AN ASSESSMENT OF CAUSES AND HEALTH IMPLICATIONS OF FLOOD DISASTER ON HEALTH AND LIFE OF PEOPLE OF IJEBU-ODE LOCAL GOVERNMENT AREA OF OGUN STATE

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CERTIFICATION

This is to certify that this research project titled; **AN ASSESSMENT OF CAUSES AND HEALTH IMPLICATIONS OF FLOOD DISASTER ON HEALTH AND LIFE OF PEOPLE OF IJEBU-ODE LOCAL GOVERNMENT AREA OF OGUN STATE** was independently carried out by **ANWARA LUCIA ORIEOMA** with matriculation number **17012423001**, PHE/DM under the supervision of **MRS. O.H.N BELLO** in, Tai Solarin College of Education, Omu-Ijebu Ogun State and approved for its contribution to knowledge and literary appreciation.

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ABSTRACT

Recent floods and consequences all over the world are becoming too frequent and threat to sustainable development in human settlements. The objective of this study is to examine the causes and health implications of flood disaster on health and life of people of Ijebu-Ode Local Government area of Ogun State with a view to identify solution for sub stainable development. Climate change resulting from global warming is attributed to anthropogenic influences, leading to many consequences, one of which is flooding. It is one of the major environmental crises that keep recurring every year in Nigeria from one region to another. Although Flooding is not a natural phenomenon caused by antecedents, such as melting of the icebergs, hurricanes, overfilling of the major rivers, but many other flood types are human caused. The devastation caused by the floods could not be adequately contained due to infrastructural (shelters, health centers, classrooms, etc.) and logistic deficiencies (inadequate personnel and facilities) Micro and macro level interventions such as development and enforcement of land use policies; construction of mobile clinics in affected areas; mobilization/recruitment and training of multi-disciplinary response teams (social workers, public health professionals, physicians, nurses, psychologists, clergy; etc.). The sample size for the study is 200 respondents and so 200 copies of the questionnaires were administered randomly to the identified respondents. The analysis of data was calculated using chi-square analytical tool via the SPSS 17.0 statistical package. The level of significance of the data collated and collected are further analyzed with Chi-Square(X^2) data analysis at 0.05 degree of freedom, to establish significance in the research hypotheses. From the findings of the study the following recommendations were made; There should be efficient mapping, monitoring, and maintenance of all floodplains, sea coast, natural lakes and reservoirs (i.e. dams) in Nigeria and that there should be dire need for collaboration between hydrologists, remote sensing and GIS experts, environmental scientists, engineers, surveyors and other professional bodies, etc. in monitoring the annual hydrological cycle and weather patterns as well as giving appropriate advice to the government. It was also recommended that education of the public (Ijebu-Ode residents) against dumping of refuse in drainage channels and roads.

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INTRODUCTION

1.1 Background to the Study

According to Merriam-Webster (2012) flood is a rising and over flowing of a body of water especially onto normally dry land. The word "flood" originates from the Old English language; /flod/, a word common to Germanic languages (compare German /Flut/, Dutch /vloed/ from the same root as is seen in /flow, float/; also compare with Latin /fluctus/, /flumen/), and was first used in 1663.

National Erosion and Flood Control Action Plan Committee (2010) defined flooding as a condition which exists when discharge of a river or stream cannot be accommodated within the margin of its normal channels so that waters spread over adjoining land.

Flooding is one of the major environmental crises one has to contend within the century. This is especially the case in most wetlands of the world (Bariweni et al., 2012). The reason for this is the general rise in sea level globally, due to global warming as well as the saturated nature of the wetlands in many parts of the world such as Nigeria. Periodic floods occur on many rivers, these rivers overflow for reasons like excess rainfall etc. Flooding as an environmental problem is an age-old phenomenon. Flooding is a significant rise of water level in a stream, lake, reservoir or coastal system that overflows the banks. The National Erosion and Flood Control Action Plan Committee (2010) defined flooding as a condition which exists when discharge of a river or stream cannot be accommodated within the margin of its normal channels so that waters spread over adjoining land.

Floods are among the most recurring and devastating natural hazards, impacting upon human lives and causing severe economic damage throughout the world, (Khan, et. al.., 2011). It is understood that flood risks will not subside in the future, and with the onset of climate change, flood intensity and frequency will threaten many regions of the world Jonkman and Dawson (2012).Floods occur because of the rapid accumulation and release of runoff waters from

upstream to downstream, which is caused by very heavy rainfall. Discharges quickly reach a maximum and diminish almost as rapidly. The occurrence of flooding is of concern in hydrologic and natural hazards science due to the top ranking of such events among natural disasters in terms of both the number of people affected globally and the proportion of individual fatalities. The potential for flood casualties and damages is also increasing in many regions due to the social and economic development, which imply pressure on land-use, e.g., through urbanization

Flooding can be divided into different categories according to their duration. Slow-Onset Floods usually last for a relatively longer period; it may last for one or more weeks, or even months. As this kind of flood last for a long period, it can lead to lose of stock, damage to agricultural products, roads and rail links. Rapid-Onset Floods last for a relatively shorter period; they usually last for one or two days only. Although this kind of flood lasts for a shorter period, it can cause more damages and pose a greater risk to life and property as people usually have less time to take preventative action during rapid-onset floods. Flash Floods may occur within minutes or a few hours after heavy rainfall, tropical storm, failure of dams or levees or releases of ice jams (Okpokwu, 2017).

Most floods damage occur as a result of extreme, intense and long duration floods caused by meteorological phenomenon such as prolonged and intense rainfall/precipitation, cyclones, storms, tidal surges and drainage modifications when combined with heavy rain (Stephen, 2012). According to Doswell (2013), floods associated with rainfall are produced by thunderstorms and that, a single thunderstorm cell can produce enough rainfall to cause a flash flood In terms of hydrological causes, floods can be caused by increased run off due to ice and snowmelt, impermeable land surfaces with saturated water, poor infiltration rates and land erosion.

The current trend and future scenarios of flood risks therefore demand for accurate spatial and temporal information on the potential hazards and risks of floods. As reported by Chang and Guo (2012), heavy convective rainfall often results in flooding in urban areas. Urbanization results into conversion of agricultural land, natural vegetation and wetlands to built-up environments and construction on natural drainages as well increase in the population of those living in flood vulnerable areas such as flood plains and river beds. In addition to population growth and the

ongoing accumulation of value assets, both the frequency and magnitude of floods due to climate change are expected to increase in the future, therefore aggravating the existing flood risk in urban areas. This scenario implies that urban areas in particular suffer from a comparatively high flood risk due to their high population number and density, multiple economic activities and many infrastructure and property values, which in turn interferes with the natural infiltration processes (Rachelle, 2013).

Some of the causal factors of flood disasters in Nigeria include land inundation from heavy rainfall, climate change, and blockage of drainages with refuse, construction of buildings across drainages, inadequate drainage networks, and population increase in urban areas. These factors do not act independently and flood disasters usually occur from a combination of several of them, Flooding does not only damage property and endanger the lives of humans and animals, but have other effects as well. Floods and its effects all over the world are becoming a threat to sustainable development in human settlements (Aderogba, 2012).

