

Full Length Research Paper

Comparative analysis of the effects of annual flooding on the maternal health of women floodplain and non floodplain dwellers in Makurdi urban area, Benue state, Nigeria

Irene D.Mngutyo¹ and Jonathan Ogwuche*²

¹Department of Urban and Regional Planning, Benue State University, Makurdi, Benue State, Nigeria

²Department of Geography, Benue State University, Makurdi, Benue State Nigeria.

Received April 14, 2013

Accepted May 14, 2013

This research seeks to analyze and compare the effects of seasonal flooding on the health of women who dwell in the floodplains against their counterparts in the non-floodplains of Makurdi urban area. Number of live births and frequency and number of times women were treated for diseases within the six months of the rainy season were used as indices of health. Structured questionnaire was administered on 220 women randomly selected (22 each from the 5 floodplains and non-floodplain neighborhoods), with the respondents from the non-floodplain dwellers as the control. Descriptive statistics were used for analysis. Results indicate that 36% of flood plain dwellers were sick enough to visit a hospital at least once, as against 23% of the non-floodplain dwellers during the six months of the rainy season. In the floodplains, 82% have children while in the non-floodplains 91% have, and 27% of pregnancies in the floodplains are not carried to full term as against 23% in the non-floodplains. This research contributes to understanding and managing the differing levels of risk to flooding and for policy and advocacy on women's rights to better health and sanitary environment in the flood plains.

Key words: Flooding, Urban areas, Women, Flood risk mitigation.

INTRODUCTION

The number of people suffering from natural disasters is expected to reach 2 billion people before 2090 (Lancet, 2007). The most common and widespread of these natural disasters is flooding. Floods is one of the major hazards which disrupt the prosperity, safety and amenity of human settlements (Jonkman and Kelman, 2005); and they define flood as a flow of water over areas which are habitually dry. Excess water in and of itself is not a problem; rather, the impacts of flooding are felt when this water interacts with natural and human-made environments in a negative sense, causing damage, death and destruction (Ingirige and Weda, 2011).

Urban areas concentrate people, enterprises, infrastructures and public institutions, and are often located in hazard-prone locations such as low-elevation

coastal zones, which are at risk from sea level rise, or in other areas at risk from flooding and extreme weather events (OECD 2009, WDR 2010, Satterthwaite 2011). For instance, 60 percent of Lusaka residents live in dense, informal and unplanned settlements, thereby making them vulnerable to floods, with drainage channels often blocked by buildings or filled with waste (Kambandu-Nkhoma, No date).

The most lingering and dangerous effects of flood are contamination and destruction to the environment. In urban areas especially in sub-Saharan Africa, this contamination is more intense because the concentration of people coupled with poor waste disposal systems increase contamination levels. Further to this, unsanitary housing environments, characterized by lack of amenities such as water supply and electricity, make the inhabitants of urban areas in sub-Saharan Africa more prone to health hazards associated with floods (WHO, 1996). In 2010, reported flood disasters killed over 8,000 people

*Corresponding Author E-mail: ogwuche.jonathan@yahoo.com

directly, while economic losses rise (Jonkman and Kelman, 2005). However, they observe that two-thirds of direct deaths from floods are caused by drowning and one-third by physical trauma, heart attack, electrocution, carbon monoxide poisoning or fire. Most deaths occur during a flash flooding event as against the slower riverine events (Du *et al*, 2010).

In developing countries, the majority of flood mortality and morbidity are caused by diarrhea and other water-borne diseases, which are primarily caused by lack of pure drinking water, improper storage and handling of drinking water, and poor hygiene practices (Ahern, Kovats, Wilkinson, Few, and Matthias, 2005).

For instance, in 2010, 564 cases of cholera were recorded in Zambia, with 30 deaths in Lusaka (Kambandu-Nkhoma, no date). This had much to do with poor wastewater management and portable water boreholes being inappropriately designed or built.

