any informal sector business which is described among other things, as, having a generally poor working condition; low productivity; use of production methods that are often harmful to the environment and unstable remuneration (Baron, 2005; Cuevas et al. 2009) and studies which have demonstrated that informal employment is generally associated with lower wages than formal employment (Angel-Urdinola & Tanabe, 2012; Bargain & Kwenda, 2011).

In terms of danger exposed to, findings revealed that 31.5% of vulcanizers have experienced collision at one time or the other. Apart from the collision, other risks exposed to included traffic noise (88.3%), exposure to unfair weather (82.9%), dust and smoke (57.7%), noise from the pump (30.6%), occasional tyre burst (28.8%), and robbery attack (13.5%). All these risk factors agreed to some general findings that informal business owners are exposed to some unpleasant working conditions. For instance, the emergence of dust and smoke as one of the prominent risks exposed to by vulcanizers is in consonance with findings that situate dust, smoke, vapour and fumes among common hazards that small-scale workers are exposed to especially in countries like Nigeria where regulation of emission control from vehicles and industries are lacking (Ahmad et al., 2016; Ali, et al., 2016; Akintunde, 2016). Again, exposure to traffic noise and noise from the pump, which though may not be considered as debilitating because of lack of health data, is in consonance with studies such as (Taheri, 2006; and Koehncke et al., 2003) who observed environmental noise as a risk factor in other workplace other than the vulcanizing trade. Whereas, 45% have the understanding that location of their trade is dangerous but their resolute to remain at these dangerous locations, though may contradict concept of sustainable livelihood, emphasized findings that social and economic threats to daily needs especially food security, are always more pressing than threats from rare seasonal hazards (Chambers & Conway, 1991).

However, in terms of the use of personal protective equipment or measure which is considered as helpful in reducing the risk that exposure to a hazard will injure the person, or the severity of an injury if one does occur. Although the hazard still exists, the potential for injury seems to be mitigated by the use of PPE. The result of the findings which showed that 39.6% claimed to be protecting themselves but with further personal chat, only said to be using the tyre to guard themselves when inflating tyres on the roadside. This gave attribution to the previous finding by Kamal et al. (2016) who reported that workers in small-scale industries such as welding, auto repair, and body paint workshops, work in unhygienic conditions, are daily exposed to fuels and chemicals, and rarely use PPEs and other protective measures that can minimize health risks. Also, the association between level of education and use of protective measure revealed that low-level education is a contributory factor to non-use of protective equipment among vulcanizers in the study area. This finding supported previous findings that finding that low education level may contribute to non-use personal protective measures among small scale business workers, as they do not know, recognize and appreciate the significance of personal protective equipment (Ahmad et al., 2017; Kumar et al., 2013; Abraham et al., 2015; Taha 2000).

5. CONCLUSION

This study was the first of its kind in the assessment of occupational risks that roadside vulcanizers were exposed to in Ife Central Local Government Area and by extension, in entire Nigeria. This study uniquely contributed to issues on occupational risk, injuries and accidents which have majorly been skewed towards the organized sector and informal sector other than

self-employed informal vulcanizers with peculiar location characteristics. The study observed dispersed spatial distribution pattern of vulcanizers also highlighted factors influencing their choice of location to include among others, proximity to traffic, multiple and high volume traffic, good open space, personal preference and nearness to the city centre as major determinants of choice of locations. However, the study revealed that nearly half of the sampled vulcanizers had the knowledge of the danger associated with their location while more than one-third had experienced collision at one time or the other. Other risks exposed to included traffic noise, dust, and smoke, noise from the pump, a tyre burst, exposure to weather conditions and robbery attack. The study recommended that roadside vulcanizers should be relocated from the roadside to reduce potential mortality from road collision and must be trained on the need to adopt protective equipment as a way of reducing the severity of injuries when at risk of sustaining any.

However, the study has a limitation of data which could have provided information on known previous risks or death cases among roadside vulcanizers. This would have provided a basis upon which this study would stand. Nevertheless, further studies can be carried out to expand on health challenges of roadside vulcanizing trade and possibly map out site suitability analysis for the relocation of their trade.