Reduction of the risk of flooding will depend largely on the amount of information on the flood that is available and the knowledge of the areas that are likely to be affected during a flood event. Therefore, it is necessary to use modern day technique in developing measures that will help relevant authorities and relief agencies in the identification of flood prone areas and in planning against flooding events in the future. At least 20 per cent of the population is at risk from one form of flooding to another. In Nigeria, flood disaster has been perilous to communities and institutions in Nigeria. It has shattered both the built-environment and undeveloped plan. It has claimed many lives, and millions of properties got lost due to its occurrences. One prominent feature about it is that flooding does not discriminate, but marginalizes whosoever refuses to prepare for its occurrence (World Health Organization, 2013).

1.2 Statement of the problem

Flood disaster either natural or man- made has been a global phenomenon. The disaster has caused great catastrophe such misfortune always result in loss of lives and properties worth millions of Naira in its rough estimate. When there is disaster of any kind, the three phenomena

essential for survival are water, air and soil but they are said to be polluted and harbor physical, chemical and biological agents that lead to health problems in any area affected.

These agents could have adverse effects on human health, destructive effects on animals and plants, damage materials of economic development of the people in particular and the society in general.

The outbreak of flood in Ijebu-Ode has been described as the worst in the past 20years. The victims affected by flood now live without, house, food, water, electricity and other essentials of life. There are already reported cases of outbreak of diseases and death of people, this situation necessitated the present study.

1.3 Research Questions

1. What are the causes of flooding disaster in Ijebu-Ode?
2. What are the physical health implications of flooding in Ijebu-Ode local government area?
3. What are the social health implications of flooding to the people of Ijebu-Ode local government area?
4. What are the emotional/mental health implications of flooding?

1.4 Research Hypotheses

$H_{01:}$ The resident age will not significantly affect the health implications of flood disaster

H_{02}: There is no significant relationship between flooding and socio-economic activities of people of Ijebu-Ode local government area.

$H_{03:}$ The residents' attitudes will not significantly affect the environmental flooding in Ijebu-Ode local government area.

1.5 Objectives of Study

The main purpose of this study was to identify the causes and health implications of flood disaster on health and life of people of Ijebu-Ode with a view of offering control and preventive measures to future occurrences of the disaster.

The primary objectives of the study will be to find out;

1. The physical causes of flooding in the community.
2. The social implications of flooding on health.
3. The emotional/mental health implications of flooding.
4. To determine if the health implications differ according to age of victims.
5. To determine if the health implications differ according to sex of the victims.

1.6 Delimitations of the Study

Since we can't study the whole town in Ogun State, this research work will also be limited in scope to five (5) towns in Ijebu-Ode Local government area of Ogun State.

Some areas in Ijebu-Ode which are mostly affected by flood include;

1. Igbeba Road down to Oke aje Market
2. Moba lufon road
3. Oke-Owa road
4. Degun and Imowo,
5. Ibadan roads

1.7 Limitation of the Study

Financial constraint: Insufficient fund tends to impede the efficiency of the researcher in sourcing for the relevant materials, literature or information and in the process of data collection (internet, questionnaire and interview)

Time constraint: The researcher will simultaneously engage in this study with other academic work. This consequently will cut down on the time devoted for the research work.

Negative attitude of the Respondents: Some of the respondents exhibited negative character. Some bluntly refused to full our questionnaire or answers basic questions posed on them. Some of them reluctantly accepted to respond with some reservations and maintained that they were not in the best position to respond when actually they were.

1.8 Significance of the Study

The research work will highlight the causes of flood disaster in the community; it will also highlight the effects on health implications of the disaster. The study will also add to the pool of knowledge already established by people on the causes and health implications of flooding and living in camps.

The findings would also be of benefit by enabling policy makers to come up with adequate measures towards mitigating the effects of flooding in the study area and in Nigeria as a whole. The research will help to identify the areas that are prone to flood. This will also aid in planning and help in decision making when addressing the issues relating to flood problems and its sustainability. It will also help future scholars who will endeavor to undertake a study on the topic.

1.9 Definition of Terms

- **Erosion:** This is the washing away of top soils by rainfall
- **Flooding:** This is considered as one of the most hazardous, frequent and widespread natural disasters. Flooding is described as a relatively high flow of water, which overflows the natural channel, provided for runoff. Floods are classifiable according to cause (high rainfall, tidal extremes, structural failure) and nature (e.g., regularity, speed of onset, velocity and depth of water, spatial and temporal scale)
- **Climate Change:** this is the change that occurs in the atmospheric condition of a particular place within a particular period of time.
- **River Floods**: This is when the actual amount of river flow is larger than the amount that the channel can hold; river will overflow its banks and flood the areas alongside the river.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Ijebu-Ode is a town in Ogun State, South-West Nigeria, close to the A121 highway. The city is located 110 km by road north-east of Lagos; it is within 100 km of the Atlantic Ocean in the eastern part of Ogun State and possesses a warm tropical climate. According to the *Britannica*, by the 16th century it was established as the chief town, and since pre-colonial times it has been the capital of the Ijebu kingdom. It has an estimated population of 222,653 (2007 census). It is home to Sungbo's Eredo one of the largest ramparts in West Africa. As with most Ijebus, people from Ijebu Ode have a nationwide reputation of being natural entrepreneurs, the primary cultural food is "Ikokore". Ijebu-Ode is located on the Coordinates: 6°49′15″N 3°55′15″E / 6.82083°N 3.92083°E (Britannica, 2018).

2.1 Historical Background of Ijebu-Ode

The largest city inhabited by the Ijebus, a sub-group of the Yoruba ethnic group who speak the Ijebu dialect of Yoruba, it is historically and culturally the headquarters of Ijebu land. The name "Ijebu-Ode" is a combination of the names of two persons namely, AJEBU and OLODE who were conspicuous as leaders of the original settlers and founders of the town. Today, however, due to migration, colonization and inter-tribal marriage, Ijebu-Ode is now composed of a mixed people who majorly speak the general Yoruba language, as opposed to the local dialect (*Opemipo &Teslim, 2019).*

In 1891, the Ijebu tribe, dwelling between 50 and 60 miles north-east of Lagos on the Magbon river, set a blockade on the trade route from the interior into Lagos, which was a crown colony, and charged customs dues which served as their income. The Awujale, the traditional ruler of Ijebu, closed down the Ejirin market, cutting off Lagos from a source of up-country trade. The British government persuaded the Awujale several times to open the blockaded route but the Ijebu ruler remained adamant. However, in May 1891, a British acting governor, Captain C.M Denton C.M.G, together with some Hausa troops (mostly slaves who fled the North to

South and were recruited by the British army) went to Ijebu kingdom to make an agreement with the Awujale on opening the blockaded route and allowing the free passage of goods into Lagos. The Awujale refused but after much persuasion and pressure, the Awujale agreed in January 1892 on the terms of receiving £500 annually as compensation for the loss of custom revenue. However the agreement didn't last long. A white missionary was denied access to pass through the kingdom and was sent back. The British governments were provoked by the action of the Ijebus and authorized the use of force on the kingdom. Britain gathered troops from Gold Coast (Ghana), Sierra Leone, Ibadan, and Lagos (the Hausa troops nearly 150). (*Ayomide &Tayo, 2017),* (The Nation (Nigeria). *13 May 2014*. Retrieved 5 February 2019*).*

