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INCIDENCE, PREDICTOR AND RISK FACTORS OF CARDIOVASCULAR ACCIDENTS AMONG PATIENTS ATTENDING NEUROLOGICAL AND CADIOVASCULAR CLINIC IN FEDERAL MEDICAL CENTRE, OWO, NIGERIA

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Abstract: **Stroke is a severe economic, social, and medical issue globally. Stroke and its risk factors epidemiological survey can assist in identifying those at higher risk and consequently support stroke preventive efforts. This study estimates the incidence, predictor and risk factors of cardiovascular accidents among patients attending neurological and cardiovascular clinic in Federal Medical Centre (FMC), Owo from 2019 to 2023. Descriptive cross sectional research design was adopted. Data were collected using a hospital based checklist developed by the researchers and instrument administered. Subsequently, data collected in the study were analyzed using descriptive statistics of both frequencies count and percentage representation. Findings from the study revealed that cardiovascular accidents among patients are more rampant in 2019 in cardiovascular and neurological clinic at FMC, Owo, Ondo state. Also, diabetes mellitus was found to be the most noticed risk factor of cardiovascular accident among patients attending neurological and cardiovascular clinic at FMC, Owo, in the period under study. Furthermore, results showed that there were more Male patients of cardiovascular accident compared to Female patients with cardiovascular accident from 2019 to 2023. However, there was no significant relationship amongst patients' gender and stroke type. According to results, stroke can be prevented or even eliminated by reducing or circumventing these modifiable risk factors. The public should be made aware of the risks associated with these modifiable risk factors for stroke, particularly systemic hypertension and diabetes. It was recommended that awareness of cardiovascular accident as a life-threatening condition should be exposed to the general public by the government and other health care providers, among others.**

Keywords: **Cardiovascular Accident, Incidence, Predictors, Diabetes Mellitus, High Blood Pressure, Modifiable Risk Factors and non- modifiable Risk Factors.**

1. INTRODUCTION

Cardiovascular accident (CVA), also regarded as stroke which occurs when an arteries of the brain becomes blocked, ruptured or impaired, resulting in death of an area of brain tissue due to loss of blood supply (Cerebral Infarction) (Chong, et al., 2022). Cardiovascular accident is one of the leading causes of death, accounting for 11.13% of the total death annually, and the main cause of disability worldwide (Habbibi-Koolaee, Shahmoradi, Niakan, Kalhori, 2018). There are different types of cardiovascular accidents, but the major types are ischemic, which occurs in almost 87% of stroke cases with the other type being Hemorrhagic (Mozaffarian et al., 2019).

The incidence of cardiovascular accident in Nigeria has been on the rise with 1.14 out of 1000 suffering from stroke in Nigeria (World Health Organization (WHO), 2020). According to 2019 data, stroke was second among ischemic heart disease leading to death and disability among non-communicable disease in Nigeria (Statista, 2022) with a population of over 200 million (Worldometers African countries by population, 2022). Hospital based studies in Nigeria showed that stroke is a leading reason for neurological admissions accounting for almost 70% of cases (Eze & Kalu, 2017). A 10-year retrospective study carried out by Ogun et.al, (2019), it was found out that out 2.4% of all patients presenting at the emergency room has a stroke case. In 2017, stroke was the ninth leading cause of death in Nigeria of all ages, rising from the tenth leading cause in 2007 data (Country profile, 2020). Cardiovascular accident (stroke) is a condition that affect every aspects of the survivor's life (Eze et.al., 2017). It diminishes the quality of life of the patient because of its adverse consequences on physical, psychological, emotional, social and economic status of the survivors (Lisabeth, Beiser, Brown, Murabito, Kelly-Hayes, & Wolf, (2019). Cardiovascular accident is one of the leading cause of death worldwide and World Health Organisation (WHO) projections shows it is likely to worsen in developing countries over the next decades (Ajidahun & Bekibele, 2020). Caregivers of people suffering from stroke also have a diminish quality of life as a result of the burden that comes with taking care of the patient, making them also prone to emotional distress (Efi, Fani, Vassilios et.al., 2017). Several risk factors predispose an individual to cardiovascular accident. Risk factors of stroke are generally classified into modifiable and non-modifiable risk factors (Bridgwood, Lager, Mistri, Khunti, Wilson, & Modi, 2018). Non modifiable risk factors of stroke include family race, gender and old age (Emeh et.al., 2018). Modifiable risk factors include hypertension, central obesity, dyslipidemias, heavy alcohol consumption, diabetes mellitus, ciggarate smoking and cardiac disorders (Emeh et.al, 2018). Sickle cell disease, oral contraceptives, vasculitis lesions and HIV are noted as novel risk factors for stroke. The most common risk factor in Nigeria is hypertension even though obesity, smoking, cardiac diseases and diabetes mellitus are also known risk factors in Nigeria (Emeh et.al, 2018).

