

PERCEPTION OF HEALTH RISKS OF PEOPLE LIVING IN CLOSE PROXIMITY TO INFECTIOUS DISEASE CENTRES AND THEIR WILLINGNESS TO RELOCATE

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Abstract

People in residential and commercial structures have encroached too closely to infectious disease treatment centres over time. This may pose great risks. This study investigated the knowledge and perception of health risks of people who live and work in close proximity to infectious disease treatment centres, using Ebola isolation centre as a case study. Survey instruments were administered to 285 participants through purposive and convenient sampling. Male, 133 (46.7%) and female, 152 (53.3%) participants from 18 years to 70 years responded to the survey. Perception of health risks increased with knowledge and did not significantly differ due to educational attainment of participants. Respondents living closest to the Ebola isolation centre expressed higher willingness to relocate than those living in locations farther from the Ebola centre ($X^2 (2, N = 285) = 7.50, p < .01$). Caution is required when constructing isolation centres near residential and workplaces with uninfected people.

Introduction

A relationship exists between medical facilities, residential and commercial structures. Classification exists in medical literature for the zoning and location of hospital types. Thus, medical facilities could be classified based on the types of treatment required. For instance, according to the Information Report No. 50 credited to American Society of Planning Officials (1953), medical conditions and treatments involving the alcoholic, narcotic, insane, feeble-minded or contagious disease patients require a different zoning and location from

a general class of hospital structure. This raises the argument that some diseases may be too harmful to other patients or to the community close to infectious disease patients.

Wallace (1929) and American Society of Planning Officials (1953) discussed the treatment of infectious diseases either in a general hospital with other patients or in isolated locations. The argument at that time was premised on the possibility of harm to surrounding patients in the hospitals or to people living in nearby communities. While some authorities believed it would cause

harm to other patients or surrounding communities if infectious disease patients are treated in general hospitals, others, and outcome of court cases thought it posed no health risk to surrounding people (American Society of Planning Officials (1953). Thus, the argument is inconclusive. This study, which was conceived prior to the coronavirus pandemic, investigated the communities' health risks near an ebola isolation centre, and sought to identify the probability of their relocation based on their perception. This will enable the development of informed policy decisions for locating isolation centres for infectious diseases generally.

Through urbanization over the years, human activities have encroached too closely to infectious disease facilities. Several studies have examined the knowledge and perception of health risks of healthcare workers in infectious disease facilities (Subramanian, Arip, Saraswathy, Subramanian, 2017; Ilesanmi, & Alele 2014; Yassi, Zungu, Spiegel, Kistnasamy, Lockhart, Jones et al., 2016; Suwantararat, & Apsamthanarak, 2015; Illiyasu, Ogoina, Otu, Dayyab, Ebenso, Otokpa, et al. (2015). Additionally, Ilesanmi & Alele (2016) and Illiyasu, Ogoina, Otu, et al. (2015) investigated the knowledge, attitude and

perception of the Ebola disease of participants who were not residing near an Ebola treatment centre.

However, none so far have investigated the health risk of people who live and work in close proximity to these facilities. For instance, a Biosafety, Biobank and Biocontainment laboratory level 3 is situated inside the Infectious Disease Hospital (IDH) in Abule Ijesha in Yaba, Lagos, a location that equally houses residential buildings in its vicinities. The location of this laboratory may compound the initial fear of the health risks the inhabitants of the Abule Ijesha environs may be exposed to by being in close proximity to the pathogen centre.

A WHO (2018) report stated that people's perception of risk can be affected by their beliefs, culture, education, political viewpoints, social norms and prior experiences. This suggests that people have perceptions influenced by different factors that may be peculiar to their environment or experiences. For instance, perception of health risks of people uninfected by pathogenic microorganisms may be influenced by their knowledge of the disease, which in turn may influence the decision of such people to relocate or move away from infectious disease elements or patients (Etokidem, Ago, Mgbekem, Etim,

Usotoh, & Isika, 2018), due to its highly infectious nature. Infectious pathogens are caused by pathogenic microorganisms such as bacteria, viruses, parasites or fungi. Infections from these pathogens are a huge cost to society at large.