2.1.1 Town structure

Adjacent to Ijebu Ode are several smaller towns and villages. They are mostly referred to as Egure "small settlement"; some of them include Odo-Agamegi, Ogbo, Italupe (a neighbourhood within Ijebu-Ode), Ososa, Imomo, Imawen, Odo Ogbun, Apa (Mesan), Okelamuren, Abapawa, Erunwon, Apunren, Isonyin, Imoru, Oke-Eri, Imagbon, Ijebu-Isiwo (***pronounce as Ijebu-Ishiwo***), Okemoyin (a village within Ijebu-Isiwo), Odo-lewu, Odo-Arawa, Idowa, Iworo, Ala, Atiba and Ibefun among others. Ijebu-Ode is made up of three parts - Iwade, Ijasi and Porogun. Italupe is a ward in Iwade, not an Egure of Ijebu Ode. The town has 39 Public Primary Schools, 14 Public Junior Secondary school, 13 public Senior Secondary Schools, 110 approved Private Nursery and Primary Schools and 22 approved Private Secondary Schools. Ijebu Ode has a local television station affiliated with the government's NTA network and is the trade center of a farming region where yam, cassava, grain, tobacco and cotton are grown (Wikipedia, 2020).

2.2 Conceptual Review: Concept of Flooding

Flooding which is an environmental hazard is usually a product of natural and anthropogenic factors. The incidences have now become very rampant in several parts of the world due to frequent changes in land use and land cover and as a result of the global climate change which is impacting on all facets of life worldwide (Wikipedia, 2020).

A **flood** is an overflow of water that submerges land that is usually dry (MSN Encarta Dictionary, 2009). In the sense of "flowing water", the word may also be applied to the inflow of the tide. Floods are an area of study of the discipline hydrology and are of significant concern in agriculture, civil engineering and public health. Human changes to the environment often increase the intensity and frequency of flooding, for example land use changes such as deforestation and removal of wetlands, changes in waterway course such as with levees, and larger environmental issues such as climate change and sea level rise (*Brown et al., 2014).*

Flooding may occur as an overflow of water from water bodies, such as a river, lake, or ocean, in which the water overtops or breaks levees, resulting in some of that water escaping its usual boundaries, or it may occur due to an accumulation of rainwater on saturated ground in an areal flood. Floods can also occur in rivers when the flow rate exceeds the capacity of the river channel, particularly at bends or meanders in the waterway. Floods often cause damage to homes and businesses if they are in the natural flood plains of rivers. While riverine flood damage can be eliminated by moving away from rivers and other bodies of water, people have traditionally lived and worked by rivers because the land is usually flat and fertile and because rivers provide easy travel and access to commerce and industry (*National Geographic Society, 2011).*

Appendix I: Image taken during the 2019 flood at Atiba Ijebu-Ode

Appendix II: Images taken during the recent flooding at Folagbade road, Ijebu-Ode

2.2.1 Types of flood

Areal

Floods can happen on flat or low-lying areas when water is supplied by rainfall or snowmelt more rapidly than it can either infiltrate or run off. The excess accumulates in place, sometimes to hazardous depths. Surface soil can become saturated, which effectively stops infiltration, where the water table is shallow, such as a flood plain, or from intense rain from one or a series of storms. Infiltration also is slow to negligible through frozen ground, rock, concrete, paving, or roofs. Areal flooding begins in flat areas like floodplains and in local depressions not connected to a stream channel, because the velocity of overland flow depends on the surface slope. Endorheic basins may experience areal flooding during periods when precipitation exceeds evaporation (*Jones &Myrtle, 2015)*

Riverine (Channel)

Floods occur in all types of river and stream channels, from the smallest ephemeral streams in humid zones to normally-dry channels in arid climates to the world's largest rivers. When overland flow occurs on tilled fields, it can result in a muddy flood where sediments are picked up by runoff and carried as suspended matter or bed load. Localized flooding may be caused or exacerbated by drainage obstructions such as landslides, ice, debris, or beaver dams (*Hjalmar, 2015).*

Slow-rising floods most commonly occur in large rivers with large catchment areas. The increase in flow may be the result of sustained rainfall, rapid snow melt, monsoons, or tropical cyclones. However, large rivers may have rapid flooding events in areas with dry climate, since they may have large basins but small river channels and rainfall can be very intense in smaller areas of those basins (Center for Neighborhood Technology, 2013).

Rapid flooding events, including flash floods, more often occur on smaller rivers, rivers with steep valleys, rivers that flow for much of their length over impermeable terrain, or normally-dry channels. The cause may be localized convective precipitation (intense

thunderstorms) or sudden release from an upstream impoundment created behind a dam, landslide, or glacier. In one instance, a flash flood killed eight people enjoying the water on a Sunday afternoon at a popular waterfall in a narrow canyon. Without any observed rainfall, the flow rate increased from about 50 to 1,500 cubic feet per second (1.4 to 42 m^3/s) in just one minute two larger floods occurred at the same site within a week, but no one was at the waterfall on those days. The deadly flood resulted from a thunderstorm over part of the drainage basin, where steep, bare rock slopes are common and the thin soil was already saturated. (*Hjalmarson, 2015)*

Flash floods are the most common flood type in normally-dry channels in arid zones, known as arroyos in the southwest United States and many other names elsewhere. In that setting, the first flood water to arrive is depleted as it wets the sandy stream bed. The leading edge of the flood thus advances more slowly than later and higher flows. As a result, the rising limb of the hydrograph becomes ever quicker as the flood moves downstream, until the flow rate is so great that the depletion by wetting soil becomes insignificant (Chanson, *2014).*

Estuarine and coastal

Flooding in estuaries is commonly caused by a combination of storm surges caused by winds and low barometric pressure and large waves meeting high upstream river flows (*Werner, 2006).*

Coastal areas may be flooded by storm surges combining with high tides and large wave events at sea, resulting in waves over-topping flood defenses or in severe cases by tsunami or tropical cyclones. A storm surge, from either a tropical cyclone or an extra tropical cyclone, falls within this category. Research from the NHC (National Hurricane Center) explains: "Storm surge is an additional rise of water generated by a storm, over and above the predicted astronomical tides. Storm surge should not be confused with storm tide, which is defined as the water level rise due to the combination of storm surge and the astronomical tide. This rise in water level can cause extreme flooding in coastal areas particularly when storm surge coincides with spring tide, resulting in storm tides reaching up to 20 feet or more in some cases (*Storm Surge Overview, 2015)*

Urban flooding

Urban flooding is the inundation of land or property in a built environment, particularly in more densely populated areas, caused by rainfall overwhelming the capacity of drainage systems, such as storm sewers. Although sometimes triggered by events such as flash flooding or snowmelt, urban flooding is a condition, characterized by its repetitive and systemic impacts on communities that can happen regardless of whether or not affected communities are located within designated floodplains or near any body of water (Center for Neighborhood Technology, 2013). Aside from potential overflow of rivers and lakes, snowmelt, storm water or water released from damaged water mains may accumulate on property and in public rights-of-way, seep through building walls and floors, or backup into buildings through sewer pipes, toilets and sinks (Eychaner, 2015).