Women and men's vulnerability to the impact of extreme climate events, like flood, is determined by differences in their social roles and responsibilities. WHO (2012) enumerates the examples of health impacts from flooding to include;

- i. Water-borne diseases caused by exposure to arsenic contaminated groundwater,
- ii. Arsenicosis caused by exposure to arsenic contaminated groundwater, and
- iii. Gynecological problems, complications during pregnancy, and birth defects due to exposure to saline-contaminated water and environmental toxins

Women are usually expected to fulfill their roles and responsibilities as care-givers of their families, even in the face of a daunting disaster as flood. The health of women is most compromised in a poor environment because women interact closely with the environment as they manage homes and so are more exposed to harmful environmental hazards, as maternal health is most sensitive to poor environment (WHO, 2011). Maternal health is defined by the World Health Organization (WHO 2011) as referring to the health of women during pregnancy, childbirth and the postpartum period. Globally, WHO (2005), in its World Health Report, states that poor maternal conditions account for the fourth leading causes of death for women worldwide, after HIV/AIDS, malaria, and tuberculosis. In Nigeria, complications of pregnancy and child-birth are leading causes of death among women of reproductive age. According to the 2008 Nigerian demographic health survey, maternal mortality in the seven years preceding the survey was 545 per 100,000 live births in Nigeria. Although most of the maternal deaths occur in the rural areas, urban populations, particularly in developing countries of sub-Saharan Africa, like Nigeria, still form one of the most deprived groups (World Bank, 1997) cited in Osinubi (2003).

Meteorologists predict heavier rainstorms with the prospects of more flood challenges. The severity and

frequency of these floods is increasing every year with women and children's health mostly at risk from contamination after each flood. Unfortunately, there is a dearth of studies that particularly investigate the impact of floods on the health of women, especially in Benue State. This paper therefore seeks to investigate the effect of flooded conditions on the health of women who live in the floodplains as compared to their counterparts in the non-floodplains of Makurdi urban area, Nigeria. The study is significant in understanding the spatial dimensions of vulnerability to floods so as to ensure that interventions in urban flood management are far reaching, efficient, and effective and provide a framework for gendered health risk assessment.

The study area

Makurdi town is located in the middle belt region of Nigeria. It has a population of 297,398 (National Population Census 2006), with the ratio of males to females being almost 1:1. Makurdi lies between Latitudes 7° 37' and 7° 47' North and Longitudes 8° 27' and 8° 40' East. The River Benue bisects the town into two parts - north and south banks (See Figure 1 and 2). Makurdi, because of her location in the Benue valley and close to River Benue, experience flooding in some parts of the town during the rainy season every year.

Makurdi's climate is hot and humid, with highest temperatures between March and April. Humidity is high all year round. Rainfall occurs between the months of April and October, while average rainfall amount ranges between 1000mm to 1300mm, and spread between 5-7 months. Majority of the neighborhoods that make up Makurdi are in the floodplains, and astride the riparian wetlands that drain Makurdi town. This means that the area is poorly drained, low-lying and susceptible to floods during rainy season. Because of high demand on land for development, the floodplains are heavily and haphazardly developed without regard to development control. Drainage channels are poorly constructed, and in most cases, blocked by refuse dumps, thus making them potential flood hazards.

METHODS

Data needed to carry out this research include demographic as well as information on the health status of the respondents. Health indices used to measure maternal health include number of times admitted into hospital in the months of the rainy season, and number of pregnancies carried to term or lost. Treatment options were considered as an indicator of overall health and well-being. A sample size of 300 women was randomly selected from the ten wards that make up Makurdi urban area, and stratified for this study. The floodplain with five