In epidemiology literature, it is documented that in global health observatory data, around 12.6 million people who were working in an unhealthy environment died in 2012 (WHO, 2017). While experts depend on risk analysis based on biomedical and epidemiological data, affected communities use more subconscious pathways to define risk. Highly infectious pathogens have the potential to cause epidemics, infect, and spread rapidly in a short time, while at the same time constitute a huge cost to society.

In Nigeria however, some existing hospitals were converted to Ebola centres and quarantining facilities that are located in residential and commercial neighbourhoods. Preventing an outbreak involves preparedness such as strengthening health care facilities, training healthcare employees, provision of vaccines and treatment centres (WHO, 2018). Numerous studies have investigated the health risks of health care workers who are constantly being exposed to infectious disease patients

(Subramanian et al., 2017; Yassi et al., 2016; Suwantararat et al., 2015). However, to the best of the knowledge of these current authors, none have examined the health risks or the perception of the people living in the surrounding communities. This is a gap in research. An approach that will tackle epidemics in the 21st century from various angles such as, but not limited to the physical environment should be a welcome development.

Objectives of the study

1. To investigate if knowledge of Ebola Virus Disease (EVD) will influence the perception of ebola isolation centre (EIC) as high health risk due to proximity to the EIC
2. To examine if respondents living closest to the EIC will express a higher willingness to relocate than those living in vicinity outside the Ebola center.
3. To investigate if level of education will influence perception of health risk due to proximity to the EIC

Hypotheses

The arguments above have necessitated that the following hypotheses be tested to ascertain the goals of the objectives are met.

1. Participants with low knowledge of EVD will perceive the EIC as high health risk compared to participants with high knowledge of EVD.
2. Respondents living closest to the EIC will express a higher willingness to relocate than those living in the vicinity outside the Ebola center.
3. There will be a significant influence of level of education on the perception of health risk due to proximity to the EIC

Methodology

The informed consent of the study participants were obtained before administering the survey. The participants were informed of the benefits, potential discomfort, risks involved and assurance of confidentiality while participating in the study. Participation was voluntary. Ethical approval for the study was obtained from the institutional review board (IRB) of the Institute of Medical Research, Yaba. The study was conducted in accordance with the tenets of Helsinki Declaration of 1964 as amended in 2013.

This study was carried out prior to the onset of Corona Virus disease. Hence, the people living in close proximity to Ebola Isolation Centre (EIC) in Abule Ijesha Mainland Local Government Area, Yaba, Lagos State were surveyed. An advocacy visit was made prior to the commencement of the study to the community residents. Abule Ijesha is a home to people of diverse backgrounds from the highly educated to illiterates. There are no markets in Abule Ijesha except road side stores in the communities.

The instrument of data collection was developed by the authors. A 2-factor solution was predicted from the items generated, and these yielded a rotated solution using the Promax rotation method that further clarified the two factors. These are Knowledge of EVD (items 1-9), and Perceived Health Risk of proximity to EIC (item 12-23). Items 10 and 11 were removed for high uniqueness (<.80) (Uniqueness is the variance that is 'unique' to the variable and not shared with other items) and cross loading. Items 1-9 loaded significantly on the knowledge of EVD while items 12-23 (0.62 – 0.737) loaded on the Perceived Health Risk of proximity to EIC. The reliabilities shows that the two sub scale reliabilities were meritorious (knowledge of EVD ($\alpha = .89$); Perceived Health Risk of

proximity to EIC ($\alpha = .90$). An example of the items that measured knowledge of EVD is 'I know how EVD is transmitted. One of the items that measured Perceived Health Risk of proximity to EIC is I will relocate from my neighbourhood at the slightest opportunity due to my proximity to EIC

The study population consists of adult males and females, including youths (in and out of school) living in communities at Yaba, Lagos. Others were community and opinion leaders (trade association leaders, religious leaders) and health policymakers at the State and Local Government levels. A sample size of 450 was projected for this study based on the cross sectional nature of the population. However, 285 valid instruments were utilised for the study.