In urban areas, flood effects can be exacerbated by existing paved streets and roads, which increase the speed of flowing water. Impervious surfaces prevent rainfall from infiltrating into the ground, thereby causing a higher surface run-off that may be in excess of local drainage capacity (*Brown, et al., 2014)*

Catastrophic

Catastrophic riverine flooding is usually associated with major infrastructure failures such as the collapse of a dam, but they may also be caused by drainage channel modification from a landslide, earthquake or volcanic eruption. Examples include outburst floods and lahars. Tsunamis can cause catastrophic coastal flooding, most commonly resulting from undersea earthquakes.

2.3 Causes of Flooding

Occurrence and reoccurrence of prolonged heavy rain showers has resulted to floods all over the world (Action Aid, 2006; Adeaga, 2008; Wright, 2011; Aderogba, and 2012). Particularly in the rainy seasons, it is usually common story to read about in the dailies and

magazines, watch on TV stations about occurrence of flood disasters (Dow and Dowing, 2006; Kersh and Simon, 2005).

Floods are caused by many factors: Heavy rainfall, highly accelerated snowmelt, severe winds over water, unusual high tide, tsunamis, or failure of dams, levees, retention ponds, or other structures. Flooding can be exacerbated by increased amounts of impervious surface or by other natural hazards such as wildfires, which reduce the supply of vegetation that can absorb rainfall (Welch et al., 2010). Runoff from sustained rainfall or rapid snow melts exceeding the capacity of a river's channels, can lead to heavy rains from hurricanes and tropical depressions, foreign winds and warm rain affecting snow pack. Unexpected drainage obstructions such as landslides, ice, or debris can cause slow flooding upstream of the obstruction (USEPA, 2012). Convective precipitation (intense thunderstorms) or sudden release from an upstream impoundment created behind a dam, landslide, can result also to flooding (Thompson, 2010).

Floods are also caused by a combination of sea tidal surges from storm-force winds. A storm surge, from either a tropical cyclone or an extra-tropical cyclone, falls within this category (Rosenberg and Snor, 2009). Floods can be caused by severe sea storms, or as a result of another hazard e.g. Tsunami or hurricane (Powell, 2009). Floods may also be caused by a significant and unexpected event such as dam breakage, or as a result of another hazard (e.g., earthquake or volcanic eruption). Accidental floods may be caused also by damage of tunnels or pipes in cities by workmen.

Bariweni, et al. (2012) summarized other causes of floods as follows; when rainfall is relatively light, the shoreline of lakes and bays can be flooded by severe winds such as during hurricanes that blow water into the shore areas. Coastal areas are sometimes flooded by unusually high tides, such as spring tides, especially when compounded by high winds and storm surges. Tsunamis are high, large waves, typically caused by undersea earthquakes, volcanic eruptions or massive explosions, these results to flooding of the sea water on buildings close to the sea and even beyond. Bariweni, et al. (2012) also added that Climate Change is also an attribute that cause flooding, because when the climate is warmer it results to the following:

a. Heavy rains
b. Relative sea level continue to rise around most shore
c. Extreme sea levels will be experienced more frequently

Therefore, Climate change is likely to increase flood risk significantly and progressively over time. Particularly increased risk will be low-lying coastal areas, as sea levels rise and areas not currently prone to fluvial or tidal flooding as more intense rainfall leads to significantly higher risk of flooding from surface runoff and overwhelmed drainage system. But according to Etuonovbe (2011) flooding in Nigeria could be as a result of natural cause or human cause; she categorized the causes as follows:

Natural causes flooding include the following;

a. Heavy rainfall
b. Oceans storms and tidal waves usually along the coast.
c. Lack of Lakes
d. Silting

While other human causes of flooding in Nigeria may be due to one of the following factors;

a. Burst water from main pipes
b. Dam failures
c. Population pressure (especially in Ijebu-Ode)
d. Deforestation
e. Trespassing on water storm drains (key cause in Southern Nigeria)
f. Unplanned urbanization (in many cities it's the key cause of urban flooding).
g. Poor Sewerage Management
h. Neglecting warnings from hydrological system data (major cause of 2012 flooding in Nigeria)
i. Lack of flood control measures (especially by government)

According to Magami et al. (2014) other factors that contributes to flooding can be due to one of the following factors;

Upslope factors

The amount, location, and timing of water reaching drainage channel from natural precipitation and controlled or uncontrolled reservoir releases determine the flow at downstream locations. Some precipitation evaporates, some slowly percolates through soil, some may be temporarily sequestered as snow or ice, and some may produce rapid runoff from surfaces including rock, pavement, roofs, and saturated or frozen ground. The fraction of incident precipitation promptly reaching a drainage channel has been observed from nil for light rain on dry, level ground to as high as 170 percent for warm rain on accumulated snow (Center for Neighborhood Technology, 2013). Most precipitation records are based on a measured depth of water received within a fixed time interval. *Frequency* of a precipitation threshold of interest may be determined from the number of measurements exceeding that threshold value within the total time period for which observations are available. Individual data points are converted to *intensity* by dividing each measured depth by the period of time between observations. This intensity will be less than the actual peak intensity if the *duration* of the rainfall event was less than the fixed time interval for which measurements are reported. Convective precipitation events (thunderstorms) tend to produce shorter duration storm events than orographic precipitation. Duration, intensity, and frequency of rainfall events are important to flood prediction. Short duration precipitation is more significant to flooding within small drainage basins (Lisa Burban, et al., 2016).

The most important upslope factor in determining flood magnitude is the land area of the watershed upstream of the area of interest. Rainfall intensity is the second most important factor for watersheds of less than approximately 30 square miles or 80 square kilometers. The main channel slope is the second most important factor for larger watersheds. Channel slope and rainfall intensity become the third most important factors for small and large watersheds, respectively. Time of Concentration is the time required for runoff from the most distant point of the upstream drainage area to reach the point of the drainage channel controlling flooding of the area of interest. The time of concentration defines the critical duration of peak rainfall for the area of interest (Leonard Church, 2015). The critical duration of intense rainfall might be only a

few minutes for roof and parking lot drainage structures, while cumulative rainfall over several days would be critical for river basins.

Down slope factors

Water flowing downhill ultimately encounters downstream conditions slowing movement. The final limitation in coastal flooding lands is often the ocean or some coastal flooding bars which form natural lakes. In flooding low lands, elevation changes such as tidal fluctuations are significant determinants of coastal and estuarine flooding. Less predictable events like tsunamis and storm surges may also cause elevation changes in large bodies of water. Elevation of flowing water is controlled by the geometry of the flow channel and, especially, by depth of channel, speed of flow and amount of sediments in it (Powell, W. Gabe, 2009). Flow channel restrictions like bridges and canyons tend to control water elevation above the restriction. The actual control point for any given reach of the drainage may change with changing water elevation, so a closer point may control for lower water levels until a more distant point controls at higher water levels.