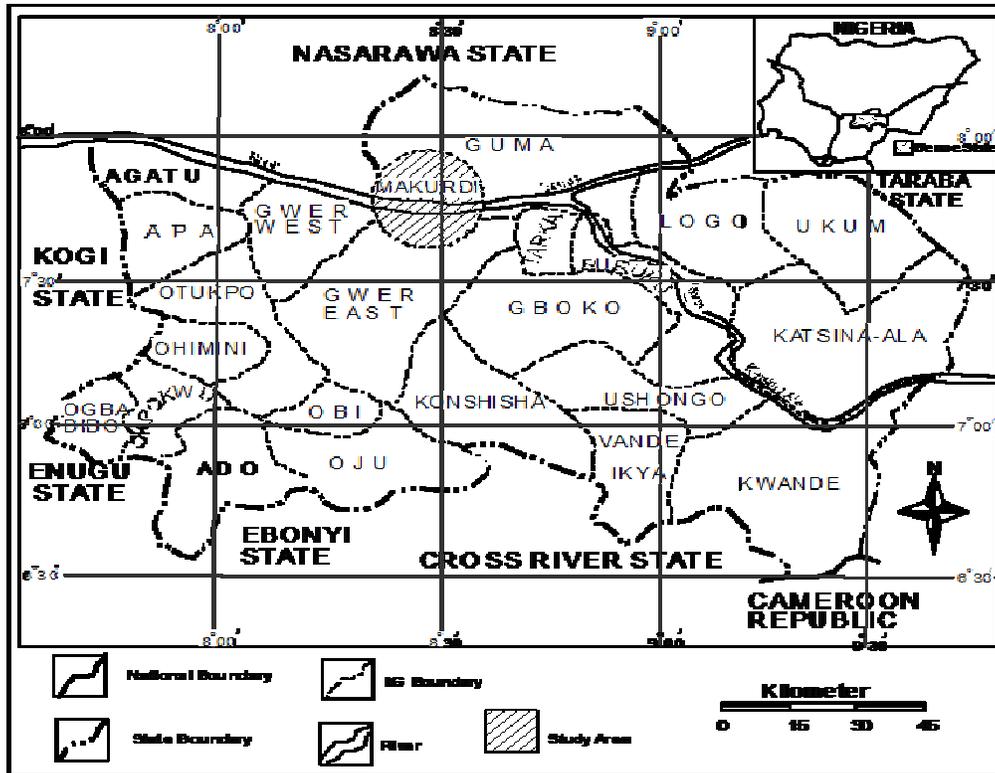


Figure 2: Map of Benue state showing Local Government Area
 Source: Ministry of Lands and survey, Makurdi

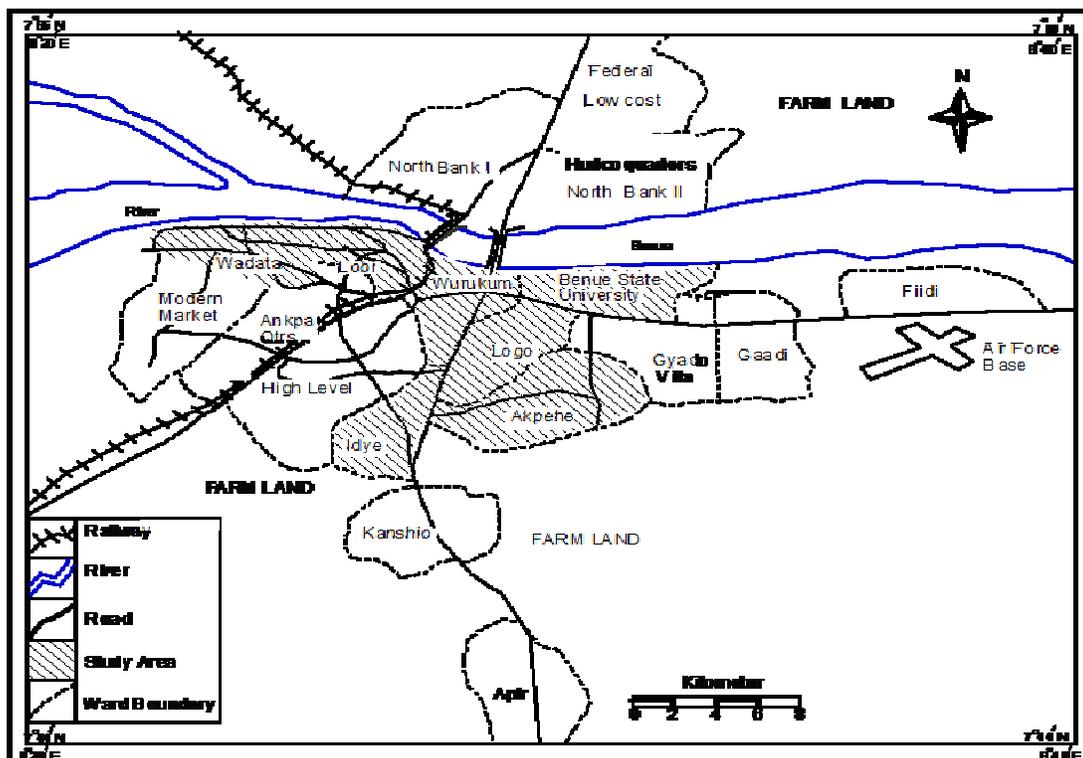


Figure 2. Map of Makurdi Town showing Floor Areas
 Source: Ministry of Lands and survey, Makurdi