This study adopted survey research design. The knowledge and perception of health risk of people living in close proximity to EIC was measured with an instrument developed by the authors. The survey period lasted for 23 days including Saturdays for residents that are in close proximity to the Infectious Disease Hospital (IDH).

Consent forms were presented to the participants to ascertain their willingness to participate in the study. Participants confirmed their familiarity and awareness of the EIC. This way, the inclusive criterion of

living or working in close proximity to the EIC was ascertained. Thus, participants who provided evidences to the aforementioned were allowed to participate in the study. Participants were asked to read the items carefully and rate their responses on a 4-point scale ranging from strongly disagree to strongly agree to align with their knowledge and perception toward living in close proximity to the EIC.

Results

Characteristics of participants

A total of 285 completed survey instruments were retrieved from participants who were identified to be living or working in close proximity to the EIC. Based on the analysis of sample characteristics, male participants were 133 (46.7%), and females 152(53.3%), age ranged between 18 and 70 years. 211(74.0%) participants had no children, 19(6.7%) had one child, 43(15.1%) had between two to four children, while 12(4.2%) had from four to ten children. For work proximity, 197 participants (69.1%) work in close proximity to the EIC, while 59 (20.7%) participants live in close proximity to the EIC while the remaining participants live and work in locations of various distances from the EIC on Lagos Mainland and the Island.

Table 1: Summary table of independent sample t-test showing the influence of knowledge of the EVD on perception of health risk due to proximity to the EIC

	knowledge of EVD	N	$\bar{x}$	SD	df	t	Sig.
Perception of health risk due to proximity to the EIC	High Knowledge	158	36.34	7.77	283	1.27	>.05
	Low Knowledge	127	37.58	8.73			

It was observed that participants with low knowledge of EVD ($M = 37.57$, $SD = 8.73$, $n = 127$) perceived the EIC as high health risk compared to participants with high

knowledge of EVD ($M = 36.34$, $SD = 7.77$, $n = 158$). The differences in the perception expressed were not statistically significant.

Table 2: Cross-Tabulation showing the interaction between residency, work location and willingness to relocate decisions

		Decision to relocate			Total
		Low Willingness	Undecided	High Willingness	
Work Location Close to Ebola Centre	Close to Ebola Centre	47(43.1%)	33(30.3%)	29(26.6%)	109 (100.0%)
	Far from Ebola centre	41(33.6%)	54(44.3%)	27(22.1%)	122(100.0%)
	Total	88(38.1%)	87(37.7%)	56(24.2%)	231(100.0%)
Far from Ebola center	Close to Ebola Centre	13(65.0%)	4(20.0%)	3(15.0%)	20(100.0%)
	Far from Ebola center	13(38.2%)	15(44.1%)	6(17.6%)	34(100.0%)
	Total	26(48.1%)	19(35.2%)	9(16.7%)	54(100.0%)

(note: Strongly agree and agree were recoded and collapsed to 3 = High propensity; undecided coded as 2 undecided, while Strongly disagree to disagree was code as 1 - low propensity).

There is a significant difference in the willingness to relocate from the area where EIC was sited based on the location of residency ($X^2 (2, N = 285) = 7.50, p < .01$). Respondents living closest to the EIC expressed higher willingness to relocate than those living in the vicinity outside the Ebola

center. Additionally, when residency and workplace location was analysed jointly, participants who lived and worked in close proximity to the EIC significantly expressed a higher willingness to relocate from their present location compared to those who live and work far.

Table 3: One-way ANOVA showing the effect of level of education on perception to living close to EIC

Source	SS	df	MS	F	Sig.
Between Groups	200.665	3	66.888	.990	.398
Within Groups	18990.963	281	67.583		
Total	19191.628	284			

There was no significant influence of level of education on the perception of health risk due to proximity to the EIC ($F(3,281) = 1.04, p > .05$). The pattern of mean differences is presented showing the perception of living close to EIC. The mean score of perception of living close to EIC was higher for respondents with Diploma education, followed by those with primary education, secondary and first-degree certification. However, these differences were not statistically significant.