Effective flood channel geometry may be changed by growth of vegetation, accumulation of ice or debris, or construction of bridges, buildings, or levees within the flood channel.

Coincidence

Extreme flood events often result from coincidence such as unusually intense, warm rainfall melting heavy snow pack, producing channel obstructions from floating ice, and releasing small impoundments like beaver dams. Coincident events may cause extensive flooding to be more frequent than anticipated from simplistic statistical prediction models considering only precipitation runoff flowing within unobstructed drainage channels. Debris modification of channel geometry is common when heavy flows move uprooted woody vegetation and flood-damaged structures and vehicles, including boats and railway equipment (*Federal Emergency Management Agency, 2015).*

2.3.1 Effects of flooding in Ogun State

Primary effects

The primary effects of flooding include loss of life and damage to buildings and other structures, including bridges, sewerage systems, roadways, and canals.

Floods also frequently damage power transmission and sometimes power generation, which then has knock-on effects caused by the loss of power. This includes loss of drinking water treatment and water supply, which may result in loss of drinking water or severe water contamination. It may also cause the loss of sewage disposal facilities. Lack of clean water combined with human sewage in the flood waters raises the risk of waterborne diseases, which can include typhoid, giardia, cryptosporidium, cholera and many other diseases depending upon the location of the flood. Damage to roads and transport infrastructure may make it difficult to mobilize aid to those affected or to provide emergency health treatment. Flood waters typically inundate farm land, making the land unworkable and preventing crops from being planted or harvested, which can lead to shortages of food both for humans and farm animals. Entire harvests for a country can be lost in extreme flood circumstances. Some tree species may not survive prolonged flooding of their root systems (Eychaner, 2015)

Appendix III: image showing the primary effect of flood during the 2019 flood at Ijebu-Ode

Secondary and long-term effects

Economic hardship due to a temporary decline in tourism, rebuilding costs, or food shortages leading to price increases is a common after-effect of severe flooding. The impact on those affected may cause psychological damage to those affected, in particular where deaths, serious injuries and loss of property occur (Indoor Air Quality (IAQ), 2013).

Urban flooding can cause chronically wet houses, leading to the growth of indoor mold and resulting in adverse health effects, particularly respiratory symptoms. Urban flooding also has significant economic implications for affected neighborhoods (Center for Neighborhood Technology, 2013).

Appendix IV: Image Captured from TVC News showing the long term effect of flood on residents of Ijebu-Ode

Appendix V: Flood taking over Houses at Ijebu-Ode

Source: Wikipedia, 2020 (images of flood in Ijebu-Ode)

The devastating effect of floods was not limited to houses and people. Many farmlands both arable and agro-forestry were swept away when schools were submerged, this therefore results to sudden food shortage resulting from loss of entire harvest, spoiling of grains when submerged in water along as well as loss of animal fodder. Some animals lost their lives to flooding when many bridges collapsed and electric poles destroyed (Etuonovbe, 2011). The effects floods have also resulted to various destructions of buildings, bridges, dams' embankments, drains, roads, railways etc. Other adverse effects of flooding are degradation of environment, spread infestations, chemical pollution of soil and water, freshwater resources and scarcity of drinking water (Etuonovbe, 2011).

Appendix VI: Image captured showing the devastating effect of flooding on Ijebu-Ode residents (Wikipedia, 2020)

2.4 Consequences of flood disaster

Studies have reported that communications and traffics are interrupted; electricity and telephone lines have been lost for many days, while many land areas were inundated, industrial plants and commercial establishment were paralyzed during floods in Nigeria. Additionally, untold hardship are experienced, especially by the most vulnerable groups (women and school children) whenever there is flood disaster in Nigeria (Oluduro, 2010; Durotoye, 2012; Folorunsho and Awosika, 2019). This revelation suggests that if all data of flood disasters in Nigeria were to be available, human would not be able to conceive the devastated effect of flooding that occurs in this Nigeria (Etuonovbe, 2011).

Bariweniet al. (2012) opined that there are four factors, which determine the consequence of flooding disasters. These are:

1. **The level of predictability:** This affects the timing, accuracy and communication of warnings given before a flood event.
2. **The rate of onset to which flood occurred:** How quickly the water arrives and the speed at which it rises will govern the opportunity for people to prepare and respond effectively for a flood.
3. **The speed and depth of the water:** This dictates the level of exposure of people and property to a flood. It is difficult to stand or wade through even relatively shallow water that is moving. Flood water often carries debris, including trees and water over 1m in depth can carry objects the size of cars. Fast flowing water can apply devastating force to property and other receptors.
4. **The duration of the flood:** This is another important factor in determining the extent of its impact, particularly on individuals and affected communities.

2.5 Benefits and Health Implications of Flooding

Floods (in particular more frequent or smaller floods) can also bring many benefits, such as recharging ground water, making soil more fertile and increasing nutrients in some soils. Flood waters provide much needed water resources in arid and semi-arid regions where precipitation can be very unevenly distributed throughout the year and kills pests in the farming land. Freshwater floods particularly play an important role in maintaining ecosystems in river corridors and are a key factor in maintaining floodplain biodiversity (Environmental Aspects of Integrated Flood Management, 2007) Flooding can spread nutrients to lakes and rivers, which can lead to increased biomass and improved fisheries for a few years.

For some fish species, an inundated floodplain may form a highly suitable location for spawning with few predators and enhanced levels of nutrients or food. Fish, such as the weather fish, make use of floods in order to reach new habitats. Bird populations may also profit from the boost in food production caused by flooding (Extension of the Flood Pulse Concept, 2015). The viability of hydropower, a renewable source of energy, is also higher in flood prone regions.

Health Implication of Flood Disaster

Related to sanitation are the health implications. Flooding has a lot of health implications on the people. Stagnant water breeds insects and mosquitoes thus causing malaria. People who are directly exposed to flood waters suffer injuries and sicknesses like skin rashes and fever.

There is an outbreak of epidemics and diseases such as cold, flu, cholera, pneumonia and malaria during flooding. The flooding incident brings about an outbreak of diseases including malaria and diarrhea in the communities. The illnesses are an additional burden on household expenses; those who cannot afford the medical bills find themselves in trouble (Gabe, 2009).

2.6 Control of Flooding

In many countries around the world, waterways prone to floods are often carefully managed. Defenses such as detention basins, levees, bunds, reservoirs, and weirs are used to prevent waterways from overflowing their banks. When these defenses fail, emergency measures such as sandbags or portable inflatable tubes are often used to try to stem flooding (Gabe, 2009).