According to a study conducted in Nigeria, the highest risk factor of CVA in the population is associated with high blood pressure (Sarrafzadegan & Mohammadifard, 2019). The prevalence of hypertension is on the high among the increasing population (Sarrafzadegan et.al., 2019). There are many other risk factors such as undiagnosed celiac disease, poor economic status, psychosocial factors, air pollution, poverty and low level of education (Micha, Michas & Mozaffarian, 2018). Some of the risk factors such as age, gender and family history are immutable (Bridgwood, et al., 2018). However, many other CVA risk factors can be corrected by lifestyle changes, social changes and medications (Bridgwood, et al., 2018). Cardiovascular accidents are followed by different complications among which the common complication for its survivor is falling (McDonnell, Hillier, Hooker, Le, Judd, & Howard., 2018). Falling is known to be a common complication consequent to cardiovascular accident, where both physical weakness, impaired postural control, physical paralysis, mental depression, mental fatigue and impaired cognitive function associated with stroke can induce regular falls (McDonnell, et al, 2018). Most patients suffering from cardiovascular accident, especially the ones that have encountered ischemic strokes are prescribed anticoagulants and antiplatelets as prevention against secondary stroke which could heighten their susceptibility to post-trauma and bleeding upon falling. Falling are more prevalent in this population compared to healthy individual (Wei, Liu, Chang & Liu, 2019).

In Nigeria, it's been recorded that 90% of stroke cases resulted from the modifiable factors such as hypertension, diabetes mellitus, heavy drinking etc. Recurrent stroke is said to be 80% preventable through optimal risk factor modification (McDonnell., et al, 2018). Stroke epidemiology is essential to comprehend the mechanisms of stroke, well-organized arrangement and effective application of stroke management strategies. Hence, the need for this study on incidence, predictor and risk factors of cardiovascular accidents among patients attending neurological and cardiovascular clinic in Federal Medical Centre (FMC), Owo.

Statement of the Problem

Globally, stroke is the second principal cause of death and physical disability (Howard, 2018). At the moment, one of the biggest issues in public health is stroke, which accounts for 7% of deaths (WHO, 2020). Over 23 million cases of stroke and 7.8 million deaths as a result of stroke are expected by 2030 respectively if there will be no proper intervention (Howard, 2018). According to global Burden of Disease (GBD) study in 2010, over 11 million ischemic stroke happened with 63% of them from middle-income countries (Statista, 2022). Because of difference in social class and economic status of rural and urban dwellers, probability of stroke incidence, its course and distribution of CVA risk factors such as hypertension, diabetes mellitus, ischemic heart disease, smoking, obesity and physical inactivity among these dwellers are different (Yew & Cheng, 2018).

Cardiovascular accident in Sub-Saharan Africa poses a serious threat to public health issue with high mortality than in advanced nations and incidence at a younger age (McDonnell., et al., 2018). There has been study in America by the American heart association with a plan to reduce death by CVA by 20% in 2020 by concentrating on seven important health factors and behavior that decreases the threat of CVA, which are not-smoking, physical activity, healthy diet, control of cholesterol, blood pressure and blood sugar monitoring (Benjamin, et.al., 2019). Considering the expected burden of cardiovascular accident (stroke) in the coming years and limited availability of organized stroke care centre in the country, it will make sense to emphasize the risk factors of these condition and population-based stroke prevention strategies. Hence, this study sought to determine the incidence, predictor and risk factors of cardiovascular accidents among patients attending neurological and cardiovascular clinic in FMC, Owo, Nigeria.

The objectives of the study are to determine the incidence of cardiovascular accidents among patients attending neurological and cardiovascular clinic in FMC, Owo, Nigeria, determine the predictor of cardiovascular accidents among patients attending neurological and cardiovascular clinic and finally to assess the risk factors of cardiovascular accidents among patients attending neurological and cardiovascular clinic in FMC, Owo, Ondo state, Nigeria

2. CONCEPTUAL REVIEW

This session reviews related literature on conceptual, theoretical and empirical discourse.

Concept of Stroke

Although the word "stroke" is connected to the Greek word "apoplexia," which means to have been hit by a lethal blow, it would be inaccurate to directly compare what has historically been called "apoplexy" to our contemporary definition of stroke (Schutta & Howe, 2016). According to Schutta et al. (2016), apoplexy is a general word used to describe a situation in which a patient experiences a "sudden abolition of all activities of the mind with the preservation of the pulse and respiration." "Rapidly developed clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than of vascular origin" was the definition of stroke given by the World Health Organization in 1970 (Aho et al., 1980). The American Heart Association and American Stroke Association now consider the World Health Organization's definition, which is still widely used, to be outdated due to significant advancements in the "nature, timing, clinical recognition of stroke and its mimics, and imaging findings that require an updated definition" (Sacco, Kasner, Broderick et al., 2018). The American Heart Association/American Stroke Association revised its approved definition of stroke in 2013 to include silent hemorrhages and silent infarctions, including those that occur in the brain, spinal cord, and retina (Sacco et al., 2018). Although the American Heart Association/American Stroke Association still uses the "traditional" clinical definition of stroke, the addition of "silent" pathology is noteworthy (Sacco et al., 2018). Moving toward a radiographic demonstration (tissue-based definition) of infarction or hemorrhage was the justification for this adjustment (Elsaid, 2020). According to Reeves, Bushnell, Howard, Gargano, Duncan, W., & Lynch (2018) a stroke happens when the blood flow to the brain is interrupted or diminished due to a blockage or leak of blood arteries. As a result, brain cells begin to die and the brain does not receive enough oxygen or nutrients (Schutta et al., 2016). Stroke is the primary cause of neurological impairment and the second greatest cause of mortality globally, behind ischemic heart disease (Reeves, Bushnell, Howard, Gargano, Duncan, & Lynch, 2018). Because it damages the blood arteries that supply the brain with oxygen, stroke is classified as a cerebrovascular illness (Reeves, et al., 2018).