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Appendix 1
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Questionnaire

This questionnaire is designed to elicit information on the occupation risks of roadside vulcanizers in Ife Central Local Government Area, Ile-Ife, Osun State. It is simply for research purpose. Therefore, every information provided will be treated with utmost secrecy. Thank you.

A. Personal/General information

1. Age: (i) 18-30 ( ) (ii) 31-40 ( ) (iii) 41-50 ( ) (iv) >50 ( )
2. Your level of education: (i) Primary ( ) (ii) Secondary ( ) (iii) Post secondary ( ) (iv) No education ( )
3. Years on the business: (i) 1-5 ( ) (ii) 6-10 ( ) (iii) 11-15 ( ) (iv) 16-20 ( ) (v) > 20 ( )
4. Years on the present location: (i) 1-5 ( ) (ii) 6-10 ( ) (iii) 11-15 ( ) (iv) 16-20 ( ) (v) > 20 ( )
5. Were you located elsewhere before? (i) Yes ( ) (ii) No ( )
6. If yes (in 4), where? (i) within Ife ( ) (ii) Outside Ife ( )
7. If yes (in 4), why did you relocate to this point? _____
_____
8. What informed your choice of this location? *Respondents can give more than one reason.* (i) Proximity to traffic ( ) (ii) Distance from home ( ) (iii) Nearness to motor park ( ) (iv) Low competition ( ) (v) Multiple flow/high traffic volume ( ) (vi) Opportunity for shelter ( ) (vii) Very good open space ( ) (viii) No other location ( ) (ix) Nearness to source of materials ( ) (x) Personal preference ( ) (xi) Nearness to other technicians ( ) (xii) presence of filling station ( ) (xiii) Nearness to city centre ( ) (xiv) Other reasons_____
9. Who constitute your major patrons? (i) Motorcyclists ( ) (ii) Private car owners ( ) (iii) Commercial bus drivers ( ) (iv) Truck drivers and others ( )
10. What is your average income per day in Naira? (i) 0-1999 ( ) (ii) 2000-3999 ( ) (iii) 4000-5999 ( ) (iv) 6000-Above ( )

B. Location information and risks experience

11. Do you know that your site of business is dangerous? (i) Yes ( ) (ii) No ( )
12. If yes (in 11), why are you still located there? (i) No place to go ( ) (ii) Fear of loss of customers ( ) (iii) The site is strategic ( ) (iv) Because of distance from home ( ) (v) Other reason _____
13. Have you experienced any collision where you are located? (i) Yes ( ) (ii) No ( )
14. If yes (in 13), what caused it? _____
_____

15. How severe was the collision? (i) Very severe ( ) (ii) Mild ( ) (iii) Not severe ( )
16. Do you think it could have been avoided if you were not located close to the road? (i) Yes ( ) (ii) No ( )
17. Do you guard yourself with anything when you attend to your clients especially on the road? (i) No ( )
18. How many times have you experienced collision here at your location? (i) once ( ) (ii) Twice ( ) (iii) More than two times ( )
19. Have you heard of any of your members who experienced any collision at his location? (i) yes ( ) (ii) No ( )
20. If yes (in 19), what is the nature of the collision?_____
21. If yes (in 19), How severe was the collision? (i) Very severe ( ) (ii) Mild ( ) (iii) Not severe ( )
22. Has there been any record of death of your member as a result of any collision on the road side? (i) Yes ( ) (ii) No ( ) (iii) I can't say ( )
23. Do you feel safe anytime you are attending to your client especially when it involves being on the road? (i) Yes ( ) (ii) No ( )
24. Have you almost been hit by any vehicle or Motorcycle before? (i) Yes ( ) (ii) No ( )
25. If you have opportunity elsewhere that is not by the road side, will you go for it? (i) Yes ( ) (ii) No ( )
26. If no (in 25), why? *Respondents can give multiple reasons*_____

_____

27. Can you tell us some other road dangers that you are exposed to apart from collision?

_____
_____

28. Has government warned you to relocate from roadside at any time before? (i) Yes ( ) (ii) No ( )
29. If yes (in 28), why are you not complying? Respondents can give multiple responses.

_____
_____