In areas prone to urban flooding, one solution is the repair and expansion of man-made sewer systems and storm water infrastructure. Another strategy is to reduce impervious surfaces in streets, parking lots and buildings through natural drainage channels, porous paving, and wetlands (collectively known as green infrastructure or sustainable urban drainage systems (SUDS)). Areas identified as flood-prone can be converted into parks and playgrounds that can tolerate occasional flooding. Ordinances can be adopted to require developers to retain storm water on site and require buildings to be elevated, protected by floodwalls and levees, or designed to withstand temporary inundation. Property owners can also invest in solutions themselves, such as re-landscaping their property to take the flow of water away from their building and installing rain barrels, sump pumps, and check valves (WaterWatch, *2013)*

In some areas, the presence of certain species (such as beavers) can be beneficial for flood control reasons. Beavers build and maintain beaver dams which will reduce the height of flood waves moving down the river (during periods of heavy rains), and will reduce or eliminate damage to human structures, at the cost of minor flooding near the dams (often on farmland).

Besides this, they also boost wildlife populations and filter pollutants (manure, fertilisers, slurry) (Gabe, 2009).

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

The methodology adopted for this study will be presented in this chapter. The research design, the population of the study, as well as the sample and sampling technique adopted for this study are also discussed. More so, the instrument used to source for data, validity and reliability of the instrument, the method at which data was collected and analysed will all be discussed.

3.1 Research Design

Descriptive survey research design was adopted for this study. The research design as defined by Ajayi (2008) is the specification of procedure for collecting and analyzing the data necessary to help solve the problem at hand, such that the difference between the cost of obtaining various levels of accuracy and expected value of information associated with each level of accuracy is measured. The research design for this study was descriptive survey.

3.2 Population of the study

Since we cannot study the whole town in the local government, five towns will be randomly selected for this study.

3.3 Sample/Sampling Techniques

The sampling procedure will be adopted with proportionately stratified random sampling. The researcher will select a sample from the resident's population which is equivalent to two hundred {200}. Some areas in Ijebu-Ode which are mostly affected by flood include;

6. Igbeba Road down to Oke Aje market area
7. Ayegbami/ New market
8. Oke-Owa road
9. Imowo Eleran road
10. Ibadan roads

3.4 Research Instrument

The instrument use for data collection is of two types: this use of primary source like questionnaire, Discussion and field observation. While the secondary source of data to be use includes academic journals, text book written on previous research conducted in different field of studies. It will contained structured items on **The Causes and Health Implications of Flood Disaster on Health and Life of People of Ijebu-Ode Local Government Area of Ogun State**

3.5 Validity of the Instrument

To ensure validity, the researcher's supervisor helped vet and edit the instrument and the researcher will also carry out a pilot study in two towns to determine content validity through the responses and results of respondents. Items that may fail to measure the variables as intended were modified or discarded completely. The towns that were used in the pilot study are excluded from the main study.

3.6 Reliability of the Instrument

The researcher will test the reliability of the research instrument by carrying out a test-retest to examine its reliability and for omission of content.

3.7 Procedure for Data Collection

The questionnaire was distributed by the researcher and six research assistant and the questionnaire will be collected back immediately as they finish answering the questions.

3.8 Methods of Data Analysis

Descriptive statistics of frequency counts and percentage will be used to describe the data collected in section A while inferential statistics of Chi-Square will be used to discuss the hypothesis at 0.05 alpha level.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF FINDINGS

This chapter is presented under the following heading; data presentation, analysis, interpretation and discussion of findings. The sample size for the study is 200 respondents and so 200 copies of the questionnaires were administered randomly to the identified respondents. The table below presents the response rate of field data collection. The data collected will be analysed and the results would be presented using the Chi-square method for testing association between two or more variable.

4.1 DEMOGRAPHIC INFORMATION

Below is the description of the socio-demographic characteristics of the respondents

Table 1: Distribution of Respondents by Sex

Gender	**Frequency**	**Percentage %**
Male	70	35%
Female	130	65%
TOTAL	**200**	**100%**

Table 4.1.1: Shows that 70 respondents which represent 35% of the total sample were male while the remaining 130 respondents (65%) were female. This shows that the sample covers all gander categories and is capable of showing if there are any discrepancies in opinion base on gender.

Table 2: Educational level of the respondents

Qualifications	**frequency**	**Percentage %**
Nigeria Certificate in Education	89	44.5

Ordinary and Higher National Diploma	57	30.5
Bachelor Of Science and Education	54	27
Total	**200**	**100**

From the table above it could be said that majority of the respondents despite all odds still find a means of getting educated as 44.5% of the residents are NCE Holders, 30.5% are polytechnic graduates while 27% of them are BSC holders from various awarding degree institutions.

Table 3: Religion status of the respondents

Religion	**Frequency**	**Percentage**
Christianity	126	63%
Islam	61	30.5%
Others	13	15.5%
Total	**200**	**100**

From table 3 above, 63% of the total participants were Christian, 30.5% were Muslims and 15.5% were traditional religion practitioners.

Table 4: Distribution of participants according to Occupation

Occupation	**Frequency**	**Percentage**
Farmer	22	11%
Trader	90	45%
Artisan	17	8.5%
Others	71	35.5%
Total	**200**	**100**

Hypothesis 1: The residents' age and flood disaster

S/N	ITEMS	SA	A	*D*	SD
1	The effect of flooding could lead to psychological distress among flooded adults	113 (56.5%)	68 (34%)	12 (6%)	7 (3.5%)
2	Flooding is caused due to Heavy rainfall	81 (40.5%)	98 (49%)	15 (7.5%)	6 (3%)
3	Broken dams caused flooding disaster	92 (46%)	82 (42.5%)	20 (10%)	3 (1.5%)
4	Lack of proper vegetations is one of the causes of flooding	66 (33%)	95 (47.5%)	32 (16%)	7 (3.5%)
5	Blockages of urban drainage basins with refuse could lead to flooding	106 (53%)	90 (45%)	17 (8.5%)	5 (2.5%)

Alternative	**Response**	**%**	**Df**	**CRT/V**	**CAL/V**	**DISCUSSION**
SA	113	56.5	-			
A	68	34	3	7.82	1.12	Accepted
SD	12	6	-			
D	7	3.5	-			
Total	**200**	**100**				

Table 4.2.1 shows that in item 1 of the questionnaire 113 residents representing 56.5% strongly agreed that the effect of flooding could lead to psychological distress among flooded adults, 68 residents representing 34% do agree to the same position. However, 12 residents representing 6% disagreed with this assertion while 7 residents representing 3.5% strongly disagreed with the same opinion. It has been observed from item 2 that 81 residents representing 40.5% strongly

agreed, 98 representing 49% agreed too, while 15 residents representing 7.5% disagreed and 6 residents representing 3% strongly disagreed to the statement. It is quite evident from table 3 that the highest frequency of the residents 92 representing 46% strongly agreed that broken dams caused flooding disaster, 82 residents representing 42.5% Agreed, while 20 residents representing 10% disagreed to this assertion and 3 residents representing 1.5% strongly disagreed. While the highest frequency of students in item 4 showing 95 residents representing 47.5% of the sampled population agreed that Lack of proper vegetation is one of the causes of flooding, while 66 residents representing 33% strongly agreed and 32 residents representing 16% disagreed that Lack of proper vegetation is one of the causes of flooding and 7 residents representing 3.5% strongly disagreed. Item 5 shows that 106 residents representing 53% strongly agreed that blockage of urban drainage basins with refuse could lead to flooding, 90 residents representing 45% agreed to the assertion while 17 residents representing 8.5% disagreed that blockage of urban drainage basins with refuse could lead to flooding and 5 residents representing 2.5% strongly disagreed to the statement. The calculated value was 1.12 at 3 degree of freedom and 0.05 alpha level. This is less than the table value of 7.82, therefore the null hypotheses is hereby accepted and this indicates that there is a significant difference between the residents age and flood disasters in Ijebu Ode local government area of Ogun state.