The majority of strokes can result in disability or death, but many are curable (World Health Organization, 2020). Ischemic and hemorrhagic stroke are the two main types of cardiovascular accidents. Accordingly, "an episode of neurological dysfunction caused by focal cerebral, spinal, or retinal infarction" is the definition of an ischemic stroke (Sacco et al., 2018). Age, gender, race, and ethnicity are examples of non-modifiable risk variables that have been linked to stroke in people, while high blood pressure, diabetes, and obesity are examples of modifiable risk factors (Reeves., et al., 2018). It is impossible to overstate the importance of preventative healthcare, particularly when it comes to primary stroke prevention (Owolabi, et al., 2022). People must be aware of the risk factors for stroke and their own risk factors in order to make the appropriate decisions to regulate their surroundings (Owolabi, et al., 2022). People must also be informed about these risk factors. Stroke mortality decreased by 22.8% and the relative rate of stroke mortality decreased by 35.8% during the last ten years (Go et al., 2013). According to Go et al. (2014), this hasn't altered the reality that 795,000 people still suffer a new or recurrent stroke each year. The total cost of stroke and disability expenses is expected to be $62.7 billion, making stroke the largest cause of long-term disability (Go et al., 2014). Compared to other racial groups, Africans are disproportionately

affected by stroke (Center for Disease Control and Prevention, 2016). This is because stroke risk factors, such as diabetes, hypertension, and high cholesterol, are more common among Africans and may be changed by behaviour or lifestyle choices (Alkadri, Bhandary & Blessett, 2017).

Prevalence of Cardiovascular Accident in Nigeria

The incidence and prevalence of stroke have Non-communicable diseases accounted for over 600 deaths out of possible 100,000 in 2019, overtaking predominant previous causes such as communicable, maternal, neonatal and nutritional (World Health Organization, 2020). Cardiovascular accident now accounts for over 10% of death and 5% of disability-adjusted life years. Ischemic heart disease and stroke are the second and fifth contributors to age specific mortality in Nigeria (Global burden of Disease (GBD), 2019). In Nigeria, the incidence and prevalence have not been determined. However, according to information provided by an Ibadan Stroke Registry, there are 26 strokes for every 100,000 Nigerians each year (Osuntokun, Adeuja, Schoenberg, et al, 2017). Although more recent findings indicated a rising prevalence, these studies were conducted in hospitals, therefore they might not be reliable (GBD, 2019). While stroke accounted for 0.5% to 45% of neurological hospitalizations, its prevalence in hospital populations has ranged from 0.9% to 4.0% (Mozzafarian, Benjamin, 2016).

Stroke was the third most common cause of medical admissions at Ogun State University Teaching Hospital (OSUTH) (Ahmad, Boschi-Pinto, Lopez, Murray, Lozano, & Innoue, 2017), while it was the most common cause of neurological admissions at Lagos University Teaching Hospital (LUTH) (Danesi, Okubadejo & Ojini, 2017). Stroke was responsible for 5%, 8%, and 17% of medical fatalities at the University College Hospital (UCH) Ibadan, LUTH, and OSUTH, respectively (GBD, 2019). Accordingly, stroke seems to be a big issue in Nigeria and a significant financial strain on the nation's underdeveloped healthcare system (GBD, 2019).

Risk factors of Cardiovascular Accident

Since there are numerous types of stroke, it is more difficult to identify risk factors for this condition than for myocardial infarction, which is nearly always caused by large vessel atherosclerotic disease affecting the coronary arteries (Adams, Bendixen, Kappelle, Biller, Love, Gordon & Marsh, 2019). Ischemic and hemorrhagic stroke are the two basic types of stroke (Danesi, et al., 2017). There are two types of hemorrhagic strokes: subarachnoid and intraparenchymal. According to Adams, et al., (2019), ischemic stroke can be further classified into what have been called etiologic subtypes or categories believed to represent the causes of the stroke: cardioembolic, atherosclerotic, lacunar, other specific causes (for example, dissections, vasculitis, certain genetic disorders, and others), and strokes of unknown cause. Compared to myocardial infarction, which is almost always brought on by large vessel atherosclerotic disease affecting the coronary arteries, stroke is more difficult to identify risk factors for due to its many different forms (Adams, et al., 2019). The two primary forms of stroke are hemorrhagic and ischemic (Danesi, et al., 2017). Hemorrhagic strokes come in two varieties: intraparenchymal and subarachnoid. The following categories, known as etiologic subtypes or categories, are thought to represent the causes of ischemic stroke: cardioembolic, atherosclerotic, lacunar, other specific causes (such as dissections, vasculitis, certain genetic disorders, and others), and strokes of unknown cause (Adams, et al., 2019). Although there are some significant distinctions between the risk factors for hemorrhagic and ischemic stroke, there are also variations in the risk factors for the various etiologic types of ischemic stroke (Adams et al., 2019)

Stroke risk variables are closely linked to the high-risk category for stroke (Wang, Wu, Tu & Li, 2022). People of 40 years of age and older who fit any of the following descriptions are often regarded as having a high risk of stroke: Atrial fibrillation or valvar heart disease, diabetes, dyslipidemia, hypertension, smoking, being noticeably overweight or obese, not exercising or participating in light physical activity, and having a family history of stroke with three or more of the eight factors; (b) experiencing a stroke; or (c) experiencing a transient ischemic attack (TIA) (Wang, et. al, 2018). Any trait, quality, or exposure that raises the chance of suffering an accident or illness is considered a risk factor (World Health Organization, 2018). There are two categories of cardiovascular accident risk factors: modifiable and non-modifiable (NIH, 2018). Neither lifestyle modifications nor medical interventions can alter non-modifiable risk variables.