Discussion

Our systematic review of the epidemiology literature suggests that to the knowledge of these present authors, no attention has been given to the knowledge and perception of health risks of people living and working in close proximity to EIC in Nigeria. The world is changing rapidly and what used to be the norm may not actually be tenable with a modernized world. The infectious diseases attacking the human race are ferocious and are proving to be dynamic. Preparing for a future outbreak of an

infectious disease that can be controlled and well managed should be critically considered. The need to isolate patients of such infections from residential location may be necessary in order to protect uninfected persons from patients who may possibly escape from isolation centres. The recent detection and spread of coronavirus globally is a call for the investigation of possible health risk to communities near the EIC.

Health care facilities were built many years ago in locations that were not populated by residential areas¹⁹. However, with increased population and urbanization, the locations of these facilities are no longer suitable. According to Ughasoro, Esangbedo, & Udorah (2019), residential and commercial buildings have encroached on the healthcare facilities. Thus, the outcome of this study has contributed to public health literature. This study could not have come at a better time with the current coronavirus pandemic ravaging the entire world.

It was noted that participants who reported a low knowledge of EVD perceived the EIC

as high risk to their health, compared to participants with high knowledge of EVD. This is surprising. However, the outcome of the study of Jonathan, Rolisona, & Yaniv (2015) confirmed our result. One plausible explanation for this result is that a higher percentage of participants in this present study expressed low knowledge of EVD compared to those who expressed a high knowledge. The low knowledge of EVD is not only peculiar to our participants. In Jalloh, Robinson, Coker, et al. (2017), only 15% of 5733 respondents perceived a high risk for acquiring Ebola. On a similar note, respondents reported low knowledge of the health hazards of tobacco Yang J, Hammond D, Driezen P, Fong GT. & Jiang, 2004; Weinstein N, Slovic P, Waters E, & Gibson, 2004). In our study, the high proportion of student- and worker- participants, who are not resident, but work in close proximity to the EIC may explain why the mean differences were not significant. The findings of this study also suggest the reality of the situation with regards to Ebola virus and other similar viruses.

A significant positive correlation between knowledge of EVD and perception of health risk due to proximity to the EIC was observed. This is interesting though because in the earlier result, high knowledge of EVD

did not represent high perception of health risks compared to participants who expressed low knowledge of EVD. But a glance at the levels of the variables in table 2 shows that knowledge was presented at two levels, thus, the positive relationship between the two variables may be due to the combined knowledge of all participants as against segmenting the high and low expression of the knowledge of EVD as indicated in table 2. As indicated in this study earlier, this is the first study on the perception of health risks of people living in close proximity to EIC. There are no similar studies whose results can be compared to the findings in this study, but references could be made to near similar results. Hence, a study by Oladimeji, Gidado, Ngku, Nwangwu, Patil, Oladosu (2015) on public knowledge and perception of Ebola in Lagos may suffice. In that study, the outcome revealed that 41 percent of respondents were reported to have general knowledge on EVD. Additionally, factors associated with residing in an Ebola case district, and being male plus having a secondary (high) school education were associated with satisfactory general knowledge of Ebola.

Additional results suggest that participants who live in close proximity to the EIC will express a significantly higher perception and

willingness to relocate from their present location. This is in agreement with the study where the attitude of nursing students suggested that 24.3% of the study sample reported they would vacate their rooms and never come back if a roommate had contacted the EVD.

Respondents living closer to the isolation centre exhibited better knowledge on the likelihood of infection, and therefore greater risk perception than those farther away. The need to isolate patients of such infections from residential location may be necessary in order to protect uninfected persons. This is not suggesting stigmatization; rather, this suggestion is borne out of the consequences of urbanization that has rendered normal living arrangements unplanned due to population explosion in urban centres. According to Quilliam RS et al. (2020), 30 – 50% of urban centres in developing countries lack proper solid waste management. Thus, the recent evidence confirming coronavirus in the sewer (Eslami H. & Jalili, 2020), and suggesting human faeces as a carrier of the virus in sewages days after treatment, calls for caution in constructing pathogen or isolation centres in close proximity to residents or workplaces.