Hypotheses 2: Relationship between flooding and socio-economic activities of people

S/N	ITEMS	SA	A	*D*	SD
6	The potential for flood casualties and damages is also increasing in many regions due to the social and economic development	88 (44%)	90 (45%)	17 (12.5%)	5 (2.5%)
7	Loss of livelihood/ source of income are part of the social health implications of flooding	71 (35.5%)	95 (47.5%)	23 (11.5%)	9 (4.5%)
8	Drowning and animal bites during flooding could lead to health risk factors.	85 (42.5%)	84 (42%)	22 (11%)	9 (4.5%)
9	Flooding could lead to loss of lives and property	96 (48%)	80 (40%)	18 (9%)	6 (3%)
10	Flooding could lead to sustenance of serious injuries	94 (47%)	82 (41%)	19 (9.5%)	5 (2.5%)

Alternative	**Response**	**%**	**Df**	**CRT/V**	**CAL/V**	**DISCUSSION**
SA	88	44	-			
A	90	45	3	7.82	1.61	Accepted
SD	17	12.5	-			
D	5	2.5	-			
Total	**200**	**100**				

Table 4.2.2 shows that in item 6 of the questionnaire 88 residents representing 44% strongly agreed that the potential for flood casualties and damages is also increasing in many regions due to the social and economic development, 90 residents representing 45% do agree to the same

position. However, 17 residents representing 12.5% disagreed with this assertion while 5 residents representing 2.5% strongly disagreed with the same opinion. It has been observed from item 7 that 71 residents representing 35.5% strongly agreed that Loss of livelihood/ source of income are part of the social health implications of flooding, 95 representing 47.5% agreed too, while 23 residents representing 11.5% disagreed and 9 residents representing 4.5% strongly disagreed to the statement. It is quite evident from table 8 that the highest frequency of the residents 85 residents representing 42.5% strongly agreed that Drowning and animal bites during flooding could lead to health risk factors, 84 residents representing 42% also agreed while 22 resident representing 11% disagreed to the assertion and 9 residents representing 4.5% strongly disagreed to this statement while the highest frequency of residents in item 9 showing 96 residents representing 48% strongly agreed that Flooding could lead to loss of lives, property , 80 residents representing 40% agreed to the assertion, while 18 residents representing 9% disagreed and 6 residents representing 3% strongly disagreed to the statement. Item 10 of the questionnaire administered shows that 94 residents representing 47% of the sampled population agreed that Flooding could lead to sustenance of serious injuries, 82 residents in the study area also agreed to the assertion while 19 residents representing 9.5% disagreed to the statement and 5 resident representing 2.5% strongly disagreed to the statement. The calculated value was 1.61 at 3 degree of freedom and 0.05 alpha level. This is less than the table value of 7.82, therefore the null hypotheses is hereby accepted and this indicates that there is a significant relationship between flooding and socio-economic activities of people in Ijebu Ode local government area of Ogun state.

Hypotheses 3: Resident attitudes and environmental flooding

S/N	ITEMS	SA	A	*D*	SD
11	Poor attitudes of residents towards the cleaning of drainage could lead to flooding	124 (62%)	63 (31.5%)	10 (5%)	3 (1.5%)
12	Residents in Ijebu-Ode local government area are found of dumping refuse in drainage channels & roads which could in turn result to flooding during raining season	83 (41.5%)	95 (47.5%)	18 (9%)	4 (2%)
13	Necessary measures has been put in place to avoid flooding	67 (33.5%)	66 (33%)	44 (22%)	23 (11.5%)

Alternative	Response	%	Df	CRT/V	CAL/V	DISCUSSION
SA	124	62	-			
A	63	31.5	3	7.82	9.65	Rejected
SD	10	5	-			
D	3	1.5	-			
Total	**200**	**100**				

Table 4.2.3 shows that in item 11 of the questionnaire 124 residents representing 62% strongly agreed that Poor attitudes of residents towards the cleaning of drainage could lead to flooding, 63 residents representing 31.5% do agree to the same position. However, 10 residents representing 5% disagreed with this assertion while 3 residents representing 1.5% strongly disagreed with the same opinion. It has been observed from item 12 that 83 residents representing 41.5% strongly agreed that Residents in Ijebu-Ode local government area are found of dumping refuse on drainage channels & roads which could in turn result to flooding during raining season, 95 representing 47.5% agreed too, while 18 residents representing 9% disagreed and 4 residents representing 2% strongly disagreed to the statement. Item 13 of the questionnaire administered

by the researcher indicates that 67 residents representing 33.5% strongly agreed, 66 residents representing 33% agreed while 44 residents representing 22% disagreed that necessary measures has been put in place to avoid flooding and 23 residents representing 11.5% strongly disagreed to the statement. This shows that there is a strong relationship between residents' attitudes and environmental flooding in Ijebu-Ode local government area of Ogun state. The calculated value was 9.65 at 3 degree of freedom and 0.05 alpha level. This is greater than the table value of 7.82, therefore the null hypotheses is hereby rejected and this indicates that there is no significant difference between Resident attitudes and environmental flooding in Ijebu Ode local government local government of Ogun state.

4.3 Discussion of findings

The present study comes with a proposal stating that more studies could be done on a wider level using probability sampling techniques to strengthen the findings of the study and to support the health education intervention program on the causes and health implication of flood disaster on human development. The findings can also serve as motivation to the society, governmental and non-governmental agency working towards various control intervention against flooding.

Based on the findings in table 4.3 and 4.4 above which shows that findings from the study revealed that, 92 residents representing 46% strongly agreed that broken dams caused flooding disaster while 95 residents representing 47.5% of the sampled population agreed that Lack of proper vegetation is one of the causes of flooding. This is in agreement with the research carried out by Theron (2007). Theron in his research work on introduction to geographical information system observed that flood disaster are largely caused by multiple factors. This stemmed from human causes such as building on water ways, inappropriate disposal of waste, soil compaction due to vehicular and human movements. Again, hydro-meteorological causes such as excessive rain fall, poor drainage system, high rate of soil water holding capacity, especially between August-September also contributed to flooding as It is therefore evident that, floods are caused by human and hydro-meteorological factors

that, in turn, have disastrous effects on the people. The study also found that, floods had effects on building structures, movement that have consequent impact on the livelihood of the people. During floods, staple food crops such as maize, millet, groundnuts and leafy vegetables are affected. Cracks on walls, floors, strip and collapsed buildings are noticed (Theron, 2007).