It is divided into two categories: lifestyle factors and medical conditions. Heart disease (myocardial infarction and atrial fibrillation), hypertension, asymptomatic carotid stenosis, diabetes mellitus, and hyperlipidemia are among the medical problems (Go et al., 2014). Obesity, excessive alcohol use, cigarette smoking, and physical inactivity are examples of lifestyle risk factors that may be changed (National stroke Association (NSA), 2019).

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3. THEORETICAL REVIEW

The theory employed for this study is Health Belief Model (HBM)

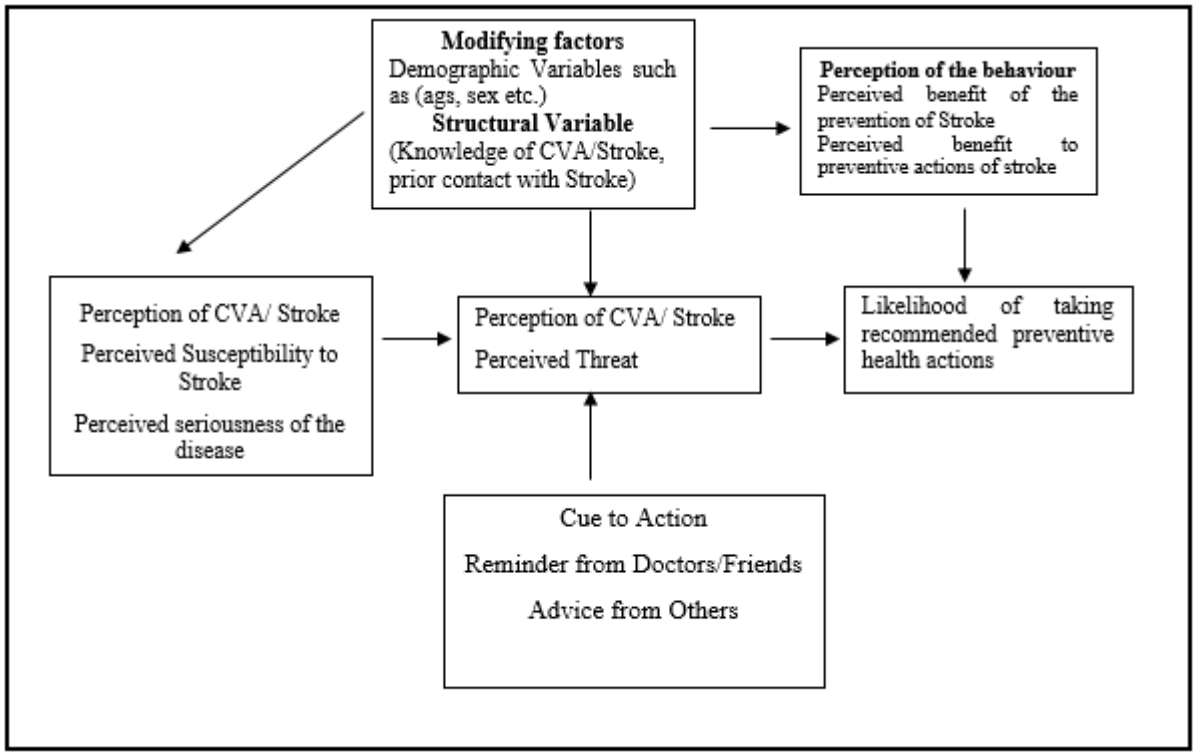

Fig.1: Diagram showing theory of Health Belief Model (Rosenstock, 1990).

The most widely applied theory in health promotion and education is the Health Belief Model (HBM) (Glanze, Rimer & Lewis 2002). It was created in the 1950s by social scientists working for the US government to better understand why individuals don't use screening tests for early illness diagnosis or disease preventive techniques. According to the concept, the chance that an individual would adopt a suggested health behaviour or activity is predicted by their belief in the personal danger of illness or disease as well as their confidence in the efficacy of the behaviour. The two components of health-related behaviour—the desire to prevent sickness or recover quickly after being unwell and the belief that a particular health activity would prevent or cure illnesses—are the basis of the HBM, which was developed from psychology and behavioural theory.

However, the model was altered to incorporate elements like personal opinions, variables that might influence the initial action, and modifying factors (Kozier & Erb, 2018). In the end, a person's views of the advantages and disadvantages associated with healthy behaviour frequently determine their course of action. The fundamental tenet of the original HBM is that individual attitudes toward a disease and the methods for reducing its incidence influence behaviour (Hochbaum 1958).