Conclusion

This study is the first to report on the perception of residents living in close proximity of an isolation Centre in Nigeria. The results of the study brought home the need to consider the current location of some treatment and isolation centres for infectious diseases. These treatment centres are becoming hoodwinked by residential and commercial structures due to high demand for space in the ever increasing population of urban centres. It was also observed that a high percentage of participants would love to relocate from their location. The inability to do this may be financial. Thus, urgent policy formulation and government assistance is needed to make this possible. Perception of health risks increased with knowledge of Ebola virus disease. Perception of health risk did not significantly differ due to educational attainment of participants. Respondents living closest to the Ebola isolation Centre expressed higher willingness to relocate than those living in locations farther from the Ebola isolation centre.

References

- American Society of Planning Officials, (1953). Zone locations for hospitals and other medical facilities. 1953 May. Information Report No. 50.
- Eslami, H. & Jalili, M. (2020). The role of environmental factors to transmission of SARS-CoV-2 (COVID-19). *AMB Expr*; 92. <https://doi.org/10.1186/s13568-020-01028-0>
- Ilesanmi, O., & Alele, F. O. (2014). Knowledge, attitude and perception of EVD among secondary school students in Ondo state, Nigeria. *PLoS Curr* 2016, 8.
- Illiyasu, G., Ogoina, D., Out, A. A., Dayyab, F. M., Ebenso, B., Otokpa, D., et al. (2015). A multi-site knowledge, attitude and practice survey of EVD in Nigeria. *PLoS ONE* 10: e0135955. doi:10.1371/journal.pone.0135955.
- Jalloh, M. F., Robinson, S. J., Coker, J., et al. (2017). Knowledge, attitudes and practices related to EVD at the end of a national epidemic – Guinea. August, 2015, *MMWR Morb Mortal Wkly Rep*, 2017; 66: 1109-1115. [http://dx.doi.org/10.15585/mmwr.mm6641a4external icon](http://dx.doi.org/10.15585/mmwr.mm6641a4external%20icon).
- Jonathan, J., Rolisona, Y., & Yaniv, H. (2015). Knowledge and risk perception of the Ebola virus in the United States. *Preventive Medicine Reports*, 2, 262-4.
- Oladimeji, A. M., Gidado, S., Ngku, P., Nwangwu, I. G., Patil, N. D., Oladosu, F. et al. (2015). EVD, gaps in knowledge and practice among healthcare workers in Lagos. *Trop Med & Int Health*, 20, 1162-1170.
- Quilliam, R. S. et al. (2020). COVID-19: the environmental implications of shedding SARS-CoV-2 in human faeces. *Envir Inter*, 105790.
- Subramanian, G. C, Arip, M., Saraswathy, Subramanian, T, S. (2017). Knowledge and risk perceptions of occupational infections among health workers in Malaysia. *Saf Health Work*, 246-9.
- Suwantarat, N., Apsamtharak, A. (2015). Risk to healthcare workers with emerging diseases: lessons from MERS-CoV, Ebola, SARS, and avian flu. *Current Opinion in Infectious Disease*, 28, 349-61.
- Ughasoro, M. D., Esangbedo, D. O, & Udorah, I. M. (2019). Health-care workers' perspectives on preparedness of health-care outbreak of communicable diseases in Nigeria: A qualitative study. *American Journal of Tropical Medicine and Hygiene*, 100, 1022-8.
- Weinstein, N., Slovic, P., Waters, E., & Gibson, G. (2004). Public understanding of the illnesses caused by cigarette smoking. *Nicotine Tobacco Research*, 6,349-355.
- Wallace, J. (1929). Care of communicable diseases in general hospitals. *American Journal of Public Health*, 20, 722-6.
- WHO. (2018). Managing epidemics: Key facts about major deadly diseases, 2018. Retrieved from <https://www.who.int/emergencies/diseases/managing-epidemics-interactive.pdf>.
- Yassi, A., Zungu, M., Spiegel, J. M., Kistnasamy, B., Lockhart, K., Jones, D. et al. (2016). Protecting health workers from infectious disease transmission: an exploration of a Canadian-South African partnership of partnerships. *Globalization and Health*, 12.