Findings from the study in table 4.6 and 4.7 it could be observed that 71 residents representing 35.5% strongly agreed that Loss of livelihood/ source of income are part of the social health implications of flooding, 95 representing 47.5% agreed too, while 23 residents representing 11.5% disagreed and 9 residents representing 4.5% strongly disagreed to the statement. In general, the impact of flooding can be direct or indirect. According to Rachelle (2013) it could be said that direct impacts of flooding are relatively easier to predict than indirect impacts. The impacts of flooding toward urban areas that are dominated by human settlement are also different from the impacts toward rural areas that are dominated by agricultural lands as indicated in table 4.6 with 88 residents representing 44% strongly agreed that the potential for flood casualties and damages is also increasing in many regions due to the social and economic development. Floods that occur in different areas can damage and wash away homes, causing injuries and deaths (Rachelle, 2013).

It has been observed that Flooding also affected trade, at Ijebu-Ode local government area of Ogun state as transporting goods to the market becomes very difficult and that, customers are not able to get to the market on flood days. School children had to be carried shoulder high to school. This, according to the study of Water Watch, (2013), which indicated that flooding slows down business activities and some perishable crops got spoilt in the process.

Finally the researcher suggested that Proper drainage system, good planning of structures, proper waste disposal mass education on proper waste disposal practices and construction of roads and gutters if implemented could avert the incidence of flooding in Ijebu-Ode local government area of Ogun State.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECCOMMENDATION

5.1 SUMMARY

Floods are one of the disasters feared by people in society, because floods come with a high water discharge, inundate at a high level for a long time, and carry waste materials that interfere with activities in society. Flooding can also affect the quality of clean water in a region. Water is a natural resource that is very important for all life on earth, especially humans. Almost all human activities on earth use water, such as basic sanitation, washing, food and drinking, and so on. The water sources that are mostly used by people in Ijebu-Ode are rivers, lakes, reservoirs, and wells. Therefore, water pollution that results from flooding will be very detrimental to people who live in the area. There is need for the Federal Government of Nigeria to review reports made by previous researches (especially of recent) on Floods Risk Management (FRM), Integrated Flood Management (IFM), Flood Control measures, causes of flood, consequences of floods, Flood Mitigation, Flood Evacuation Methods, whether those reports were made by NGOs, Water Ministries, Environmental Agencies, Research Institutes or even individual researchers. Government can then look into the possibilities of implementing the necessary measures among them. Agriculture serves as the main source of employment in Nigeria, contributing over 40% of GDP. Therefore failure to implement climate change mitigation measures that could minimize floods can undermine Nigerian's drive of becoming one of top developing nations. For these reasons research reports and warnings issued by NIMET on flood predictions should be taken seriously by the government.

5.2 CONCLUSION

Consequences of floods in Nigeria were critically reviewed, in which causes of flooding were attributed to climate change, extraordinarily heavy rains and continued release of

excess water from artificial reservoirs. While sometime the dams were accidently broken or overfilled. The 2018 flood event in Ijebu-Ode exceeded the natural floodplains, and is one of the natural disasters Ijebu-Ode residents cannot forget in history, though its impacts may also be exacerbated by anthropogenic influences. Other reasons found from this review, are the poor channel maintenance of drainage channels. Scenes of the flood show settlements and infrastructure such as road at risk during inundation. The impact is great on populations and infrastructure due to the encroachment of urban facilities on floodplain, poor enforcement of physical planning regulations with respect to floodplain management and waterway planning. Prevention and sustainable management options has been emphasized. Therefore housing agencies should enforce planning regulations across the country to avoid urban unplanned settlements, and enlightening rural communities on the risk associated with riparian settlements.

5.3 RECOMMENDATIONS

The following were recommended based on the findings of this research work;

a. There should be efficient mapping, monitoring, and maintenance of all floodplains, sea coast, natural lakes and reservoirs (i.e. dams) in Nigeria.
b. Establishment of Efficient Monitoring Stations at each sea coast should be made.
c. There is a dire need for collaboration between hydrologists, remote sensing and GIS experts, environmental scientists, engineers, surveyors and other professional bodies, etc in monitoring the annual hydrological cycle and weather patterns as well as giving appropriate advice to the government.
d. As all prognoses available suggest that Nigeria will experience alterations in weather patterns throughout 21st century, with changes in temperature, rainfall, rise in sea level, therefore, data from NIMET should be obtained quarterly and measures should be implemented based on predicted future events.

e. Fast evacuation should always be carried out to minimize consequences of floods whenever they occur. This could only be achieved through supervision by serious minded personnel.
f. Both rural and urban dwellers of riverine and sea coast areas should be educated on the risk and consequences of floods or even compensated with safe alternative land.
g. Procurement of cutting-edge flood modeling, prediction and mitigation should be highly motivated.
h. Education of the public (Ijebu-Ode residents) against dumping of refuse in drainage channels and roads.

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APPENDIX

QUESTIONNAIRE FOR RESIDENTS

Dear Respondent,

The questionnaire below seeks your opinion on **The Causes and Health Implications of Flood Disaster on Health and Life of People of Ijebu-Ode Local Government Area of Ogun State**

The importance of this questionnaire is in partial requirement for the fulfillment of Nigeria certificate in Education (N.C.E.). It is designed for the purpose of research only; and all information supplied shall be treated with strict confidence.

Thanks for your anticipated co-operation.

SECTION A: INSTRUCTION

Kindly tick (√) in the appropriate columns key:

SA - Strongly agreed A - Agreed

D - Disagreed SD - Strongly Disagreed

SECTION B: DEMOGRAPHY

GENDER: MALE ☐ FEMALE ☐

AGE: 25-30 ☐ 31-36 ☐ 37-40 ☐ 50&above ☐

EDUCATIONAL LEVEL: N.C.E ☐ OND/HND ☐ B.SC/OTHERS ☐

RELIGION: CHRISTIANITY ☐ ISLAM ☐ OTHERS ☐

OCCUPATION: FARMER ☐ TRADER ☐ ARTISANS ☐ OTHERS ☐

NAME: _____

1. The residents age and flood disaster

S/N	ITEMS	SA	A	D	SD
1	The effect of flooding could lead to psychological distress among flooded adults				
2	Flooding is caused due to Heavy rainfall				
3	Broken dams caused flooding disaster				
4	Lack of proper vegetations is one of the causes of flooding				
5	Blockages of urban drainage basins with refuse could lead to flooding				

2. Relationship between flooding and socio-economic activities of people

S/N	ITEMS	SA	A	D	SD
6	The potential for flood casualties and damages is also increasing in many regions due to the social and economic development				
7	Loss of livelihood/ source of income are part of the social health implications of flooding				
8	Drowning and animal bites during flooding could lead to health risk factors.				
9	Flooding could lead to loss of lives and property				
10	Flooding could lead to sustenance of serious injuries				

3. Resident attitudes and environmental flooding

S/N	ITEMS	SA	A	D	SD
11	Poor attitudes of residents towards the cleaning of drainage could lead to flooding				
12	Residents in Ijebu-Ode local government area are found of dumping refuse on drainage channels & roads which could in turn result to flooding during raining season				
13	Necessary measures has been put in place to avoid flooding				