4. EMPIRICAL REVIEW

With more than 13 million new occurrences each year, cardiovascular accidents (strokes) rank as the second most common cause of death and disability globally (Morgenstern & Kissela, 2018). The most recent WHO data, released in 2020, shows that 57,744 stroke deaths—or 3.90% of all deaths—occurred in Nigeria. According to reports, prevention and improved management of risk factors were major drivers in the overall decline in incidence rates between 1990 and 2016 (Johnson et al., 2019). However, compared to the prior years, there was a rise in stroke cases, with the annual admission of stroke patients increasing by at least 10% between 2017 and 2018 and the decline of around 60% of the records in 2019 (Johnson et al., 2019). The general public's increased knowledge and preventive actions may have contributed to the drop (Johnson et al., 2019). Nonetheless, the institutions' records of stroke cases increased by double in 2020 and 2021, respectively. This increase may not be surprising given the global COVID-19 and post-COVID-19 pandemic local and international ease

policies, which left many patients powerless because they couldn't access hospitals and diagnostic facilities because of international lockdowns implemented by numerous nations to stop the threat and spread of the pandemic (Boehme, Esenwa, Elkind, 2017). Measures that prohibited public meetings, foreign travel, and social distance were implemented because there were no established treatments or vaccinations to combat the pandemic (Lofmark, & Hammarstrom, 2017). Public awareness campaigns on good handwashing, hygiene, and sanitation, mandatory house quarantines, and general lockdowns are further steps taken to combat the pandemic (Feigin et al., 2022). The frequency of cardiovascular accidents by age, sex, and ethnicity among the three main Nigerian ethnic groups admitted to MMSH Kano—Hausa, Yoruba, and Igbo—was assessed in a research conducted at the Mortala Muhammad Specialist Hospital.

According to the study, the average age of stroke was 56.30 for women and 58.20 for men. This was in line with the African mean age of stroke onset, which is 57.0 years (Cadilhac, Kim, Lannin, Kapral, Lee, Dennis, Norrving, & Meretoja, 2016). In contrast to the earlier data, which revealed an 87% incidence of ischemic stroke (IS) cases, the study also suggested that intracerebral hemorrhagic stroke (ICH) accounted for 74% of all stroke cases in the hospital (Mozaffarian et al., 2019). According to the study, stroke risk factors are linked to demographic and epidemiologic shifts caused in part by rural-urban drift, population growth, rapid economic development, aging, physical inactivity, and consumption of processed foods high in salt and cholesterol (Kumar, & Kelly, 2019). These changes result in hypertension and related cardiovascular diseases. According to reports, hypertension is a major risk factor for Black people (Adeloye, Ezejimofor, Auta, Mpazanje, Ezeigwe, & Adewole, 2019). In the Black community, smoking, diabetes mellitus (DM), and advanced age are additional known risk factors for intracerebral hemorrhagic stroke (Guo et al., 2019).

According to a different research conducted at the teaching hospital of Nigerian University, there may be a lower overall incidence of strokes in rural areas compared to urban ones, or there may be differences in the ways that people seek medical attention. According to research from Nigerian urban teaching hospitals, between 9% and 12% of medical admissions were due to stroke (Ekenze, et al., 2018). The timing may be the cause of the differences with the results of this study. The other research examined admissions data from 1995 to 2007. The growing rate of stroke in Africa is consistent with this disparity (Feigin, et al., 2017). There was a male majority among acute stroke cases in our investigation, which is consistent with findings from other studies (Akpalu, et al., 2019). The hospital's sex ratio may reflect the community's as male sex is a known, non-modifiable risk factor for stroke (Haast, Gustafson & Kiliaan, 2012). This study's top modifiable risk factor was hypertension, which is consistent with findings from a number of other studies conducted in Africa and other parts of the world (Wang, et al., 2017). It is generally known that hypertension is linked to both ischemic and hemorrhagic stroke, and that treating hypertension can lower the risk of stroke by as much as 40% (Guzik & Bushnell, 2017). The percentage of dyslipidemia reported in this study was lower than that of the Owolabi et al. (2022) case-control study and greater than that reported by Andrew, & Spine (2016). Given that this study reviewed old medical records, which may include missing lipid profile values, the percentage of assessed risk variables, such as lipid profile, is probably underestimated. The patient death rate in this study was greater than in Brazil, Japan, Spain, and Canada, but comparable to earlier studies conducted in Madagascar and Nigeria (Bridgwood, et al., 2018). This disparity might be caused by a number of reasons, such as population genetic variations, healthcare service quality, socioeconomic position, and health-seeking behaviour. Age beyond 65 was linked to worse outcomes and increased mortality, according to this study, which supported findings from other Nigerian investigations (Bridgwood, et al., 2018)