Table 1. Age Distribution of Female Floodplain and Non-Floodplain Dwellers in Makurdi

Age	Floodplains (%)	Non-Floodplains (%)
Below 30	43 (39.1)	40 (36.4)
31-40	40 (36.4)	29 (26.4)
41-50	23 (20.9)	21 (19.1)
51-60	4 (3.6)	4 (3.6)
61-70	0 (0.0)	11 (10.0)
Above 70	0 (0.0)	5 (4.6)
TOTAL	110 (100)	110 (100)

Source: Authors fieldwork (2011)

Table 2. Marital status of women on flood and non-floodplains in Makurdi

Marital Status	Floodplains (%)	Non-Floodplains (%)
Married	84 (76.4)	84 (76.4)
Single	24 (21.8)	23 (20.9)
Divorced	1 (0.9)	3 (2.7)
Single Parent	1 (0.9)	0 (0.0)
TOTAL	110 (100)	110 (100)

Source: Authors fieldwork (2011)

wards (Wadata, Wurukum, Akpehe, Logo, and Idye) had 140 women participants, while the non-floodplains with five wards (High level, New Government Reserved Area (G.R.A), North Bank, Old G.R.A, and Ankpa Ward) had 160 women participants. The choice of the population is informed by the criterion of common interest, which anchors on socio-economic and environmental conditions. Also, the sample size of 300 is considered sufficient because of the homogeneity of the phenomenon under investigation (Osuala, 2001). Using the simple random sampling technique, 30 households were sampled from the 10 neighborhoods, yielding 300 households in all (both flood and non-floodplains). Of the 300 questionnaire that were sent out, only 220 (110 each from the two study areas) were retrieved. Descriptive statistics involving frequencies and percentages were used in the analysis of the results.

RESULTS AND DISCUSSION

Demographic Information

Age distribution of floodplains and non-floodplains dwellers of Makurdi

Table 1 indicates that 96.4% of the respondents fall below the age of 50 years in the floodplains while in the non-floodplains it is 81.9%. The age range indicates that

the women are in their active stage of life, hence have the energy to care and manage their homes. This means that they are very close to their environment as they manage and take care of their homes, even during flooding. Secondly, women within this age range are in their reproductive and productive stage of life. Pregnancy increases a woman's vulnerability to diseases; hence more women in the floodplains are exposed to risks from the environment than those on the non-floodplains.

Also worthy of note is the indication from table 1 that the older age ranges (61 and above) are not on the floodplains, but 14.6% of them are on the non-floodplains. This indicates that life expectancy is lower in the floodplains than on the non-floodplains. Marital status increases responsibility in the home for women, hence increasing exposures to environmental problems.

Marital status

Table 2 shows the data on marital status of the respondents, and indicates the same number of married women in both the floodplains and non-floodplains. This means that the same number of women are vulnerable to environmental hazards on both the floodplains and on the non-floodplains. A total of 23.6% (on both the flood and non-floodplains) are single, single parents and divorced; and means that they are also vulnerable. Though there are slightly more single women on the floodplain (21.8%)

Table 3. Literacy status of women on flood and non-floodplains in Makurdi

Educational levels	Floodplains (%)	Non-Floodplains (%)
No Formal Education	4 (3.6)	3 (2.7)
Primary Education	15 (13.6)	11 (10.0)
Secondary Education	50 (45.5)	51 (46.4)
Tertiary Education	41 (37.3)	45 (40.9)
TOTAL	110 (100)	110 (100)

Source: Authors fieldwork (2011)

Table 4. Occupations of women on flood and non-floodplains in Makurdi

Occupation	Floodplains (%)	Non-Floodplains (%)
No Work	4 (3.6)	0 (0.0)
Farming	11 (10.0)	3 (2.7)
Studying	11 (10.0)	13 (11.8)
House wife	10 (9.1)	8 (7.3)
Trading	54 (49.1)	52 (47.3)
Civil Service	17 (15.5)	22 (20.0)
Pensioner	0 (0.0)	4 (3.6)
Artisan	3 (2.7)	8 (7.3)
TOTAL	110 (100)	110 (100)

Source: Authors fieldwork (2011)

than those (20.9%) on the non-floodplains, it still does not reduce exposure to environmental hazards, because as females, they still carry out their expected roles.