According to recommendations for stroke management, where treatment in a stroke unit is critical, patients who were handled in the stroke unit had better results than those who were managed in the general medical wards (Langhorne & Ramachandra, 2020). A crude prevalence of 851/1000 was found by a more recent community-based research conducted in Nigeria's Niger Delta (Onwuchekwa, Tobin-West & Babatunde, 2016). According to Nicoletti, Sofia, Giuffrida et al. (2016), the prevalence of our study is lower than 174/100,000 from rural Bolivia but comparable to 143/100,000 reported from rural Kashmir in India when compared to the results of previous similar household surveys like ours. Bombay, India, recorded far higher numbers (424/100,000), whereas Cotonou, Benin, reported 461/100,000 (Cossi, Gobron, Preux et al., 2014). The study also discovered that 17.6% of stroke cases had heavy alcohol usage, tobacco use, obesity, and hormonal contraceptive use for family planning. Although heavy smokers are more likely to have a stroke, quitting smoking lowers the chance of developing the condition, suggesting that the effects of tobacco use are dose dependent. (Bonita, Duncan, Truelsen, Jackson, & Beaglehole, 2017). Only two (11.8%) of the stroke cases had diabetes mellitus, and two (11.8%) of the stroke cases were repeat strokes, according to the research (Bonita et al., 2017).

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5. METHODOLOGY

This session focuses on research design, research setting, target population, sampling technique, instrument for data collection, validity of instrument, reliability of instrument, method of data collection, method of data analysis and ethical consideration.

Research Design and setting

This study adopted a descriptive cross sectional research design. The research setting is the FMC, Owo, Ondo State, Nigeria. It has a land mass of 58.5 hectares. Administration and clinical activities commenced in the hospital in 1993 and 1994 respectively. The hospital undertakes all functions of Federal University Teaching Hospitals except training of medical students. Its mission includes developing quality service delivery through necessary infrastructures that enhance effective and efficient services. The departments at the hospital include, clinical directorate, head of clinical services, internal medicine, orthepaedic and trauma, pharmaceutical services, obstetrics and gynaecology, nursing services, radiology, family medicine, psychiatry, physiotherapy, opthamology, dental services, Community health, emergency services, surgery, anaesthesia, dietetics, pathology, paediatrics, renal unit, staff medical services, cardiovascular clinic and neurological clinic.

Target Population and Sampling Technique

The target population of this study is all the patients attending neurological and cardiovascular clinic of Federal Medical Centre, Owo, from January 2019 to December 2023. A convenient sampling technique was used to collect data on risk factors for cardiovascular accident among cardiovascular and neurological patients in FMC, Owo

Inclusion and Exclusion Criteria

The record on database irrespective of age, gender, race and stage that attended neurological and cardiovascular clinic of FMC, Owo, Nigeria between January 2019 to December 2023 was used, while patients who were on admission in other clinics in the hospital during the period under study were excluded.

Instrument for Data collection

The instrument used for data collection of the study is an observational checklist, developed based on the objectives of the study. The checklist was used for manual collection of primary data of the patients. It was used to collect data from the case notes and hospital records of patients who attended neurological and cardiovascular clinic of FMC, Owo, Nigeria. The checklist is divided into two sections in which the first section was for the demographic data of the patients and the other section was used to collect data in line with the objectives of this study. A one-year record on data base of patients was also used to determine the proportion of patents with risk and those who presented with CVA among patients that attended cardiovascular and neurological clinic in FMC, Owo between January 2023 to March 2024.

Validity of Research Instrument.

The research instrument was thoroughly assessed for face and face content validity. In face validity, the checklist was properly scrutinized, modified and amended to ascertain the face validity. Remarks, Feedback, comments and observations were used to make corrections on the checklist, to ensure data collection in line with the research purposes.

Method of Data Collection.

Patients case notes and hospital record books of the patients that attended neurological and cardiovascular clinic of FMC, Owo, Nigeria from January 2019 to December 2023 were manually screened. Using the checklist adopted for this study, data of patients with cardiovascular accidents including their socio-demographic characteristics, risk factors present in them and treatment were extracted. Data were collected with the help of two trained research assistants from the record department of the hospital.

Method of Data Analysis.

The data was subjected to analysis using descriptive and inferential statistics at 5% level of significance. Chi-square and T-test were used to determine the association between variables. All analysis was carried out using IBM SPSS (Statistical Package of Social Science) version 23 at 0.05 alpha level.

Ethical Consideration.

We got approval for ethical consideration from FMC, Owo, where we were granted access to the case notes and hospital records of patients needed to carry out the study. The respondents were assured of the confidentiality of information provided by keeping secret their identities.

6. PRESENTATION OF RESULTS AND SUMMARY OF FINDINGS

This session presents the findings of this study and analysis of the data gathered on the incidence, predictor and risk factors of cardiovascular accidents among patients attending neurological and cardiovascular clinic in FMC, Owo, Nigeria from 2019 to 2023. The results of the analysis were then tabulated and presented as follows.

Demographic Data of the Patients

Table 2: Demographic Characteristics and clinical variables of stroke patients attending neurological and cardiovascular clinic in Federal Medical Centre, Owo, Nigeria from 2019 till 2023

Variable	Frequency (N=148)	Percentage (%)
Gender		
Male	87	58.8
Female	61	41.2
Age Group		
Less than 40	32	21.6
Older than 40	116	78.4
Ethnic Group		
Yoruba	83	56.0
Hausa	27	18.2
Igbo	38	25.8
Stroke Type		
Ischemic (IS)	44	29.7
Hemorrhagic (HMG)	50	33.8
Transient Ischaemic (TIS)	54	36.5

Source: Field Survey, 2024

The clinical and demographic characteristics of stroke patients who visited the FMC, Owo cardiovascular clinic. Males made up 87 (58.8%) of the 148 records of stroke occurrences throughout the study period, while females made up 61 (41.2%). According to the incidence by ethnicity, there were 38 (25.8%) Igbo, 27 (18.2%) Hausa, and 83 (56%) Yoruba. Additionally, 32 (21.6%) of the incidence was found in individuals under 40, and 116 (78.4%) in patients over 40. Of the stroke types that occurred among the patients, 50 (33.8%) had an intracerebral hemorrhagic (ICH) stroke, 44 (20.7%) had an ischemic stroke, and 54 (36.5%) had a transient ischemic attack (TIA). The incidence of left impairment accounted for 44 (29.7%), while that of the right 86 (58.1%), and incidence of both sides (bilaterally) constituted 18 (12.2%) of the recorded cases.

Answer to Research Objectives

Research Question One: To determine the incidence of cardiovascular accidents among patients attending neurological and cardiovascular clinic in FMC, Owo, Nigeria?

Table 3: Yearly Distribution of the Incidence of Cardiovascular accidents among patients attending neurological and cardiovascular clinic in Federal Medical Centre, Owo, Nigeria

YEAR	FREQUENCY	PERCENTAGE
2019	39	26.3
2020	37	25.0
2021	20	13.5
2022	26	17.6
2023	26	17.6
Total	148	100.0

Checklist 2019 to 2023. Authors' computation

Interpretation

The total number of patients' folders assessed at neurological and cardiovascular clinic in Federal Medical Centre, Owo, Nigeria is 148. The highest incidence of cardiovascular accident among patients attending neurological and cardiovascular clinic in federal medical centre, Owo was found in the year 2019 (26.3%), the table and figure further showed that cardiovascular accident was less rampant in the year 2021 at federal medical centre, Owo with (13.5%). In conclusion, the result indicated that the folder assessed revealed that cardiovascular accident among patients in federal medical centre are more rampant in 2019 in cardiovascular and neurological clinic at Federal medical centre, Owo, Ondo state.

Answer to Research Objective Two

Research objective two: To determine the risk factors of cardiovascular accidents among patients attending neurological and cadiovascular clinic in Federal Medical Centre, Owo, Nigeria

Table 4: The common risk factors of cardiovascular accidents from 2019 to 2023 at FMC, Owo, Ondo state

Risk Factors	Frequency	Percentage (%)
Hypertension	35	23.6
Diabetes Mellitus	19	12.8
Family history	19	12.8
Obesity	19	12.8
Alcoholism	20	13.5
Smoking	21	14.3
Ethnicity	3	2.1
Atrial Fibrillation	12	8.1
Total	**148**	**100.0**

Checklist 2019 to 2023. Authors' computation

Interpretation

The table above provides the common stroke risk factors of patients attending cardiovascular clinic of FMC from 2019 to June 2024. The stroke caused by hypertension contributed the most, with an incidence rate of 35 (23.6%) of the records obtained. This was followed by 21 (14.3%), Smoking, and 19 (12.8%) cases of diabetes mellitus. Family history and obesity) each contributed 19 (12.8%) respectively. Similarly, Ethnicity contributed just 3 cases (2.1%).

Research Hypothesis

H_{o1}: There is no significant relationship between patients' cardiovascular accident type and gender of the patients

Table 5: T-test analysis on the association between patients' gender and stroke type

Sex	Test	Hemmorhagic	Ischemic	TIA	Total	Df	X^2 value	P-value
Male	Observed	36	24	27	87			
	Expected	36.22	23.29	26.11				
	X^2 contribution	0	0.09	0.4				
Female	Observed	14	20	27	61	2	1.240	0.435
	Expected	13.71	18.89	28.54				
	X^2 contribution	0	0.11	0.64				
Total		50	44	54	148			

Inference

The table above showed the association between sex and stroke types in patients attending cardiovascular clinic at FMC, Owo. These included transient ischemic attack (TIA), ischemic stroke (IS), and ICH stroke. There was no statistically significant correlation between the kinds of stroke and sex (p-value = 0.553, DF = 2, $\varphi 2 = 1.186$). Given that the p-value exceeds the 0.05 alpha value, the hypothesis indicating that there is no significant association between patients' gender and the type of stroke is accepted. This implies that there was no statistically significant association between patient gender and the stroke type.

Conclusion

Overall, 148 patient folders from 2019 to 2023 were reviewed in this study, the total number of cardiovascular accident cases that presented themselves at neurological and cardiovascular clinic within the year 2019 to 2023 at FMC, Owo, Ondo State. The highest incidence was noticed in the year 2019, hypertension was also the most noticed risk factor of cardiovascular accident among patient attending neurological and cardiovascular clinic at FMC, Owo, Ondo state from 2019 to 2023. Majority of subjects in the accessed folder were males accounting 58.8%.

7. DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This session presents the discussion of findings, as well as conclusion and recommendations.