Literacy Status

Table 3 shows that more illiterate women (3.6%) live on the floodplains than those on the non-floodplains (2.7%). This shows the level of awareness of the women; hence implies that more women in the floodplains are not informed, and so do not understand how to take measures to reduce their risks, than those on the non-floodplains, thereby increasing their vulnerability. Also more women (87.3%) in the non-floodplains are educated at secondary and tertiary levels than those (82.7%) in the floodplains. This means that more women in the higher lands know what to do to reduce their vulnerability to environment-related diseases than in the floodplains.

Knowing how to reduce vulnerability may not actually reduce vulnerability if one cannot afford it. A good income level is necessary to afford precautionary measures to reduce vulnerability. A good income also dictates where to go to for treatment when illness strikes. The occupation one is involved in determines ones income level.

Occupations (Sources of Livelihoods)

Table 4 has information on the occupations women in

Makurdi are involved in, and shows that 3.6% of women on floodplains have no jobs, while none on the non-floodplains is unemployed. There are more civil servants (20%) in the non-floodplains than in the floodplains (15.5%). In Nigeria, government work is the most stable source of income, so more women in the non-floodplains have more stable incomes than those in the floodplains, and so can afford measures to reduce vulnerability to environmental hazards and better treatment options when ill, than women in the floodplains.

There are more women traders in the floodplains (49.1%) than those (47.3%) on the non-floodplains. This increases the vulnerability of women in the floodplains because they operate their trading activities in filthy/unhealthy environments as well as on the streets in Makurdi, and these increase their exposure to health hazards from the environment.

Health Status

The health status of women is measured by the number of times (frequency) they have been sick in the months of the rainy season and the treatment options they use when sick. Table 5 shows data on the number of times women in the flood and non-floodplains have been sick during the months of the rainy season. Data shown indicates that more women in the non-floodplains are sick for once or twice during the rainy season (35.46%) than the women in the floodplains (26.36%). A total of 8.2%

Table 5. Frequency of illness during the rainy season

Frequency	Floodplains (%)	Non-Floodplains (%)
Once	23 (20.9)	24 (21.8)
1-2 Times	6 (5.5)	15 (13.6)
More than Twice	9 (8.2)	17 (15.5)
None	72 (65.5)	54 (49.0)
TOTAL	110 (100)	110 (100)

Source: Authors fieldwork (2011)

Table 6. Treatment Options of Flood and Non-Flood

Treatment Options	Floodplains (%)	Non-Floodplains (%)
Hospital	59 (53.6)	88 (80.0)
Pharmacy	15 (13.6)	19 (17.3)
Native Doctor	36 (32.7)	3 (2.7)
TOTAL	110 (100)	110 (100)

Source: Authors fieldwork (2011)

are sick many times in the flood plains as compared to almost double the percentage (15.45%) in the non-floodplains.

While 65.4% were not sick at all (during the rainy season) in the floodplains, only 49% on the non-floodplains were not. This result did not support available research findings by Ugal (2006) that poor household environments contribute to poor health, especially maternal health. One possible explanation for this variance could be that the floodplain dwellers are more conscious of their exposure, and take more preventive measures to safeguard their health. Where one goes to (when sick) for treatment, could endanger the overall health.

Table 6 shows data on where the women treat themselves when sick. The table indicates that more women (80%) on the non-floodplains patronize hospitals than those in the floodplains (53.6%). The implication is that though the non-floodplain dwellers are more often sick, their overall health is better than the floodplain dwellers. This result is supported by findings in table 1 that indicate that women from age 61 years and above in the floodplains show poor quality of health. Further to this, more women (17.3%) in the non-floodplains patronize pharmacies when sick than those (13.6%) floodplain dwellers. It can therefore be adduced that the quality of medication given in the hospitals is the same with that of the pharmacy. This means that the overall health is better on the non-floodplains than in the floodplains. The 32.72% of the women in the floodplains that patronize native doctors as against 2.73% on the non-floodplains is an indication of poor health practice that has negative impact on overall health. Native doctors use herbs and potions which have no dosage and whose

efficacy cannot be guaranteed. This is an indicator of higher levels of poverty in the floodplains than on the non-floodplains.