Discussion of the Findings

This study provides solution to the incidence, predictor and risk factors of cardiovascular accidents among patients attending neurological and cardiovascular clinic in FMC, Owo, Nigeria using hospital based data. Research Question one tends to proffer solution to the incidence of cardiovascular accidents among patients attending neurological and cardiovascular clinic in FMC, Owo, Nigeria from 2019 to 2023. Finding revealed that 148 cardiovascular accident patients folder were recorded in neurological and cardiovascular clinic in FMC, Owo, Nigeria from 2019 till 2023. This implies that the total number of patients suffering from cardiovascular accident within the 5 years of this study (2019 to 2023) is 148 patients. The study further shows that the incidence of cardiovascular accident was more rampant in 2019. This study is comparable to other studies that were carried out in the University Teaching Hospital, Benin (Omoti, 2023) which proclaimed that cardiovascular accident was responsible for 34.4% of patients' visitation to the hospital between 2016 to 2020.

Research question two sought to check the risk factors of cardiovascular accidents among patients attending neurological and cadiovascular clinic in FMC, Owo, Nigeria in the same period. From our study, we saw that diabetes mellitus was the most rampant risk factor for cardiovascular accident, followed by alcoholism 20 (13.5%), hypertension, family history and obesity were third most noticed risk factors of cardiovascular accident among patient at FMC, Owo with 19 cases (12.8%) each. Ethnicity was ranked last as the risk factor of cardiovascular accident from with just 3 cases (2.1%). This study is similar to one conducted by Reeves et al (2018), who found that stroke patients with diabetes had higher rates of stroke recurrence at 1 month (4.9% versus 2.6%) and at 2.6 years (15.2% versus 11.4%), as well as severe disability, higher mortality, and slower recovery following a stroke. This is also in agreement with past study carried out in Ilorin by (Bonita, et al., 2019) which reported that in line with Meschia et al. (2017), who found that diabetes mellitus more than doubles the risk for stroke and that 20% of people with diabetes will die from stroke, the risk factors for stroke were found to be systemic hypertension, tobacco smoking, excessive alcohol consumption, and use of hormonal contraception. The risk of stroke has been strongly linked to elevated systolic and diastolic blood pressure and appears to have a log-linear relationship throughout all ranges of arterial blood pressure among the population. Transient ischeamic attack was the second leading risk factor, and in a previous study, one-third of patients who had TIA went on to develop stroke within four years (Bonita, et al., 2019). The study further reported that 17.6% of the stroke cases were obese, smoked tobacco, heavily consumed alcohol and used hormonal contraceptives for family planning. The effect of tobacco smoking has been said to be dose related, as heavy smokers are more likely to develop stroke; however, the risk of having the disease reduces with smoking cessation years (Bonita, et al, 2019). In another study, it was recognized that large body mass can lead to increased stroke risk because of inflammation which is caused by excess fatty tissue that leads to increased difficulty in blood flow and increased risk of blockage, both of which can cause stroke (Daniels, Jacobson, McCrindle, Eckel, & Sanner, 2016). Research hypothesis determines the association between patients' gender and the types of stroke being suffered from, this study shows no association between sex and stroke.

Although prior research has documented sex differences in the incidence of stroke due to differences in body physiology (Petrea, Beiser, Seshadri, Kelly-Hayes, Kase, & Wolf, 2019), boestradiol promotes endothelial dilatation and blood flow, while testosterone has the opposite effects (Yu et al., 2015). The lack of a sex difference in the types of stroke likely indicates the influence of age, as the ages recorded were primarily postmenopausal. Oestradiol concentrations were found to drop dramatically during menopause (Adeloye et al, 2019). Therefore, vasoconstriction in older women is caused by the testosteronelike behavior of oestradiol decline.

Conclusion

Stroke is the third major cause of morbidity and the second leading cause of death worldwide. Stroke has a significant worldwide burden, including rising incidence, death, and economic effect, especially in low- and middle-income nations. There are two categories of stroke risk factors: modifiable and non-modifiable. Transient Ischemic Attack (TIA), family history, and prior stroke are frequent non-modifiable variables that are uncontrollable. On the other hand, most controllable variables are uncontrolled hypertension followed by uncontrolled diabetes and then other cardiac risks. Furthermore, cigarette smoking, obesity, excessive alcohol use, and physical inactivity are all regarded as modifiable risk factors for stroke. By managing or avoiding these modifiable risk factors, the frightening stroke can be reduced or even avoided.

In Owo, Ondo state, we found a high prevalence of stroke and a high risk population for stroke, along with associated risk factors for stroke among adults aged ≥40 years. The largest contributors to overall stroke were diabetes, hypertension, dyslipidemia, and a lack of exercise, alcohol, and smoking, followed by atrial fibrillation, obesity, and family history of stroke. The community needs to be educated about the risk associated with modifiable risk factors for stroke, particularly systemic hypertension and diabetes.

Recommendations

Based on the findings, the following recommendations were made:

1. Awareness of cardiovascular accident as a life threatening condition should be exposed to the public by the government and other health care providers.
2. The costs of care for patients with cardiovascular accident need to be augmented by the hospital, non-governmental agencies and kind-hearted wealthy ones so that the patients can survive, since most of them cannot cope with financial burden of the treatment.
3. Individuals should come to the hospital as soon as they observe changes in their body systems related to cardiovascular accidents, outreach programs should be conducted in the areas around the hospital and throughout the state.
4. Effective stroke education of patients by healthcare practitioners in primary care remains the key to lower incidence of stroke and eradication of unfavourable health attitudes.

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