CONCLUSION

This paper has compared the health status of women living in the floodplains with their counterparts on the non-floodplains of Makurdi urban area, during the rainy season months from May to October 2011. The study has found out that the records of illness were more in the non-flood than in the floodplains. This could be because the floodplain dwellers are more conscious of their exposure and so take more precautions that reduce their exposure. However in terms of overall health, the floodplain dwellers have poorer indications of good health as seen from the places they go to for treatment and the age ranges of respondents in the floodplains as compared to the those in non-floodplains. The study therefore concludes that the health of women in the floodplain is compromised more because of treatment options and poverty than because of exposure to the contaminated household environments. Therefore efforts towards reducing the effects of flooding on the health of women should be geared towards educating the women on better health practices as well as improving their incomes.

RECOMMENDATIONS

The ongoing climate change has direct and indirect impacts on health because of associated infectious

diseases that result from climate change variability on weather. The impacts, often times negative, can easily spread across national and international borders. Women who interact with the household environments closely are exposed to the contamination from the environment in flooded areas. This study therefore recommends improved education and awareness to be created for women in the floodplains of Makurdi urban area. Also more should be done in strengthening health systems to focus more on preventive than on curative medicine.

Urban flood management should include women as stakeholders in the planning process. Information on areas that experience seasonal flooding should be made available so as to guide development in the areas to focus more on adaptation development and human occupation is already dense. Long term planning for flooded areas should be encouraged, and health system planning and urban planning policies should be synchronized.

REFERENCES

- Ahern M, Kovats RM, Wilkinson P, Few R, Matthias F (2005). Global health impacts of floods: Epidemiologic evidence. *Epidemiological Review* 27(1): 36-46.
- Du W, Fitzgerald G, Clark M, Hou X (2010). Health impacts of floods. *Prehospital and Disaster Medicine* 25: 265-272.
- Ingirige B, Wedawatta G (2011). Impacts of flood hazards on small and medium sized companies. In *flood hazards: Impacts and responses for the built environment*, ed Lamond J, Booth G, Hammond F, Proverbs. Florida, CRC Press.
- Jonkman SN, Kelman I, (2005). An analysis of the causes and consequences of flood disaster deaths. *Disasters* 29(1): 75-97.
- Kambandu-Nkhoma (No date). CDKN AlertNet. Available <http://www.cdkn.org/>
- Lancet (2007) Urban Health Vulnerabilities to Global Climate Change: Improving Urban Health While Protecting the Global Climate. *Journal of Urban Health*. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1891643>
- National Population Commission (2006) National Bureau of Statistics .Available from www.nigerianstat.gov.ng
- Organisation for Economic Cooperation and Development (OECD) (2009). Integrating climate change adaptation into development cooperation: Policy guidance. OECD
- Osinubi TS (2003). Urban poverty in Nigeria: A case study of Agege area of Lagos State, Nigeria.
- Osuala EC (2001). Introduction to research methodology. Africana FEP Publishers Ltd, Onitsha
- Satterthwaite D (2011). How urban societies can adapt to resource shortage and climate change. *Phil. Trans. R. Soc. A*. 369: 1762-1783.
- Ugal DB (2009). Household environment and maternal health among rural women of Northern Cross River State, Nigeria. Department of Sociology, Faculty of the Social Sciences University of Ibadan, Ibadan, Nigeria.
- WHO (2005) World Health Report. Available at www.who.int/whr/2005/en/indx.html
- WHO (2011). Gender, climate change and health, Geneva.
- WHO (2012). Mainstreaming gender in health adaptation to climate change programmes, Geneva.
- World Development Report (WDR) (2010). Development and climate change, Washington, DC.
- World Health Organisation (WHO) (1996). *Healthy Cities*. Magazine of the World Health Organization, 49th Year, No 1, Geneva.